

**Scaffolding understanding at a
conceptual level in an L2 academic
context: A SCT approach**

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ABSTRACT

Within the socio-cultural school of thought, Galperin, was influenced by Vygotsky's theory of mind. Following Vygotsky's argument about the leading role of instruction within the Zone of Proximal Development (ZPD), Galperin developed an instructional approach, known as Systemic Theoretical Instruction (STI), which encourages the active construction of materialized concepts and their monitored transformation into mental processes in order to foster development. Following from this, the present thesis aimed at investigating a) how knowledge at a conceptual level can be fostered and supported online, b) the affordances of an online (Moodle-based) Pedagogic Unit to potentially foster L2 English online academic training with specific reference to Applied Linguistics terminology (although the findings could be applicable to other disciplines as well) c) the effectiveness of the online scaffolding mechanisms that were developed for each online task and d) the students' views with regards to all the previous.

To this end, this study adopted an exploratory qualitative approach and collected various types of data to support conceptual development among 13 UK based L2 learners who were pursuing postgraduate studies. Importantly, while existing STI investigations have employed mainly qualitative data, the analysis conducted for this study included both quantitative and qualitative methods such as introspection techniques, recorded interviews, pre-post interview tasks, concept-mapping, online Moodle tasks and questionnaires, screen-captures and audio recordings of the online activities.

The findings revealed that the Moodle unit was a suitable environment in fostering the students' conceptual development and that specific scaffolding features and types of tasks have contributed towards this. Furthermore, this study contributes to the growing body of research into the potential role of scaffolding to enhance ZPDs in online environments in order to facilitate the L2 learners' English for Academic Purposes training. It also sheds light into the affordances of STI and online environments to develop the students' academic speaking and reading skills which, ultimately, contribute to overall conceptual development. Finally, it highlights the potential role of verbalisation (through introspection tasks, use of concept maps and oral presentations) as a means of both fostering and assessing conceptual development.

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1. Introduction

This chapter outlines the nature and scope of this research project and it locates the study in the wider research context in relation to English Language Teaching (ELT) and in the field of English for Academic purposes (EAP). It thereby emphasizes its significance for both these areas and ends by presenting the structure of the thesis.

1.1 Overview of the study

The current project set out to investigate how an online Moodle Pedagogic Unit fostered understanding at a conceptual level to users of L2 English in an academic context. Furthermore, the affordances of Moodle as an environment that fostered online academic training and the task types it offered were explored along with the effectiveness of the scaffolding mechanisms that were developed for each online task. To this end, this study employed two types of individual verbalisations to support the cognitive development of learners with the academic reading and speaking skills under focus. The last part of the study was to evaluate the students' opinions about the training pedagogic unit, the scaffolding options and Moodle's affordances in general.

The importance of using EAP reading and speaking skills within an academic environment according to Hyland (1997: 89) is more evident at a postgraduate level mainly because this level of students focuses mostly on consulting academic journals for their studies or delivering presentations at conferences. Furthermore, postgraduate students should already have mastered a certain level of academic skills for reading and speaking. However, their ability to engage in the conceptual understanding and knowledge necessary to successfully understand sophisticated, academic texts and deliver

effective academic presentations varies considerably. Thus, students at this level seem to understand text but at a rather superficial level, focusing on the basic meanings. The literature claims that there is still considerable ground to be covered especially by international students with lower IELTS levels (BALEAP, 2011). This is one of the gaps that the present research project seeks to address.

Moreover, some studies have established that university student use of reading strategies is related to their level of reading comprehension and that successful readers tend to be more active strategy users than less strong readers. However, these findings are based on studies using print texts. A large proportion of university reading and materials in general are now online though, which requires different skills and warrants for researching EAP training online (1.6).

Furthermore, according to Vygotsky, a pedagogical model should evolve around the object of learning which should be grounded on coherent and complete scientific knowledge. His proposal though was limited to the principle that “instruction must focus on the coherent presentation of theoretical concepts (i.e. scientific concepts) (Negueruela & Lantolf, 2006: 80). This is the principle followed in the present study’s online Pedagogic Unit whereby the core object of learning focuses on enabling learners to acquire scientific concepts by schematically presenting them to facilitate gradual online learning. This was achieved by employing concept maps and by revising Bloom’s taxonomy to address SCT and in particular, STI principles.

Systemic-Theoretical Instruction (STI) is a mode of instruction that takes into consideration the principles of Galperin’s theory (based on Vygotsky). The theoretical concepts are presented verbally (through speech and/or writing) and represented visually (through diagrams, pictures, etc.) to guide the learners’ actions. This study also hopes to contribute to the growing body of research into the potential role of scaffolding and ZPD

(see 1.5) in online environments to facilitate the L2 learners' EAP training. It explores the affordances of STI and online environments to scaffold the students' speaking and reading skills and lead to overall conceptual development and the potential role of verbalisation (introspection tasks, oral presentations) as a means of assessing conceptual development. The aim was to use Moodle which is an online environment as a space that can support (scaffold) the learners' development while interacting with the course tasks and tools to help them develop conceptually.

Emphasis was in particular on four broad areas: a. the importance of researching EAP reading and speaking skills and online training in particular, b. the application of STI theoretical approaches in developed units in online environments such as Moodle, c. the contribution of online environments such as Moodle in enhancing student conceptual development and d. the use of scaffolding in environments such as Moodle. The next sections will offer information on the areas in which the present research project has contributed and on the structure of the thesis as well.

1.2 The importance of the topic in English language teaching and EAP research

From an academic literacy perspective, understanding is seen as a primarily social, situated activity in which text is seen as dialogic and multi-voiced. Both author and reader are intimately intertwined in a dynamic process of meaning-making. Theorists in this area (Lantolf, 2008) recognise the socio-cultural nature of discourse viewed under the prism that communication is impossible without shared frames of reference, and patterns and conventions of language with which to mediate meaning. From a socio-

cultural perspective, however, reading and speaking are viewed as social practices, involving collaborative, co-construction of meanings between the (multiple) voices of the text and the reader (Bakhtin, 1994).

As Lantolf (2014) has mentioned by citing Tyler (2012: 7), Sociocultural Theory (SCT) L2 research has manifested ‘an interest in promoting classroom language development just like applied cognitive linguistics’ which explored ways of bridging the theory to bear on classroom practice. For the purposes of the current project academic reading as a skill will be approached by adopting the SCT theoretical approach. This includes seeing the development of reading as closely linked to the use of higher order cognitive processes such as reasoning, development of concepts, planning, voluntary attention, etc.

Finally, regarding speaking skills, most of the research in this field has focused on identifying the elements of successful seminar participation to address the learners’ problem with seminar speaking (Lynch and Anderson, 2001: 188). However, a very important aspect of academic speaking is the oral presentation and the present study aims at covering this gap.

1.3 The importance of researching the use of STI (developed units) in online environments

The STI approach was selected because it is in line with the present study’s aims and it allows for exploring the interaction of participants with a tool such as the computer and the online learning materials it provides. The theory also allows for exploring the pedagogic use of visual tools by suggesting the process in which concepts are developed

and how visual stimuli can support them (2.2.1). Verbalisations (i.e., explicating the concept and monitoring and evaluating one's performance) help learners to simultaneously internalize and communicate their understanding of the concept. Importantly, while existing STI investigations were conducted by employing materials in tangible form, there are no studies that have attempted to transfer these representations in online environments in order to exploit the affordances of learning environments for training purposes. Furthermore, while existing STI investigations have employed mainly qualitative data, the analysis conducted for the present study included qualitative data along with screen-captures and audio recordings of online activity. As it will be indicated later (2.2.2), most research to date on STI has focused on grammar. However, there is “no reason why it could not address any aspect of language, including pragmatics, vocabulary, discourse, and figurative language” (Littlemore & Low, 2006: 8).

Consequently, not only does my study aim at innovation by applying STI and its underlying concepts (supporting learners through their Zones of Proximal Development (ZPDs), internalization and verbalisation processes) within an online learning environment but it also ascertains the potential of scaffolding to support the internalization and teaching of EAP concepts online.

1.4 The importance of researching the contribution of online environments in enhancing student conceptual development

Within the STI framework and for the purposes of the current online study which broadly focuses on English for Academic Purposes (EAP) training, it is important that

these skills and the necessary knowledge are presented to learners as concepts that form the minimal unit of higher forms of academic verbal thinking (i.e. planning, abstract thinking, etc.) (Negueruela & Lantolf, 2006: 81). These concepts then constitute the primary means of mediating cognitive ability and it is therefore crucial that L2 learning is grounded and guided by “explicit conceptual understanding to promote learner awareness” (Negueruela, 2008: 204) by making use of appropriate online affordances. Negueruela (2008: 201), claimed that the emphasis on the teaching of concepts should be on “constructing understanding that has a direct reflection on oral communicative development”. In the present study, this is achieved and assessed by inviting the students to deliver academic oral presentations on academic articles (Appendix 1), which demonstrates whether the students were successful in establishing the relationships between academic article concepts and whether the students have internalised the L2 concepts for their individual communicative needs.

Once the target of instruction is established (in the current study the development of academic reading and speaking skills, section 2.3.2) the next step requires the construction of didactic models to “capture the complexities of the concepts” (Negueruela & Lantolf, 2006: 84). The online models should enable learners to “guide their performance and ultimately internalize the conceptual knowledge as a means of regulating their meaning making ability” in the L2 context (Salaberry & Lafford, 2006: 8). In Galperian terms this is achieved through the use of “Schema[ta] for the Orienting Basis of Action” (SCOBA). These schemata represent the concrete / materialized form of conceptual knowledge in a “holistic way to avoid rote memorization of purely verbal formulation of the knowledge” (Lantolf, 2011a: 308). For the purposes of the present study, concept maps were employed in order to capture the semantic networks between

various academic article elements. The maps also served as a way of structuring thoughts before delivering an oral presentation.

1.5 The importance of researching the use of scaffolding in online environments

Scaffolding, in the present study, should be perceived as a more general support mechanism to assist participants' development within their ZPDs: the ZPD is an abstract area, (in constant flux), of a person's cognitive development that defines the limits between which one can learn independently and within which one achieves development. Progress within the ZPD is observed when the scaffold is removed and the individual progresses from the completion of relatively simple tasks to more complex ones without that additional support. However, upon reaching the boundaries of the ZPD (i.e. a certain level of cognitive or, in our case, language related maturation), and in order for further learning and subsequent development to occur, the [learner] requires assistance through interaction (Lightbown and Spada, 2006:206), which could be with a more knowledgeable learner or the instructor. In the present study, this is provided by the environments' affordances that offer hints but also interaction opportunities to support learning.

1.6 The importance of researching EAP training online

The present research study offers an instructional design investigating a pedagogical approach based on SCT focusing on reading in a foreign language, academic

vocabulary comprehension drawn from selected academic articles and academic speaking when delivering an oral presentation within an English for Academic Purposes (EAP) context. It is essentially a trial of the STI approach that employs Moodle and other features of this online environment to support the learners' training. Moreover, attention was given to the role of academic concepts in the field of Applied Linguistics embedded in the learners' verbalisation activities, reading texts and speaking tasks. The training could have also been taken exclusively online however for the purposes of the current study students were in a class to receive controlled input, to prevent them from other distractions and to ensure that they would complete the tasks within the set time.

Emphasis is on offering EAP training online as some of the previous research on Moodle has traditionally compared systems and explained the affordances of various types of Moodle tasks. They have also indicated the environments' use within an L2 teaching context. There is, however, a significant lack of work which carefully addresses the issue of utilising Moodle to foster work within the ZPD or using Moodle traits to scaffold the learners' understanding at a conceptual level. These are the gaps that the present study will attempt to bridge. It should also be noted that the current study's findings are not only relevant to Moodle but also to any software with similar affordances.

1.7 Structure of the thesis

This thesis consists of six chapters which center around the study's four main research questions:

RQ1: How has the Pedagogic Unit (implemented on Moodle) fostered understanding at a conceptual level by users of L2 English in an academic context?

RQ2: How have the Moodle Pedagogic Unit's affordances for academic training (comprising of academic reading tasks and speaking advice) enabled participants to:

- (a) Understand academic texts at a conceptual level
- (b) Effectively deliver an oral presentation for academic purposes

RQ3: How have the various scaffolding mechanisms in each task supported:

- (a) The successful completion of the tasks
- (b) The participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes

RQ4: What were the participants' opinions and attitudes towards:

- (a) The Pedagogic Unit
- (b) The pedagogic environment, i.e., Moodle
- (c) The pedagogic tasks (i.e. reading tasks and oral presentation)
- (d) The scaffolding mechanisms

The present chapter (Chapter 1) is an introduction that contextualises the study within the general research field in EAP and ELT and also provides a justification for conducting it in order to address specific research gaps.

Chapter 2 is the literature review that offers a more detailed analysis of the background theories and concepts of the present study. It consists of four main sections that cover SCT and L2 development, Pedagogy and SCT, a SCT perspective on the development of reading and writing for academic purposes and an overview of open source Learning Management Systems (LMS). It ends with the research questions that the study addressed.

Chapter 3 details the research methodology that was followed for the present study. It begins with an overview of the study framework and design. A detailed account of the participants follows and the data-gathering instruments are also presented. Finally, the procedures for the data collection and analysis are described.

Chapter 4 reports the results of the main study. It consists of four sections and each section addresses the findings that answer a specific research question (RQ). The first section reports on the relative value of a Pedagogical Unit which was designed to foster understanding at a conceptual level by users of L2 English in an academic context. The main purpose was to assess the development and progress of the participants upon

completion of the training and as discussed in the literature review (Ch. 2) from a SCT perspective. The second section focuses on how the Moodle Pedagogic Unit has supported the development that was described in the first section. Following from this, section 3 presents findings about the value of the scaffolding mechanisms of the Moodle pedagogic unit and whether they facilitated the students' progress at a task level or if they have impacted on the students' conceptual development. Finally, section four presents the participants' opinions and attitudes towards a. The Pedagogical Unit, b. The pedagogical environments, i.e., Moodle, c. The pedagogical tasks (i.e. reading tasks and oral presentation) and d. The scaffolding mechanisms.

Chapter 5 is the discussion chapter where the findings that were presented in Chapter 4 are interpreted by taking into consideration other studies in the field. The chapter is organized into four sections, according to the number of the research questions. Finally, Chapter 6 concludes this thesis. It begins by summarizing the main research findings and then it focuses, at first, on the pedagogical implications of Systemic-Theoretical Instruction and on the implications for Moodle online training and SCT pedagogies. Then, the limitations of the study are also discussed and recommendations for future research are also provided.

2. Literature Review

2.1 Sociocultural theory (SCT) and L2 development

2.1.1 Introduction

Over the past decades there has been a major growth of interest towards the ideas of the Russian psychologist Lev Semenovich Vygotsky. This is reflected in the increased number of citations of Vygotsky's publications, in the various translations of his writings (Vygotsky, 1978, 1987) and in the several work biographies that have been published (Kozulin, 1990; Leont'ev, 1990; van der Veer and Valsiner, 1988, Wertsch, 1991).

The interest in his work has since then led to countless numbers of studies especially in psychology and education and several factors seem to have played a crucial role. One of them is the fact that many of Vygotsky's ideas seem directly relevant to issues in education and other applied fields (Moll, 1990). Moreover, one should also note the factor that Western scholars, especially those in the United States, have been exploring the application of new theoretical frameworks and Vygotsky's ideas seemed to address many of the issues that have motivated this quest. As Voss et al. (1995) have observed, the recent decade has witnessed "the Sociocultural revolution" with its focus on learning in out-of-school contexts and on the acquisition of intellectual skills through social interaction (p.174). Moreover, SLA research using a Vygotskian SocioCultural Theory (SCT) framework only began to appear in the mid 1980s, (i.e. Frawley and Lantolf, 1985). Since then, SLA work that incorporates Sociocultural theory has been devoted to better understanding L2 learning.

To appreciate the theoretical claims of SCT and the positions it argues for and by which contemporary research is driven forwards, it is important to understand that unlike other psychological theories, “it is grounded in a dialectic rather than a dualistic approach to the relationship between humans and the world” (Lantolf and Poehner, 2008). That is, SCT addresses the major question of the way people perceive the world (in its physical entity), given the mind’s abstract nature. The dialectic orientation to this problem, as Lantolf (2006: 165) states, starts from the assumption that “there is no mind-body dualism in the first place”. Therefore, the act of thinking in SCT does not constitute a reality that exists independently of the physical body but is a mode of existence of the body itself, “just as the mode of the legs is walking, the mode of action of the human body is thinking” (Ilyenkov, 1977: 35).

Vygotsky, following this line of reasoning, proposed that human consciousness emerged from the organic (i.e. dialectic) unity of our biologically endowed brains and our culturally created symbolic artifacts and activities. Lantolf (2009: 58) argues that “humans develop the capacity to use cultural means to gain intentional control over their brain rather than being controlled by this biological organ”. Lantolf (2009: 53) continues by suggesting that “instead of remembering only what the world presents to us as direct stimuli, we can remember voluntarily by creating what Vygotsky (1987) called ‘auxiliary’ stimuli of a physical (i.e. tying a knot) or of a symbolic (i.e. telling ourselves linguistically in oral or written form) nature”. Our thinking appears to follow a dialectic rationale that “is formed by ‘the abstract’ or theoretical domain and the ‘concrete’ or empirical realm” (Lantolf, 2009: 62). This dialectic relationship is the essence of Vygotsky’s theory, particularly regarding the relationship he argues that exists between everyday and scientific concepts. As Miller (2011: 96) outlines, “everyday or otherwise called ‘spontaneous’ concepts are formed on the basis of concrete experience and are

based on generalisations from superficial features of entities”. Scientific concepts, however, are formed based on systematic observation and they constitute the result of deeper knowledge and research.

Although Vygotsky did not formulate specific suggestions for implementing his theory, his colleagues and students devoted time in developing the theoretical framework that Vygotsky outlined (Arievitch and Haenen, 2005). Piotr Galperin was among those whose pedagogical theory is based on the Vygotskian principle that instruction constitutes a key element in driving development forwards (Lantolf, 2005). Arievitch and Haenen (2005) posit that the Galperian approach brought forward a pedagogical practice grounded on the Vygotskian idea of the instructional method and its influence in the construction of mental actions through specially organised teaching and learning activities. Galperin’s pedagogical model, known as Systemic Theoretical Instruction (henceforth STI) in the L2 context (section 2.2.2), was centred around a “specific sequence of instructional phases with an emphasis on materialisation and verbal explanation of the concept in achieving internalisation of the object of study” (Arievitch & Haenen, 2005: 158).

This approach exhibits strengths derived from the Vygotskian praxis-based principle of the dialectical unity of theory-practice “as an instrument of change” (Lantolf and Beckett, 2009: 259). Instruction and development are interwoven in “concrete practical activity” (Negueruela & Lantolf, 2006: 80). Therefore, schooled instruction should guide development by employing theoretical or scientific concepts which should also guide the knowledge gained from daily / everyday activities (Lantolf & Thorne, 2006: 292).

In the context of L2 learning and teaching, Galperin’s approach emphasizes the primary value of pedagogical activity to mediate L2 development (Lantof & Thorne,

2006). The element of instruction within this approach focuses on promoting theoretical concepts (such as academic discourse) in learners to enable the internalisation of such concepts. As discussed in Negueruela & Lantolf (2006: 98), the design of STI follows a “preferred procedure to promote the internalisation of the theoretical concepts”. Combined with the use of, for example, concept maps to orient the learners’ actions, this approach attempts to establish “the connection between visible explicit knowledge and its application in performance” (Negueruela & Lantolf, 2006: 98). Therefore, the ability to master the conceptual -higher-order academic knowledge- promotes overall development evident in learners who exhibit the skill of consciously reflecting and understanding specific scientific concepts for facilitating their communicative purposes (Lantolf, 2007a: 37). In sum, through the association and mapping of meanings and concepts, L2 learners can enhance their communicative abilities. This development can be supported through verbalisation, by means of self-explanation of concepts and by engaging learners in practical activities to establish connections and links between concepts and meanings.

In the sections that follow, major and core concepts and ideas of Vygotsky’s theory to L2 instruction and learning will be further outlined and explicated. The unique relationship of learning and development that has distinguished SCT from the cognitive views of SLA will be analysed resulting into a discussion of the concept of mediation which was proposed by Vygotsky to “account for the dialectic unity of biology and culture that gives rise to human consciousness” (Lantolf, 2009). The individual’s ability to master scientific concepts that are perceived by humans allows them to verbalise these abstract concepts and use them in practice. However, for the internalisation of the scientific concepts (see 2.1.3) to take place, Vygotsky argued that mediation is the first step. This process is supported within the Zone of Proximal Development (ZPD), an idea that was developed by Vygotsky to explicate and capture the dynamic interactions of

humans with their environment and other individuals but also to account for the influence of these interactions and their prospects of spurring development. The relationship between learning and L2 development that SCT posits, will therefore be considered in the following sections.

2.1.2 The nature of knowledge, learning, and L2 development

Regardless of the views of his time, in which “learning was regarded as an external process and development an internal process”, Vygotsky was concerned with the unity and interdependence of learning and development (Palinscar, 1996). Therefore, Vygotsky criticised Piaget’s theory according to which “maturation is viewed as a precondition of learning but never the result of it” (Vygotsky, 1978: 80).

Learning through the prism of Vygotskian theory refers to “an individual’s ability to perform a task with the assistance of others or with artefacts that are created by others” (Lantolf, 2007a: 698). The theory also reflects the Vygotskian notion of mediation. Learning and development are always mediated by either physical or psychological tools. For Vygotsky, learning is a “mediated process that originates in societal activity” and the role of interaction “developmentally underlies all higher functions and their relationship” (Stetsenko, 1999: 236). As Stetsenko (1999: 236) notes, the environment within which the human interacts with more capable peers “define[s] the direction and organisation of the individual’s cognitive development”.

Therefore, learning appears to be mainly about the internalisation of knowledge which can potentially lead to the creation of new tools to regulate an individual’s activity. Development on the other hand, and according to Lantolf and Thorne (2006) is the “internalisation of tools of the mind with the function of orientation (awareness and

control) through participating in socially mediated activity that is the re-structuring of higher mental functions (intentional memory, voluntary attention etc.)”. Development is then interpreted as a process of internalising psychological tools which could eventually result in certain psychological functions to attain self – regulation while performing an activity.

To illustrate this, Vygotsky (1987), theorised that children become conscious of their linguistic system and “all of its subtle detail as they learn how to control their linguistic system” during schooled instruction to fulfil communicative intentions (Lantolf & Thorne, 2006: 293). Schooled instruction, therefore, plays a crucial role in promoting a “deep conceptual understanding of how language functions in general” and “how various subsystems (i.e. phonology, morphology, etc.) are organised” (Lantolf and Thorne, 2006: 293). Within this setting, instruction is not contingent on “the developmental readiness of the child” but it “leads to the development of the child itself” (Lantolf, 2005: 337).

Turning to L2 development as a conceptual process, it “is the internalisation of new orienting tools for inter-intra personal communication” (Negueruela, 2003). Consequently, the goal of L2 teaching is not attaining communicative competence but rather communicative development. Development can occur in many possible ways, but as Negueruela (2003) argues “the organisation of properly articulated pedagogical activity that centres on conceptual development promotes both overall development and learning”. In Vygotsky’s view, development facilitates and leads the learning process while simultaneously learning feeds and leads development. This is what Vygotsky asserts that can be best achieved when working in the students’ ZPD (section 2.1.4).

Moreover, Vygotsky’s understanding of L2 development as a conceptual process is conceived as “the emergence of meaningful consciousness or conscious awareness through categories of meaning – i.e. concepts – which lead to linguistic control”

(Palinscar, 1996). Specifically, the conscious communication of scientific concepts can constitute measurable evidence of linguistic development. The act of employing tools of the mind such as the language when participating in activities generates the individuals' conscious awareness. Moreover, the crucial role of conscious awareness can be understood by further exemplifying the role of notions such as internalisation and mediation. According to Negueruela, "internalisation emerges from mediation through psychological tools, which foster development" (2003 ctd. in Lantolf, 2008: 192).

Finally, the development of an individual, including higher mental functioning (e.g., voluntary attention, reasoning, planning, etc.), was viewed as having social origins. This theme is best represented in Vygotsky's "genetic law of development" (Valsiner, 1987:67):

"Every function in the cultural development of the child comes on the stage twice, in two respects"; first in the social, later in the psychological , first in relations between people as an interpsychological category, afterwards within the child as an intrapsychological category...All higher psychological functions are internalised relationships of the social kind, and constitute the social structure of personality.

Vygotsky therefore, rejected the notion of an autonomous learner and that cognitive development is "exclusive within the individual's mind by means of biological mechanisms and internal processes" (Gánem-Gutiérrez, 2006: 235). Considering this, one could observe that new strategies and cultural world knowledge is acquired by learners as they develop by participating in a wide range of collaborative activities and by internalising knowledge while working together.

In sum, from a Sociocultural perspective, learning and development occur in socially and culturally influenced settings which are in constant flux. The next sections will explain in more detail the tenets of a key term in SCT that refers to the transfer of actions and functions within the social and physical world and among individuals: mediation (see 2.1.3), but first concept formation and conceptual development will be discussed.

2.1.2.1 Systemic and schematic knowledge vs. conceptual knowledge

This section will focus on describing the role of scientific and spontaneous concepts. Vygotsky's position on the relevance of theoretical concepts (scientific knowledge) for pedagogical practice and the importance he gives to well-articulated explicit knowledge (as the object of instruction and learning) are center stage and key for the present study.

To explicate this further, the role of systemic and schematic knowledge should be introduced at first. For Widdowson (1990), 'schematic knowledge' (e.g., the semantic networks of concepts for the present study) is viewed through a cognitive prism as representative of the socially acquired knowledge. Therefore, the meanings of concepts represent societal beliefs which Widdowson contrasts with 'systemic knowledge'. The latter, in his view, is the knowledge derived from the formal properties of language, involving the interpretation of language from a syntactic and a semantic viewpoint. Therefore, in native language learning, an individual's schematic and systemic knowledge are said to develop simultaneously in a bidirectional way. Nevertheless, according to Widdowson, the experience of foreign language learning is quite different as

when learners encounter uses of the foreign language they are acquiring, ‘their natural inclination is to interpret them in reference to this established association’ and the concepts of their pre-existing L1 knowledge (Widdowson, 1990: 110).

However, this is not the case within SCT as “development within the educational practice is preceded by intentionally organized activity (i.e. teaching)” that “reorganizes and helps the mental behavior” to develop a deeper understanding and control over relevant concepts (Lantolf, 2011a: 306). In other words, teaching drives the individual’s development forward and the language that is used to refer to scientific knowledge can shape the learners’ mental thoughts. According to Vygotsky, this is achieved by acquiring scientific concepts which are “explicit concepts that are accessible to conscious inspection” (Lantolf, 2011a: 306). These concepts, within the SCT framework, arise from theoretical learning that involved investigating the concept in a systematic and principled way (Lantolf, 2007a: 40-41). Accordingly, Vygotsky advocated that the strength of scientific conceptual knowledge “resides in its potential to impart to learners greater understanding, awareness, control and creativity” (Negueruela, 2008: 193; Lantolf, 2011a: 307) and in turn can help learners to use concepts and knowledge independently to serve their communicative needs (Negueruela & Lantolf, 2006: 81). Spontaneous concepts on the other hand, reflect common-sense, and everyday beliefs that people live with but rarely articulate. However, contrary to Widdowson, Vygotsky stresses the role that language plays in developing thought processes: “Learning to direct one’s own mental processes with the aid of words and signs is an integral part of the process of concept formation”. He also observed that there is a striking discrepancy between the individual’s ability to form concepts and his/her ability to define them, which shows that “concepts evolve in ways differing from deliberate conscious elaboration of experience in logical terms”.

Consequently, the focus should be on the quality of the scientific knowledge that is presented to the learners to encourage conceptual development. According to Vygotsky, the pedagogical model should evolve around the object of learning which should be grounded on coherent and complete scientific knowledge. In Vygotskian thought, scientific knowledge is a special kind of explicit knowledge which is also systemic and to a certain extent complete. He advocated that the quality of cultural tools (i.e. concepts) is crucial to promote the developmental processes and their link to learning (Arievitch & Stetsenko, 2000: 240). His proposal though was limited to the principle that “instruction must focus on the coherent presentation of theoretical concepts (i.e. scientific concepts) (Negueruela & Lantolf, 2006: 80). This is the principle followed in the creation of the present study’s pedagogic unit whereby the core object of learning focuses on enabling learners to acquire scientific concepts by schematically presenting them to facilitate gradual learning. The concretisation of Vygotsky’s thoughts regarding how scientific concepts operate within the SCT of the mediated mind, was later expanded by the empirical work of his colleagues. One of Vygotsky’s students who has driven social theory forwards by explicating the process of presenting schematic knowledge to learners and linking social theory with pedagogy was Galperin. He proposed a systematic pedagogy known as “Systemic Theoretical Instruction” (STI) to promote language development through concept formation. Therefore, for the purposes of the present study conceptual development is defined as the learners’ ability to develop a higher level of understanding and engagement with scientific concepts by being, at first, gradually and schematically exposed to them until the learner attains self-regulation and the concepts are internalised without the need to rely on material/schematic representations to employ them.

Given that the present study focuses on the creation of an online training unit with a view to foster academic training and support student development by employing a variety of tools (scaffolds), it is worth noting that the pedagogic unit can function as the environment that will allow individuals to establish relationships with the various online “artefacts” of the unit, to receive assistance from the integrated scaffolds. This will allow them to develop a higher level of understanding of scientific concepts in their field of studies.

2.1.3 Mediation and mediated activity

Within SCT, Vygotsky laid the foundations for defining how all human activity is mediated. The concept of mediation has been widely discussed in a broad range of SCT literature (Wertsch b, 1985; van der Veer and Valsiner, 1991; Cole, 1996) as well as in SCT L2 research (Lantolf, 2000; Lantolf and Thorne, 2006). According to Wertsch (2007: 178), for Vygotsky “a hallmark of human consciousness is that it is associated with the use of tools, especially ‘psychological tools’ or ‘signs’. This translates as an indirect contact of individuals with the social and physical world, ‘mediated’ by the utilisation of signs. As Vygotsky (1978) posits, human mental functions (including voluntary attention, memory and reasoning) are organised and mediated by cultural artefacts (signs, symbols, numbers, etc.) and activities (i.e education, labour, etc.) in which humans take part (Swain, 2000). Cultural tools, which have both a social and psychological function, are appropriated or internalised ‘by acting upon and with them...in the course of actively reconstructing their meaning and function’ and this is possible ‘only through interaction with other people who already have the knowledge to deploy a given cultural tool (Stetsenko & Arievitch, 2002: 87).

According to Kozulin (1996), the issues of culture and learning have been inseparable for centuries due to the fact that one of the main goals of learning is the diffusion of culture from generation to generation. Vygotsky's (1981: 161) answer to this challenge lies in his notion that "it is through others that we develop into ourselves", alluding to the fact that for psychological functions to become an integral part of a child's cognition, they manifest themselves in the external world as interaction between the child and the people around her/him (Daniels, 2001). According to Kozulin et al. (1996), one of the innovative contributions made by Vygotsky was his idea that our sense of the world is shaped by symbolic tools acquired in the course of education and learning. He understood intellectual development in terms of intellectual tools such as language that we accumulate as we grow up in a society and which mediates the kind of understanding that we can form or construct.

Swain, building on Lantolf's and Thorne's definitions (2011: 8) has also referred to this process as *internalisation* by defining it as a process in which "symbolic systems take on psychological status". Lantolf and Thorne (2006: 62) also define this process as a stage at which individuals "voluntarily organise and control (i.e. mediate) their mental activities in the physical world" (Lantolf & Thorne, 2006: 62). Eventually, individuals achieve in "gain[ing] the capacity to perform complex cognitive and physical motor functions with progressively decreasing reliance on overt social assistance or mediation" (Thorne et. al., 2008: 262).

Karpov (1998) stressed the Vygotskian distinction between metacognitive and cognitive mediation. Metacognitive mediation refers to the process through which humans control their thinking by employing signs, whether implicitly or explicitly. In more detail, metacognition or self-regulation, entails "inwardly directed speech or inner speech derived from social speech" (Lantolf, 2011a: 309). As explained by Lantolf and

Thorne (2006: 72), “social speech aimed at regulating others also develops into psychological speech that is aimed at regulating our own mental (and physical) behavior” (i.e. inner speech). As Ganem – Guttierrez & Roehr, (2011: 298) argue, once inner speech is internalized by the individual, it begins to serve a self-regulatory function and influences mental activity. Given the non-overt nature of inner speech though, empirical investigation of this type of speech can be difficult since unlike private speech, inner speech is not audible and not externalized.

On the other hand, cognitive mediation has to do with “domain specific quality of semantic content of self – directed speech” (Karpov, 1998: 29). Such a distinction between two different types of mediation emphasize the fact that concepts can be understood as “meanings that culture constructs in assisting us to make sense of the world” (Lantolf, 2011b: 25). “Spontaneous concepts are formed during concrete practical experience whereas the scientific ones represent the generalisations of the experience of humankind that is fixed in science” (Karpov, 2003: 66). Resulting from the mediation process, the mastery of scientific concepts, (because of their abstract and generalised nature), enables us to liberate our thinking from the constraints of context specific spontaneous experiences and allows us to apply the abstract concept and function appropriately in any situation in which the concept may be relevant. Therefore, the context specific spontaneous concepts have limited applications and usage whereas scientific concepts allow individuals to employ them in a variety of situations due to the abstract nature that encompasses them. These concepts are found in language and they transfer academic meaning and content in speech as in the case of delivering an academic oral presentation.

2.1.3.1 *Mediating development: materialization*

Materialization, as described by Galperin (1969), refers to the use of objects and physical actions to represent a concept or strategy as a higher mental function while it is being internalised. The materialization stage enables the individual to concentrate on the concept or strategy that is to be internalized. The physical action and tools not only parallel the mental action that the individual will eventually internalize, but can guide this action (Galperin, 1969, 1985, 1992). Bodrova (1998) refers to the example of a “word window” where “children have a frame they use to place around each word as they read. The window materializes the concept of “word” as a separate entity, which is contained within the frame”. Therefore, the action of framing each word consolidates the mental process of seeing words as distinct entities.

When materialization occurs appropriately, it allows individuals to perform at the highest levels of their zones (ZPD, 2.1.4.2) — more specifically it facilitates the execution of tasks that are more difficult than ones they can perform without materialization. Moreover, the materialization of abstract concepts enables learners to develop higher mental functions that allow them to perform at a high level without external concrete support. Once an appropriate conceptual model or diagram has been provided to the learner by the instructor to facilitate the mastery of a given concept, the learner is encouraged to act within the materialisation level where mental development can be fostered. The concepts to be internalised by the individual need to be represented in a concrete material way to facilitate the internalisation process. It is not sufficient for the learner to be “exposed to the concept in a form of verbal explanation as spoken forms”, according to Lantolf and Thorne (2006), are “ephemeral”. Thus, according to

Galperin (3.3.1) the use of physical objects like diagrams or flow charts in the case of adults are an appropriate means of materializing complex concepts.

However, the temporary support character of both materialization and private speech should be noted. Once the mental actions are internalized, materialization serves no purpose. The assistance provided by materialization could be compared to the use of scaffolds (Wood, Bruner & Ross, 1976) because the latter are also designed to offer support initially and have to be removed as the learners' abilities develop.

2.1.3.2 Mediating development: verbalisation

The mastery of scientific concepts, which takes place through explicit and systematic instruction leads to a deeper understanding and control over a notion (Lantolf & Thorne, 2006). Vygotsky (1987) stressed that the mastery of such concepts entails much more than merely memorising verbal definitions of the concepts which, as Vygotsky warns, gives rise to verbalism or the inability to connect the concept to specific concrete practical activity. Within this view, language (i.e. verbalisation) is a “symbolic tool not only to control and organise the social world such as mediating interpersonal activity, but also to control and organise the psychological world, such as mediating intrapersonal activity (Ahmed, 1994: 158). Speech, therefore, plays a dual role since for Vygotsky it serves for cognition as well as communication.

As Swain (2006a) notes, verbalisation or “languaging” (her preferred term) is used to “mediate solutions to complex problems and tasks” (Swain, 2009: 5). These tasks normally include two particular types, verbalisation of the concept to oneself, or to others, and materialisation. “Languaging” defined as “the process of making meaning and shaping knowledge and experience through language” (Swain, 2006a: 98) can occur

during collaborative activity with peers or as “self-explanation” (Swain, 2011). However, verbalisation can serve the purpose of self-explanation, by utilising language as a tool to “generate explanation to oneself” (Swain, 2011: 115).

In the present study, the term verbalisation will be used and will be understood as a tool for mediating both cognitive and linguistic development as individuals interact with physical and psychological tools such as concept maps, diagrams and so on to support the development of cognitive ability. Verbalization was initially operationalized by encouraging students to think aloud at pre- and post-testing phases. This act also involved self-explanation as the purpose of ‘think aloud’ was to help learners think about the process they follow when reading academic articles. By explaining the process to themselves aloud, learners could use language as a scaffolding tool to regulate (or control) their ways of approaching academic texts and “make connections between the different pieces of new knowledge presented to them as well as between the new knowledge and the prior knowledge” (Knouzi, 2010: 25). At a later stage, the learners were invited to deliver oral presentations on academic article topics and therefore, verbalization was used as a tool for self and other explanation of scientific concepts.

2.1.4 The Zone of Proximal Development (ZPD)

One of the major contributions of the Vygotskian thought to pedagogy is the concept of the ZPD. The common conception of the ZPD presupposes “an interaction between a more competent person and a less competent person on a task, such that the less competent person becomes independently proficient at what was initially a jointly-accomplished task” (Chaiklin, 2003). The following sections will provide an introduction

to this concept, the ways in which conceptual development can be achieved within this framework and an overview of how ZPD has been employed in education research.

2.1.4.1 Introduction

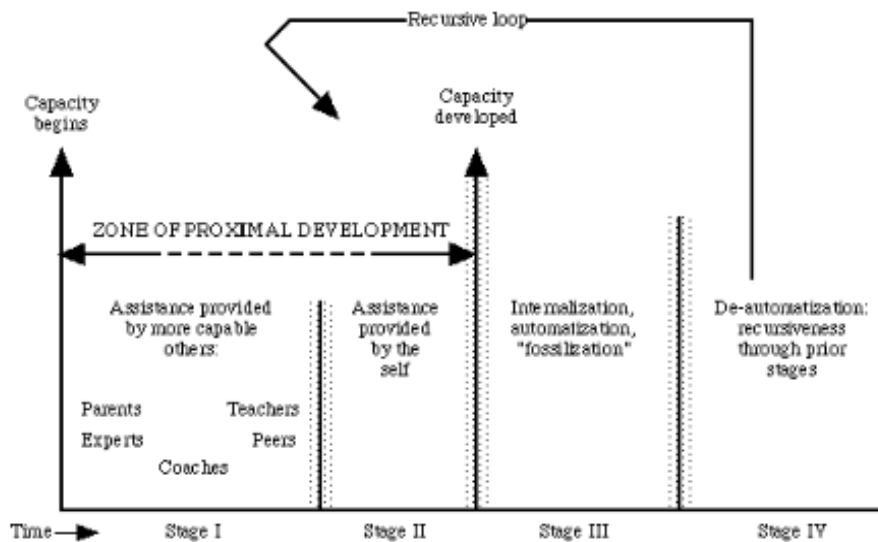
The original definition for the ZPD is “the distance between the actual developmental level, as determined by independent problem solving, and the level of potential development, as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978: 86).

As Lantolf and Poehner (2009) point out, although the ZPD has achieved great popularity in the research literature, there continue to be multiple and at times conflicting interpretations of this concept. Vygotsky’s insight that inter-mental functioning precedes intra-mental functioning led him to critique conventional approaches to (originally) assessment by arguing that to require from a learner to perform without dialogic interaction is that the mediator limits the scope of the assessment to only those functions that have already fully developed and ignores those that are still in the process of forming (Vygotsky, 1998). Vygotsky argued in more detail that the abilities that one possesses can only be revealed by exploring the individual’s responsiveness to input provided by the mediators. He thus, advocated a double method of evaluation that includes both independent performance to reveal an individual’s zone of actual development (what the individual can do already) and performance in cooperation with a mediator to uncover the ZPD, the potential that can be achieved by the learner that lies on skills that are still developing.

2.1.4.2 The ZPD

Several models of the ZPD have been implemented, including this 4-part ZPD suggested by Tharp and Gallimore (1988), which highlights a return to the ZPD via an infinite loop as learners move from one ZPD to another during the learning process.

Figure 2.1: The four stages of ZPD



The ZPD is the area in which instruction (i.e., socialization at home and formal teaching at school) and development “are interrelated from the child’s very first day of life” (Atkinson & Lantolf, 2011: 84).

With aid from social interactions, a learner can achieve a higher level of development at a quickened pace with the aid of input resulting from interaction with a person or entity who is more knowledgeable than the learner. The ZPD begins with the real ability of a student who is working independently, and the student’s future development is determined by his or her ability to use and internalize information resulting from mediation. Because each learner develops at his or her own pace, and has

his or her ability limitations, students who are seemingly at the same developmental level may or may not develop in the same way or at the same pace in the future (Anton, 2009).

Within the ZPD, at least one other participant is necessary to assist the learner in developing beyond his or her current learning level. This More Knowledgeable Other (MKO) is the person or entity (possibly a computer or software, etc.) that has more knowledge about a subject than the student does. These MKOs are meant to act as “mediators [who] do things with, rather than, for children” and adult learners alike (Atkinson & Lantolf, 2011: 29). With a “boost” from the MKO, the student can achieve a new level of understanding, thus changing his/her ZPD for the next task.

The individual is key in Vygotsky’s Developmental theory. According to SCT, higher-order thinking would not be possible without social interaction. A MKO (parent, teacher, tutor, older sibling, etc.), is responsible for supporting the learner according to his or her individual needs so that he or she is able to transition from a developmental stage that has already been mastered to a stage that can be reached with assistance. Without the social interaction from the MKO, critical thinking (and development of skills), would not be possible either. According to SCT, a student receives the most benefit when the MKO uses “scaffolding.” The metaphor of scaffolding is a set of successive steps upon which a student can achieve development through the ZPD and as a pedagogic tool to graded assistance.

Proper scaffolding within the ZPD requires five main attributes. First, it is imperative that the MKO builds interest and engages the learner in a particular activity. Once the student is interested in participating, the task should be broken down into smaller sub-tasks. The MKO then should keep the student focused on the main ideas of the task/assignment. Finally, the MKO should model one way in which a task could be

completed. The student/learner is expected to ‘imitate’ the MKO until internalization is achieved. The following section will further analyze language education within the ZPD.

2.1.4.3 ZPD and language education

From a Vygotskian perspective, the development of higher psychological functions is interpreted as the result of mediated activity. Thus, Vygotsky understands the development of higher mental functions such as voluntary attention, logical memory and concept formation as the consequence of the actual relations that develop between human individuals (Vygotsky, 1978).

As it was mentioned in section 2.1.3.2, Lee (1985) argues that Vygotsky’s approach means that language, when verbalized, ends up serving two major functions. The emergence of theoretical thoughts and logic is the aspect of language that relates to referential aspects of language use. “Inner speech”, on the other hand, is a “function of language used to represent the means-end and interpersonal aspects of communicative interactions” (Lee, 1985).

Following from this, Vygotsky (1987) argues that in a problem involving scientific concepts, the learner must, with the help of a teacher, achieve something that he has never achieved spontaneously. In other words, as Escandon & Sanz (2011) argue, “at the lower limits of the ZPD lie spontaneous or everyday concepts. Scientific or subject-matter concepts are situated at the upper reaches”. Within the ZPD, social activity generates knowledge which is co-constructed through the social interaction between the individual and the more capable peer.

Escandon and Sanz (2011), state that “L2 learning is a particular case of conceptual mediation, since the L2 concepts are being mediated no longer by everyday

concepts but by the whole conceptual-semantic system of the L1, including scientific or subject-matter concepts”. However, Lantolf and Thorne (2006: 301) clarify that, ‘while scientific concepts are explicit and conscious, not all explicit knowledge qualifies as scientific knowledge’. Negueruela (2008) also asserts that “whilst language development is predicated on activity, not every single activity fosters development”.

Negueruela’s concern lies in locating appropriate activities that spur L2 development. For example, grammar-translation instruction does not necessarily involve scientific concepts. The language rules being presented to students employ terms dissimilar to those that linguists accept in their scientific analysis of language (Sanz, 2010a, 2010b). However, as Escandon (2011) notes, instruction with a communicative purpose “does not necessarily make use of everyday concepts exclusively”.

The selection of appropriate activities and instructional design was crucial for enabling the learners of this study to achieve their goals and help them progress within their ZPD (Escandon & Sanz, 2011). The next section develops this idea by focusing on the relationship between ZPD and scaffolding.

2.1.5 Scaffolding and the ZPD

The notion of scaffolding has been an issue of wide discussion in the L2 pedagogic literature. Stone (1998) had critiqued “the metaphor of scaffolding” and called for enriching this framework, primarily since it appeared to apply to the field of learning disabilities. Following from this, Palinscar (1998) drew attention to the “atheoretical use of scaffolding that has become problematic” (p. 370). Palinscar called for “repositioning the metaphor in its theoretical framework,” “consider ways in which contexts and activities scaffold learning,” “and research the relationship between scaffolding and good

teaching” (p.1). Scaffolding is key for the present study and it is perceived as a general mechanism supporting the student’s interaction within his/her ZPD by providing gradual assistance for the completion of a task and that can be withdrawn once the commonly understood learning aims are achieved. The assistance can be even provided by an environment and be tailored to student needs based on continuous assessment while the success also depends on the active and dialogic participation of the learner.

In its original definition by Bruner (1975), scaffolding referred to interactions between a parent and a child or between an instructor and a student. The adult (parent, tutor) appeared to offer just enough support depending on the progress made by the child to complete a task. However, the notion of scaffolding has now assumed a different interpretation as the language classrooms have developed a project or design based approach. Within this environment the role of scaffolding is to function as a tool in the form of hints and prompts that supports the learning process. The great shift in interest lies in the fact that scaffolding does no longer focus solely on describing interactions between individuals but it also refers to the utilization of artifacts, resources and even online environments as scaffolding mechanisms. The scaffolding construct is now more widespread and support can be provided through paper and pencil tools (Puntambekar & Kolodner, 2005), technology resources (Bell & Davis, 1996; Jackson, Krajcik, & Soloway, 1998), peer interactions (Puntambekar, Nagel, Hubscher, Guzdial, & Kolodner, 1997), or teacher led discussions (Tabak & Reiser, 1997). As Hubscher and Puntambekar (2002: 1) note, “although the original description of scaffolding does little to explain the multifaceted nature of supporting learning in the complex environment of a design or project-based classroom, the scaffolding construct is increasingly being used synonymously with support”. To this extent, further details about the key features of scaffolding will be outlined in the following paragraphs.

Wood, Bruner and Ross (1976) have defined the term scaffolding as an “adult controlling those elements of the task that are essentially beyond the learner’s capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence” (p. 9). The role of various types of scaffolds is to provide assistance to the learner and facilitate the movement from actual to the potential development, i.e., to support learners while working within their ZPDs.

In line with this, scaffolding, in the present study, should be perceived as a more general support mechanism to assist participants’ development within their ZPD: the ZPD is an abstract area, (in constant flux), of a person’s cognitive development that defines the limits between which one can learn independently and within which one achieves development. Progress within the ZPD is observed when the scaffold is removed and the individual progresses from the completion of relatively simple tasks to more complex ones without that additional support. However, upon reaching the boundaries of the ZPD (i.e. a certain level of cognitive or, in our case, language related maturation), and in order for further learning and subsequent development to occur, the [learner] requires assistance through interaction with an interlocutor (Lightbown and Spada, 2006:206), which could be a more knowledgeable learner or the instructor.

Let us now turn to the role of the expert which is one of the most crucial aspects of scaffolding. According to the initial interpretation of scaffolding, a more capable individual, such as an instructor, helps an individual learner by providing him or her with exactly the help he or she requires to move forward (Bruner, 1975; Wood et al., 1976). Wood et al. (1976) have distinguished between six different supportive roles that an adult can assume: recruiting the child’s interest, reducing the degrees of freedom by simplifying the task, maintaining direction, highlighting the critical task features, controlling frustration, and demonstrating ideal solution paths. The instructor should be

viewed as a domain expert and as a facilitator who guides the development of the appropriate skills required for effective learning. The role of the knowledgeable adult here is not only to motivate the learner and provide the necessary support to accomplish specific tasks. As in the current study, the expert should also offer assistance by visually representing and modeling aspects of the subject matter to be acquired, by emphasizing the critical features of the tasks, and providing hints and questions that might guide the students' process of self-reflection (Wood et al., 1976).

Successful scaffolding also depends on a shared understanding of the goal of the activity. Although some elements of the tasks may be beyond what the individual could accomplish by working alone, (Rogoff 1990; Wertsch, 1985a) shared understanding of the activity, is considered crucial. According to Puntambekar (2005), this refers to inter-subjectivity, which is attained when the expert and individual "collaboratively redefine the task so that there is combined ownership of the task" and the individual "shares an understanding of the goal that he or she needs to accomplish". The expert's role, as in the present study, is to ascertain that the learner has understood the requirements of the activity and to help sustain motivation.

Providing appropriate assistance based on the continuous assessment of the individual's current level of understanding is essential. The expert should therefore not only have a thorough knowledge of the activity and the goals that need to be accomplished, but be in a position to identify the learner's skills that alter as the instruction progresses. Wood et al. (1976) stated:

The effective tutor must have at least two theoretical models to which he must attend. One is a theory of a task or problem and how it may be completed. The other is a theory of performance characteristics of the tutee. (p. 97).

The continuous assessment of the learners' skills at each stage of development within the ZPD could lead to a careful "calibration of support" (Stone, 1998), i.e., of the scaffolding, and consequently the expert can offer assistance in various ways. In the present study, this was attempted by providing in-built scaffolds and feedback that the students receive during their online training depending on the level or task score they have received (3.5.5). This is similar to the way an expert would employ a range of methods and strategies to provide support, by constantly fine-tuning the assistance based on the individual's changing knowledge and capabilities. Hence, this calls for a differentiation in the amount and types of strategies which should vary for different learners who are at different stages in their learning process, but also for the same learner over a period of time.

The essential component of this process is that the continuous assessment and adaptation of the provided expert support should be attained "through the dialogic and interactive nature" of scaffolded instruction. As Newman, Griffin, and Cole (1989) observed, "the appropriation process is reciprocal" (p. 58). Although the teacher's role is crucial in the instructional process, the learner should also engage as an active participant in order for the scaffolded interactions (in our case within the online environment) to drive the learning forwards. The interactive nature of scaffolded instruction (Reid, 1998), enables the expert to continuously evaluate the learners' level of understanding and to place the student at the center of the interactions.

2.1.5.1 Conclusion

After discussing the ZPD and its relationship to the mechanism of scaffolding, the final key theoretical feature of scaffolding is to remove the support provided to the

learner by withdrawing it gradually, so that the learner takes responsibility for learning. Therefore, in the present study, progression within the boundaries of the ZPD and with scaffolded assistance is understood as a transfer of responsibility from the expert (e.g., the computer) to the learner so that the scaffolding can be eventually withdrawn, as the learners enhance their ability for independent activity. According to Vygotsky, internalization is not a mechanical operation. Hence, from a SCT perspective, progress is perceived as the internalization of the steps of a process that allows the individual to generalize knowledge and perform an action in similar contexts in an automated way without any form of external support.

2.1.6 Research on scaffolding and the ZPD

This section is structured around the notion of scaffolding and how this has been applied in the ZPD in various L2 contexts. An overview of various pedagogic models that extended the theoretical foundations laid by Vygotsky and SCT will be provided, to set the framework within which the present study was developed. The last part will focus on a review of studies that have explored similar issues and their findings.

2.1.6.1 *Studies in the L2 context*

Wood et al. (1976) conducted one of the earliest known studies on scaffolding. In their study, 3-, 4- and 5-year-olds engaged in a task of building a pyramid from interlocking blocks. Each child was instructed individually following a set of guidelines for her tutoring. The instructor responded to the child's actions by encouraging the child to continue after having successfully assembled a pair of blocks. This type of intervention

developed into direct assistance by modeling, providing verbal prompts to enable the child to think about the task and offering verbal directions or reminders. Continuous assessment and gradation of support was taking place as the tutor's response depended on what the child achieved at any particular time. In this study, although younger children required more help, the instructor did not always follow the set guidelines in her interaction with the students but she adjusted her tutoring to meet the changing behaviors of the child. Hence, the tutor provided just enough assistance to help the child move forward, subject to the child's progress.

Following from this study, one of the most well-known studies on classroom scaffolding is the work on reciprocal teaching (Brown & Palinscar, 1985). According to Brown and Palinscar, the procedure they developed was "a form of expert scaffolding" and "reciprocal teaching [was] a form of expert scaffolding in the classroom" (p. 86). Palinscar and Brown's study was targeting the acquisition of four comprehension monitoring strategies by students – self-directed summarizing (review), questioning, clarifying and predicting. The learning process took place in an interactive classroom context where both the tutor and students participated in the process. Inter-subjectivity (which can be thought of as the extent to which two subjects can engage in conversation and dialogue that transcends their own worlds/minds) was achieved by getting the students to be active participants who understood the value and use of the strategies (Donaldson, 1978). The study's methodology encouraged the teacher to model the applications of the strategies to concretize them. If the passage students were working on was new, the teacher directed the students' attention to other elements of the writing such as the title. The responsibility for the comprehension monitoring activities was gradually transferred to the students. As students became more confident and independent, one of them assumed the role of a leader to guide the other learners of the group and clarify any

difficulties. During this process, feedback was provided to enable students to achieve competence.

These early interventions are key cases which indicate how the primary features (inter-subjectivity, continuous assessment, tailored assistance, fading) were achieved within a dynamic, interactive environment. Although, Wood et al.'s (1976) study demonstrated a one-to-one situation, the reciprocal teaching studies were conducted with small groups of learners in a classroom. In these studies, methodological factors such as the quality and quantity of support were varied, depending on the needs of particular learners. As learners attained higher levels of skills, the scaffolding was withdrawn, offering the learners more control.

In Lidz's (1991) study, a scale for measuring mediated instruction was used based on Vygotsky's notion of ZPD and Feuerstein's work on 'dynamic assessment.' Lidz employed a concept of scaffolding which "describes the tutor/mediator adjusting the complexity and maturity of the teaching interaction to facilitate the child's mastery of the task; providing support when necessary; and providing encouragement and prompts to the child to move ahead when ready" (p. 80). Lidz's methodology proceeded to the construction of a scale for concretely identifying and evaluating an adult's mediating behavior when actively interacting with a child in a learning experience incident. The scale consisted of 12 component behaviors to be observed in the adult which included among others intentionality, meaning, sharing of experiences, task regulation, psychological differentiation, affective involvement and challenge. A potential use of Lidz's scale was to observe any type of mediated teacher-learner or learner-learner interaction in the language classroom and to enable its classification.

Aljaafreh and Lantolf (1994) started identifying important characteristics of scaffolding in L2 contexts. According to these authors (p. 468), an effective tutor

intervention should have three characteristics: be "graduated" (sensitive to the learner's level of help required), "contingent" (offered only when needed), and "dialogic" (achieved through the medium of dialogue). This specific study focused on how negative feedback (error correction) was negotiated in tutor-learner interactions. The study findings indicated that the ZPD can vary for different learners and that both implicit and explicit feedback may be required for error correction depending on the extent to which the learner notices an error. As van Lier (1996) has argued, pedagogical scaffolding depends on careful and continuous organized observation of what is easy and difficult for specific learners, guided by "a long-term sense of direction and continuity, a local plan of action, and a moment-to-moment interactional decision-making" (p. 199).

A further study of the application of the concept of scaffolding to L2 acquisition is Adair- Hauck and Donato's (1994) study of a tutorial lesson in French. The authors' purpose was not simply to define scaffolding but also to explore the discourse strategies employed within the ZPD and the interaction network when teaching within the ZPD. The study illustrates that interactive instruction in the ZPD enhances skill-using before skill acquisition (in other words, performance should precede competence). Regarding methodology, as the ZPD lesson was progressing, the tutor's discourse strategies were gradually withdrawn as the tutees assumed task responsibility. During the lesson, intersubjectivity emerged between the tutor and learner since the task was no longer interpreted differently by both. A "temporarily established we" is reached since both achieve mutual understanding of the task requirements (p. 548), by reflecting on a shared perspective of the instructional situation.

Ohta (1995) also focused on examining peer scaffolding within the ZPD. Similarly to Donato's study, Ohta's methodology focused on analysing classroom interaction between a pair of Japanese language learners, one more advanced than the

other, and demonstrated that peer collaboration can positively enhance language development. The less advanced learner benefited from peer assistance and the more advanced learner experimented with refining her own language through the interaction to help her classmate.

Finally, researchers Anton and Di-Camilla, conducted a study of scaffolding during collaborative writing tasks in the Spanish L2 classroom. They carried out microgenetic analysis of the students' interactions and they mentioned the importance of repetition, private speech, and first language (L1) in the students' discourse as powerful tools of semiotic mediation (Anton & DiCamilla, 1998).

2.1.6.2 Conclusion

All the previous studies focused on researching the application of the scaffolding mechanism. Adair- Hauck and Donato's (1994) study in particular has informed the methodology of the present study in terms of exploring the students' planning and other strategies employed within the ZPD and their interaction network when teaching within the ZPD. The same applies for Ohta's (1995) study whose design for exploring peer-scaffolding has been adjusted for the present study's online peer-feedback tasks and general task model (section 3.5.5). The previous studies have also informed the theoretical principles of applying the scaffolding mechanism in studies in online environments for L2 learning. These studies will be discussed later on in section 2.4.5 of this Chapter after an introduction to the characteristics of these environments will precede.

2.2 Driving development: Pedagogy and SCT

The following subsections will offer an overview of various pedagogic models and of the ways in which they have linked (and/or applied) SCT with teaching contexts. Section 2.1.2.1. has addressed the difference between systemic and conceptual knowledge in Vygotskian literature, while section 2.2.2 builds on it by discussing an approach that was developed by Vygotsky's followers and which was adapted for the present study: Systemic Theoretical Instruction (STI).

2.2.1 Galperian approach

At the center of Galperin's theory is the nature of developmental cognitive change. Building on Vygotsky's ideas about internalization, Galperin conceived it as a transformation process that involves “certain material forms of individual external activity into other mental forms of the same external activity and as a specifically human form of appropriation of new knowledge and skills” (Arievitch & Haenen, 2005: 158). He contended three stages in the process of this transformation. These stages included progressing from physical action to oral verbalisation and, finally, to 'internal speech' (Galperin, 1989a, b, c). In his view, these internalized actions constitute the essence of the mind in terms of structure and content.

Moreover, the transformation of material actions into internalized 'mental processes' is a complex procedure that involves mastery of cultural tools such as higher mental functions. Therefore, exploring the process by which cultural tools are acquired (or learned) by individuals is crucial in studying cognitive development (Arievitch & Stetsenko, 2000).

Based on these theoretical claims, Galperin developed his mental action model where he interpreted actions as “conscious attempts to change objects according to some intended results” (Arievitch & Haenen, 2005: 159). The cornerstone of his approach places the analysis of instructional practices at centerstage based on different types of cultural tools, and emphasizes the developmental potential of different kinds of instruction.

This was the outcome of an examination of existing instructional practices, which according to Galperin failed to provide learners with the cultural tools that are most beneficial for their cognitive development. He contended that learners are not offered tools that enable them to construct their actions in a form that is most conducive to the efficient transformation of these actions into the instruments of mind. Instead, learners are often faced with fragmented phenomena that are supposed to be learned by simply memorizing them. For Galperin each concrete form of an action can be characterized by “two relatively independent properties – the level of abstraction and the quality of an action” (Haenen, 2001: 160). As Arievitch and Haenen (2005) argue, Galperin distinguished the levels of abstraction into three basic categories which included the material, the verbal and the mental level.

The actions performed at the material level are often supported by “physical objects or their material representations” such as models or diagrams (Haenen, 2001: 160). This level can also foster actions performed “without the actual hands-on manipulation of the physical objects” (Arievitch & Haenen, 2005: 159), such as moving furniture visually around the room. The verbal level, was defined as a stage where individuals no longer require external assistance or tools to guide their actions. Instead, “speaking aloud” and “covert speech” serve to perform actions (Arievitch & Haenen, 2005: 161). Finally, the third level of abstraction, the “mental”, refers to actions that are

performed without requiring external tools or audible speech and which are performed within the mind, by taking the “form of thought” such as conceptual thinking, or “concepts” (Arievitch & Haenen, 2005: 161).

Furthermore, according to Haenen (2001: 160), a performed action should be characterized by quality. This is contingent upon three indicators including generalization, abbreviation and mastery. According to Arievitch and Haenen (2005: 159), for an action to progress through the earlier outlined three levels, the subject matter needs to be presented in various ways to focus the learners’ attention “to the essential and non-essential properties of the objects studied”. Therefore, the generalization stage allows for these object properties to be generalized by the learners. Moreover, when an action progresses through the three basic levels “the number of operations that are originally part of the action is reduced” and therefore the action becomes “abbreviated” (Haenen, 2001: 160). Finally, according to Haenen (2001: 160), the action can only reach the mastery level if it can be carried out with ease and only if the learner can perform it without help from a more knowledgeable individual.

Moreover, Galperin developed further a method for constructing actions and clearly outlined their levels of abstraction to explain his mental action model. Galperin emphasized that for the formation of action and the creation of a successful pedagogic intervention, three main functions are essential: the orienting function, the executive function and the control function (Lantolf & Thorne, 2006: 304). The orienting function provides the learner with all the necessary information for the successful operation of an action and the last two functions refer to issues of execution and evaluation (Lantolf & Thorne, 2006: 304).

Starting with the orienting function, Haenen (2001: 95) defined it as “the planning function of activity”, determining “what is and how something is done”. According to

Lantof and Thorne, Galperin had emphasized the role of the orienting function since he perceived it as the stage during which the learner deploys conceptual knowledge to perform a cognitive and communicative task (2006: 304). Importantly, the learning content should be presented as a whole from the beginning of the learning process to ensure student and teacher motivation and increased levels of engagement (Lantolf & Thorne, 2006: 304). Therefore, the orienting function is essential in the process of presenting conceptual knowledge and action goals with clarity to learners through explanations and by employing material artifacts (Lantolf and Thorne, 2006: 305). Galperin further developed this approach into the concept of “Orienting Basis of Action” (OBA) to refer to the “whole set of orienting elements by which the learner is guided along in the execution of an action” (Haenen, 2001: 162). This also emphasized that learners need to be introduced to “the essential characteristics of their subject matter at the outset of study” regardless of their complexities” (Arievitch & Stetsenko, 2000: 77). Therefore, the learners’ understanding assumes a more conceptual nature and is not simply a series of empirical experiences (Thorne, 2008: 261).

After developing conceptual understanding of the object of studying, the learners should progress at a verbalisation level to “separate the action from its previous materialized support” (Haenen, 2001: 163), which is another form of internalization. Galperin contended that the introduction of a verbalisation activity assists the transition between the materialized and the mental action, however the learner is not yet in a position to perform the action through inner speech only (Arievitch and Haenen, 2005: 161). If one takes into consideration that in Vygotskian thought “social speech becomes the source of thought” (Haenen, 2001: 163) it is then understood how overt speech allows the learner to perform a task to internalize the acquired concepts through tool free actions since these are “replaced by words” (Haenen, 2001: 163). This stage is followed by

“silent speech” which involves the transformation of the structure of the speech itself into a more abbreviated form since verbalisation at this stage relies only on an “inner dialogue” or “covert dialogic thinking” (Haenen, 2001: 164). This leads to the final phase which involves “inner speech” and where the learners can perform the mental actions without error or assistance and by treating them as mental concepts (Arievitch and Haenen, 2005: 161). Therefore, the action reaches the stage where it “constitutes pure thought” (Haenen, 2001: 164).

For the purposes of the current study, the necessary knowledge will be presented to learners as concepts that form the minimal unit of higher forms of academic verbal thinking (i.e. planning abstract thinking, etc.) (Negueruela & Lantolf, 2006: 81). These concepts constitute primary means of mediating cognitive ability and is therefore crucial that L2 learning is grounded and guided by “explicit conceptual understanding to promote learner awareness and control over specific conceptual categories” (Negueruela, 2008: 204). Negueruela (2008: 201), claimed that the emphasis on the teaching of concepts should be on “constructing understanding that has a direct reflection on oral communicative development”. In the present study, this is achieved and assessed by inviting the students to deliver academic oral presentations on academic articles (Appendix 1). These demonstrate whether the students were successful in establishing the relationships between academic article concepts and whether the students have internalised the L2 concepts for their individual communicative needs.

Once the target of instruction is established (section 2.3.2) the next step requires the construction of didactic models to “capture the complexities of the concepts” (Negueruela & Lantolf, 2006: 84). The models should enable learners to “guide their performance and ultimately internalize the conceptual knowledge by regulating their meaning making ability” in the L2 context (Salaberry & Lafford, 2006: 8). In Galperian

terms this is achieved through the use of SCOBAs. These schemata represent the concrete / materialized form of conceptual knowledge in a “holistic way to avoid rote memorization of purely verbal knowledge” (Lantolf, 2011a: 308). To ensure that the SCOBAs can function as a psychological tool to assist learners internalize conceptual knowledge the representation of the latter, according to Galperin (1989a) “in a materialized form that is concrete” by means of diagrams, charts or concept maps is essential to represent the properties and meanings of the concepts . Examples of this can be found in the work of Negueruela (2003, 2008) to teach tense-aspect in L2 Spanish. For the purposes of the present study though, concept maps were employed to capture the semantic networks between various academic article elements. The maps also served as a way of structuring thoughts before delivering an oral presentation.

Moreover, the verbalisation stage is considered very important for internalizing concepts and for guiding the learners’ development in the use of L2 concepts for meaning making (Negueruela & Lantolf, 2006: 84). The activities at the verbalization stage aim at encouraging learners to utilize “the conceptual knowledge that has been internalized” (Swain, 2009: 22) and to mediate their conceptual understanding. Thus, the potential of self verbalisation manifested either as “self-explanation” or through collaborative activity allows the academic language features to become visible for learners to reflect on their structure and meaning. Within this STI approach, the verbalisation activities involve “learners talking through the concept and not about the concept” (Swain, 2009: 6). In this sense, the learners of the present study were expected to explain to themselves, the researcher and others by employing the concepts as tools for understanding rather than merely verbalising the concepts aloud (Negueruela, 2008: 212). The verbalisation activity involved in STI differs from other verbalisation activities such as think-aloud activity either concurrent or retrospective (Swain, 2006b). Various forms of think-aloud tasks

have been used as a verbal report method to observe the cognitive linguistic process of L2 learners when performing tasks such as text comprehension and L2 learning strategies (Bowles, 2010: 112). However, in STI the verbalisation activities aim at helping the internalization of the L2 and not simply gaining access to the learners' thinking process" (Lantolf, 2011b: 38).

Finally, it should be noted that the research case studies that have been conducted within the STI framework have involved a small number of participants (Mitchell, 2009). Mitchell argues that within the SCT paradigm researchers implemented complex language learning processes with a series of investigation activities which required intensive work with "a fairly small number of L2 learners" (2009: 686), at times with just one or two participants (Negueruela, 2003). Consequently, not only does my study aim at innovation by applying STI and its underlying concepts (supporting learners through their ZPDs, internalization and verbalisation processes) within an online learning environment as well as to ascertain the potential of scaffolding to support the internalization and teaching of EAP concepts online, but, importantly, it involves a larger number of participants. I will now consider in more detail some of the L2 studies conducted within the Galperian framework.

2.2.2 L2 studies informed by Galperian pedagogies

The first program illustrating principles of systemic-theoretical instruction in the L2 context aimed at teaching foreign languages such as German (Kabanova, 1976). The students were provided with generalized schemes to understand and systematically identify the sources of grammatical forms in the contexts of human activities and practices. For example, the complex rules of German modal verbs, were not presented as

a collection of rules to be memorized, but in a systematic way by revealing the functions of these verbs. The explanation occurred under the guidance of a teacher who provided students with the basic rules for linguistic exploration.

This program resulted in a cognitive-developmental change, since children advanced from an empirical level of thinking (i.e., based on apparent but often non-significant perceptual features of phenomena) to one that is theoretical (i.e., based on essential characteristics of phenomena). Significant improvements occurred in children's abilities to analyze, plan, and reflect upon their actions. Furthermore, impressive changes occurred in the individual's learning motivation. The individuals in experimental classes gradually developed a strong and stable interest in the process of discovering regularities and general ways of solving problems.

Another key, and recent, study in the field was carried out by Thorne et al. (2008; 2011) who examined the use of “directives” (indirect requests) among twenty International Teaching Assistants (ITAs) within an ESL context. The project followed the STI model and included three stages: a. Orienting Basis, b. Conceptual Materializations and c. Individual and Group verbalisation. Data was derived from a corpus with 152 various types of academic speech events provided by MICASE and it was used to benchmark the ITAs’ performance and develop instructional materials (i.e. diagrams). The ITAs were exposed to “corpus informed” data which included the detailed description of the use of directives in English (Thorne, 2008: 270-71). The findings revealed that there were “visible shifts in the ITAs’ language use that are traceable to the mediated corpus-informed materials” (Thorne, 2008: 278-79).

Moreover, past research into CBI has shown that internalized linguistic concepts serve a powerful mediational role in L2 development and use. Concept-based approach to teaching (CBI) is a mode of instruction that takes into consideration the principles that

were outlined by Galperin earlier. However, in the present study STI is the currently ‘preferred’ term which is used among a group of SCT pioneers whose work is based on Galperin’s STI approach. Studies in the field have investigated the teaching of tense, aspect, and modality in Spanish (Negueruela, 2003), Spanish locative prepositions (Serrano-Lopez and Poehner, 2008), genre in an ESL academic writing course (Ferreira, 2005), the concept of voice in French (Swain et al., 2009), and Spanish literature and metaphors (Yanez-Prieto, 2008). CBI, contrary to other forms of explicit language teaching, focuses on concepts which provide learners with an orienting basis for the employment of a variety of linguistic features (Lantolf, 2007b, 2008). In other words, concepts are not bound to particular forms, but rather unite different—and sometimes seemingly unrelated—features of language.

Negueruela (2008), who followed a similar approach developed a 16-week course to instruct grammatical concepts such as Spanish aspect, tense and mood. The selected topics and concepts were concretised / materialized by employing charts (SCOBAs) which served as tools to guide the learners decisions before applying a concept in their activities (Negueruela, 2008: 211). Negueruela added a variety of verbalisation activities as homework “for which the final product (language knowledge or use) would be in the target language (Swain, 2009: 22). There was also a communicative activity which employed DiPietro’s (1987) strategic interaction approach (Negueruela, 2008). The data in this study revealed that there was significant development in the learners’ spoken and written competence (Negueruela, 2008).

Most research to date on STI has focused on grammar. However, there is “no reason why it could not address any aspect of language, including pragmatics, vocabulary, discourse, and figurative language” (Littlemore & Low, 2006: 8). In the

present study, the concepts of feedback, noticing and motivation were selected to support the university students with their academic reading and speaking skills. .

The preceding sections of the literature review have outlined some of the key features grounded in SCT and some of the key pedagogic interventions and research that have linked the theory to classroom practice. The next section will highlight the rationale of the current project while a more detailed analysis will be found in Chapter 3.

2.2.2.1 Galperian approach in the current study

There is very little work in the area of language use for “regulatory purposes”, especially when L2 learners are engaged in genre focused pedagogic tasks (Gánem – Gutiérrez & Roehr, 2011: 299), such as the learning of EAP speaking and reading discourse. To date there are no empirical studies documented in the literature about the role of verbalisation during the delivery of an oral presentation for speaking skills development. Furthermore, the present study employs retrospective self-regulation and verbalization tasks within a SCT framework (see 3.6.1.1). Moreover, the present study has extended the boundaries of the instruction context by transferring the learners’ activities and training online within a course management system like Moodle and by adopting an approach that has not yet been explored and therefore calls for more research.

Based on the theoretical and empirical work discussed in this chapter, the current project set out to investigate the relative value of an online Moodle pedagogic unit designed to foster understanding at a conceptual level by users of L2 English in an academic context. Moreover, the relative affordances of Moodle as an environment that fostered online academic training were explored along with the effectiveness of the scaffolding mechanisms that were developed for each online task. Therefore, this study

collected various types of data including two types of individual verbalisations as mentioned earlier, implemented to support the cognitive development of learners in relation to the academic reading and speaking skills under focus. Moreover, attention was also given to the role of academic concepts in the field of Applied Linguistics embedded in the learners' verbalisation activities, reading texts and speaking tasks. Importantly, while existing STI investigations have employed mainly qualitative data, the analysis conducted for this study included both quantitative and qualitative data along with screen-captures and audio recordings of online activity. Subsequently this study hopes to contribute to the growing body of research into the potential role of scaffolding and ZPD in online environments as a means of facilitating L2 learners' EAP training; into the affordances of STI and online environments to develop the students' speaking and reading skills and lead to overall conceptual development; and into the potential role of verbalisation (introspection tasks, oral presentations) as a means of assessing conceptual development.

The model that was developed for the research purposes of the present study included elements of the STI approach which are summarised below:

Table 2.1: Systemic Theoretical instruction model

Systemic Theoretical Instruction
1. Orienting at a basic level
2. Acting at a material level
<i>i.e. employing physical tools, i.e. concept maps</i>
3. Acting at a verbal level
<i>i.e. verbalisation activities</i>
4. Acting at a mental level
<i>i.e. developing conceptual thinking</i>
5. Orienting at an advanced level

Section 2.3 that follows will highlight the challenges in the area of EAP teaching and more specifically in academic reading and speaking. Following from this, Section 2.4

will discuss the role of course management systems and particularly the environment of Moodle and its characteristics.

2.3 English for Academic Purposes (EAP): A SCT perspective on the development of reading and writing for academic purposes

2.3.1 Introduction

This research study offers an instructional design investigating a pedagogical approach based on SCT focusing on reading in a foreign language, academic vocabulary comprehension drawn from selected academic articles and academic speaking when delivering an oral presentation within an English for Academic Purposes (EAP) context. Therefore, some studies and relevant concepts will be discussed in the following sections in relation to current research. Furthermore, the meaning of ‘strategy’ when reading and speaking within the academic environment is also considered.

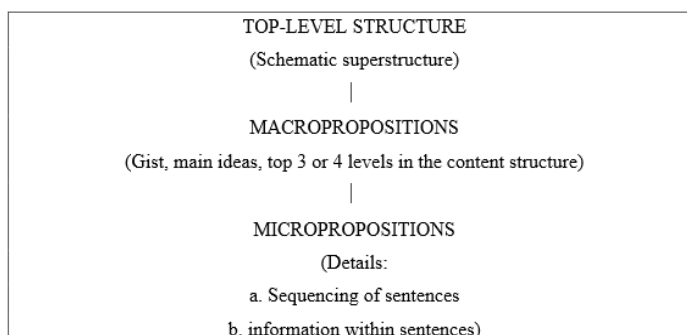
2.3.2 EAP syllabus and course design

Hyland (2006) has referred to three different EAP curriculum options: study skills, socialisation and academic literacies. From an academic literacy perspective, understanding is seen as a primarily social, situated activity in which text is seen as dialogic and multi-voiced. Both author and reader are intimately intertwined in a dynamic

process of meaning-making. Theorists in this area (Lantolf, 2008) recognise the Sociocultural nature of discourse viewed under the prism that communication is impossible without shared frames of reference, patterns and conventions of language with which to mediate meaning.

The cognitivist approach, which lies behind the study-skills based approach to EAP teaching, emphasizes the reading and speaking process which are enhanced by relevant strategies. This approach was influenced by L1 (first language) literature proponents such as Smith (1978) and Goodman (1967), and brought into the L2 (second language) literature by Carrell (Carrell, 1988), Oxford (1990) and Chamot and O'Malley (1994). Texts and speech are seen as consisting of propositions which readers/listeners must locate and understand, with the primary aim of reading/listening to process information.

Figure 2.2: Meyer's (1984) cognitive hierarchy of text structure



From a Sociocultural perspective, however, reading and speaking are viewed as social practices, involving collaborative, co-construction of meanings between the (multiple) voices of the text and the reader (Bakhtin, 1994). Texts/speech do not exist in isolation, but in relation to both the reader/speaker and the writer's/audience's contexts (Hirvela, 2004: 18).

Within this framework the literature suggests a wide variety of roles for the teacher and students. For Jarvis (1983) these include flexibility, analyzing AP situations,

devising performance objectives, producing materials and assessing achievement of objectives. An adapted depiction of the EAP methodology followed here can be found in Appendix 2.

Finally, before moving on to the sections that specifically discuss the academic skills of reading and speaking (and the way in which learners developed strategies in their effort to develop conceptually), a distinction between skills and strategies should be made. Skills are automatic procedures that do not require thought, interpretation, or choice (Kispał, 2008). They are product-oriented, observable behaviors such as answers to questions, skills lists, and taxonomies. Moreover, skills instruction focuses on repeated practice in applying skills until they become habitual responses to particular tasks.

VanDijk & Kinsch (1983) however, have defined a strategy as a routine or procedure to accomplish a goal. A strategy therefore, is a conscious plan under the control of the learner, who must decide what strategies to use and when. They are process-oriented, cognitive operations that learners engage in, generally unobservable, which stress the reasoning process learners undertake as they interact with and comprehend spoken or written discourse. Most importantly, strategy instruction focuses on ways to help students understand what they read. In the present study, as it will be explained below, strategies are defined as the learners' conscious employment of higher order cognitive processes to comprehend texts and spoken discourse.

2.3.2.1 Academic reading skills

In the late 1980s and 1990s, a range of studies aimed at identifying the particular reading strategies that are used by 'good readers', on the premise that these strategies could then be taught to less competent readers to improve their reading skills (Devine,

1993; Song, 1998). The emphasis was on investigating how SL learners learn or what actions lead to successful or unsuccessful performance (Oxford, 1990; Wenden, 1991). As Phakiti (2003) observes, the initial distinction was between learning strategies (to facilitate acquisition) and user strategies (to enhance performance).

More recent studies have conceived reading as an interactive process in which readers interact with the text by relying on prior knowledge (Carrell, 1985). Bernhardt's (2005) research for instance, further explores the interplay between L2 syntax, vocabulary and metacognitive awareness which is considered a component of general reading knowledge that may be transferred from L1 to L2 reading. The emphasis on the role of metacognitive awareness as enhancing one's motivational and cognitive processes in reading and its importance have been recognized in various correlational studies (Gelderen et al., 2003; Guo and Roehrig, 2011).

However, as Sheory and Mokhtari (2001) mention, research in strategy use by advanced second language learners, especially at university programs, is almost "non-existent", mainly due to the assumption that reading problems correlate with the level of target language proficiency (p. 4). However, in the current project academic reading as a skill will be approached by adopting the SCT theoretical approach and by focusing on university level second language speakers. This includes seeing the development of reading as closely linked to the use of higher order cognitive processes such as reasoning, development of concepts, planning, voluntary attention, etc.

Therefore, the students for the present study were expected to plan their approach when reading a text by identifying top-level structures (Smith & Edwards, 1997) or by formulating self-generated questions (Padron & Waxman, 1988). The students were then trained to focus their attention to specific terminology by underlining (Amer, 1994) and to plan and depict the relationships of specific article terms with the use of concept-

mapping (Amer, 1994; McCagg & Dansereau, 1991) to develop their understanding of concepts. Then, the students' reasoning processes were employed to proceed with note-taking and planning the structure of notes for summary creation.

Moreover, as Nuttall, (1996) argues, students are often not taught how to approach academic texts. There is therefore, a wide range of macro and micro – reading skills that EAP students should develop with the use of appropriate strategies (Nuttall, 1996). These skills include activating and orienting the learners' attention to specific concept characteristics, planning their learning by assuming responsibility for their own progress, etc. Among the necessary micro-skills to develop is the identification of thematic relationships such as cause and effect, comparison and contrast, and distinguishing fact from opinion. Other skills also include identifying and learning field-specific terms (Jordan, 1997) for the development of concepts.

Furthermore, in an interesting study by Wyatt et al. (1993), reported in Pressley (2002) which resembles the structure of the present study, university lecturers (experts), were invited to think aloud (verbalisation) as they read articles in their own field of expertise. They employed cognitive processes which involved planning their learning via predictions, paying voluntary attention when scanning for specific information, summarising sections of text, commenting on why certain sections made sense or not and monitoring their reading frequently.

The specific reading skills that were addressed during this training can be found in section 3.5.3.

2.3.2.2 *Academic speaking skills*

As Flowerdew and Peacock (2001) argue, academic speaking is a very important aspect of EAP training. However, “compared to the research article, which is the most

researched academic genre, little work has been done to describe the spoken academic genres” (2001: 189). Jordan (1997) describes typical EAP speaking skills as asking and answering questions during lectures and tutorials, giving oral presentations and participating in discussions. Most of the research though has focused on identifying the elements of successful seminar participation to address the learners’ problem with seminar speaking (Anderson and Lynch, 2001: 188).

However, a very important aspect of academic speaking is the oral presentation and the present study aims at covering this gap. To date, the discourse structure of the typical oral presentation has been described by Price (1997): “general introduction, statement of intention, information in detail, conclusion, inviting to discuss.” Moreover, Anderson and Lynch (1991) have proposed the following areas of focus for the delivery of oral presentations: “sequencing, signposting, delivery and concluding”. The speaking skills that were covered during the present study’s training will be presented in section 3.6.1.3.

2.3.3 Research on reading and speaking for academic purposes: A SCT perspective

This section will briefly discuss some of the most recent studies conducted on specific EAP reading and speaking skills within a SCT framework. It will start by outlining the studies which focused on academic reading and it will continue with academic speaking in focus.

Boivin’s (2013) study investigated the use of theme based content and language integration in an English Foundation course at a higher education institution in Malaysia. The findings indicated that the content and language integration facilitated vocabulary

comprehension according to students. The study involved pre-Bachelor of Education in TESOL students with mixed proficiency levels as they would normally enter with low academic reading and writing skills. A nine-week research course was therefore designed with Language Development learning results. The study used piloted pre and post questionnaires and the quantitative data were triangulated with student interviews and their coursework reflections. The process entailed skills such as writing an article summary, note-taking, creating or designing graphic organizers (i.e. diagrams, etc.), critical analysis of arguments and understanding viewpoints. However, ultimately it was the design of the process which facilitated increase in student overall motivation within this EAP context.

The study conducted by Amiryousef, Dastjerd & Tavakoli (2013), has focused on reading skills as elements of the most recent and important models of reading comprehension which are key in the reading process. The study treated reading as a componential skill but it has identified the gap that no prior research examined the reading components based on EAP students' points of view.

This study was, therefore, an attempt to explore the reading strategies used by Iranian EAP students and reveal their considerations of EAP reading components. A questionnaire was developed based on the recent definitions and classifications of reading strategies and was given to 170 EAP students along with a survey question to elicit their beliefs about major EAP reading components. The results of the study revealed both bottom-up and top-down strategy use but a prominence of bottom-up processes was evident. They also believed that vocabulary, topical knowledge, structure and reading techniques and strategies were the basic components of EAP reading comprehension. Finally, the researchers developed an EAP reading model (Fig. 2.3) which was also partly

adapted for the purposes of the present study (Fig. 2.4) by keeping the elements of topical knowledge, conceptual knowledge and reading strategies.

Figure 2.3: Amiryousef, Dastjerd & Tavakoli's (2013) EAP model

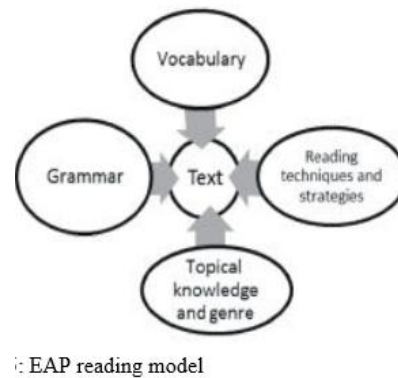
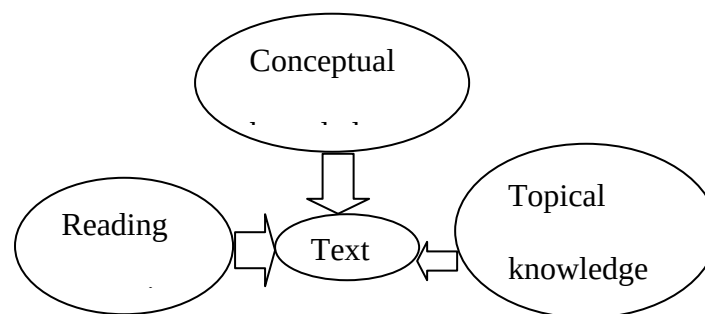


Figure 2.4: Antoniou (2015) EAP model



Turning to international students for whom English is an Additional Language (EAL) it has now been acknowledged that they take classes in English for Academic Purposes (EAP), delivered in language institutes which exist independently on the margins of the university. EAP has received criticism for ‘skilling up’ students rather than taking a critical, ‘literacies’ approach appropriate to the rapidly globalising ‘fluid’ contexts of the twenty-first century (Doherty & Singh, 2005; Lea & Street, 2006). In her study, Wilson (2014) investigated how EAP reading pedagogies in Australian universities are responding to the need for more critical approach by conducting an ethnographic-

ecological methodology (van Lier, 2004) to gain an understanding of reading pedagogy in three EAP learning environments. The study generated qualitative data, including classroom transcriptions, observation notes, interviews and examples of students' written work. Combined with Engeström's Activity Theory (Engeström, 1999; Lantolf & Thorne, 2006) a holistic analysis of the interaction between the multiple, intersecting elements of each environment was conducted. The data, which were also considered for the creation of the current Moodle pedagogic unit, suggested that conditions for such a pedagogy entail a negotiation of goals, texts and tasks which present high challenge (Hammond & Gibbons, 2005). The research also recommends that practitioners create learning environments which scaffold direct student engagement and dialogue with texts to develop as critical readers.

The study by Sterzik & Fraser (2012), is one of the few examples which –as in the case of this study - has employed concept maps to foster students' reading comprehension. The authors acknowledge that text-based comprehension (Kintsch, 1998) alone is not sufficient for academic success and that prior knowledge application to define purpose(s), to verify hypotheses, and to infer and question content is also required (Macaro & Erler, 2008). The authors contend that even though research has offered teachers direction regarding the approach to use when offering strategy instruction, specific teaching tools towards this direction have not been developed. Therefore, an innovative approach, Reading Comprehension MAP for Situation-based comprehension (RC-MAPS) was employed as an instructional technique. This offered teachers an “easily modified tool to assist in developing interpretative comprehension skills among second-language readers in academic environments through the strategy of questioning” (Sterzik & Fraser, 2012).

Another study by Jarvis and Stakounis (2010), examined academic speaking with Non-Native Speakers (NNS) of English at a summer English for Academic Purposes (EAP) course. These learners normally have expectations regarding the level of academic speaking skills they would like to attain before their postgraduate studies. Jarvis and Stakounis (2010) qualitative study and microgenetic analysis of the kind of contact that such NNS have with native speakers in the community suggested that “expectations are generally not met”. They argued that when developing speaking skills in the classroom the need to recognize the importance of interactive and communicative skills emerges by designing tasks which contain examples of such language and key strategies.

Finally, Dashtestani's (2013) EAP project focused on exploring the use of EAP oral presentations with 533 Iranian students. His study assessed the EAP students' perspectives on the use of PowerPoint presentations in EAP instruction. He identified the motivating and demotivating factors which might affect EAP students to use PowerPoint presentations for EAP learning. By using a mixed-methods research design, including surveys and in-depth interviews to address the perceptions of the learners, potential obstacles to the use of PowerPoint technology in EAP courses were revealed such as the learners' technical competence or their ability to introduce content to the slides wisely. However, the results confirmed that the EAP students perceived PowerPoint as a beneficial and effective learning tool which should be incorporated into EAP courses. As EAP instruction is based on learner-centered and student-oriented approaches to pedagogy, it is crucial that future EAP courses will be developed based on what EAP students will be required to perform such as academic oral presentations.

2.3.3.1 Studies on scaffolding the delivery of EAP reading and speaking courses online

This section will present research studies that have explored ways of scaffolding the delivery of online EAP and speaking courses. The discussion will begin with four reading studies and continue with the four speaking ones.

Hsieh's and Dwyer's (2009) study examined the instructional and scaffolding effectiveness of different online reading strategies for EAP learners. Participants were 169 undergraduate students, randomly assigned to four online reading treatments: none, re-reading strategy, keyword strategy, and question and answer strategy. After interacting under relevant instructions the learners obtained four individual criterion measures. Data analysis revealed a significant effect for learners receiving the online re-reading treatment which also appeared to be significantly more effective than the control for the comprehension test. Results also indicated that not all types of reading strategies were equally effective in scaffolding different types of learning objectives. For the present study, the implications are that during the online students' reading activities we should not expect the learners to use specific strategies with equal frequency when the learning objectives of the tasks vary and that identifying keywords or formulating pre-reading questions might not be popular.

Moreover, other studies have established that university students' use of reading strategies relates to their level of reading comprehension and more importantly successful readers are more active strategy users than less strong readers. However, these findings are based on studies using print texts. A large proportion of university reading is online though, which requires different skills. As there is currently not a lot of research on the utilization of strategies in online environments and whether these are linked to overall

reading proficiency, Poole's (2009) study addressed this issue "by analyzing the use of online reading strategies by 527 undergraduate students who completed a quantitative survey". His findings are also important for the current study since they suggest that "good readers are active strategy users in both print and online environments". We should therefore expect that weaker students will not be able to employ the appropriate strategies to extract the relevant information about concepts.

Moving on to Watson & White's (2012) study, their 5 week online summer pre-session course was offered focusing on academic writing, reading, study skills, and vocabulary development within a discipline specific course context. Scaffolding was offered through the role of the "e-tutor and through the design of the core-content itself (activity based learning objects)" (Watson & White, 2012). In detail, "the sequences of activities were scaffolded with optional help and feedback" while the tutor also assumed the role of "scaffolding student understanding of content through online discussion and feedback" (Watson & White, 2012: 316). Moreover, the course offered thematic forum discussions each week with live chatting sessions between the students leading to an assessed reading task and formative vocabulary tests with automatic feedback. The scaffolding assistance was successful without any face-to-face contact with the tutor and this was encouraging for the present study too, which offered similar online feedback, scaffolding features on Moodle and forum discussions.

Finally, Narelle Clarke's (2015) study is probably the most recently produced research output regarding the use of Moodle to research the development of academic reading skills and its scaffolding affordances in creating autonomous academic readers. In her action research project she designed online reading tasks and scaffolding assistance was provided in the forum areas both from the tutor and the students who worked in collaborative groups. Furthermore, the students entered journal entries once a week,

which offered them the opportunity to reflect on their activities. Although in the current study, students were not collaborating for task completion, the reflective Moodle options and forum scaffolding were implemented in similar ways and were successful.

The studies on scaffolding the delivery of EAP speaking online, on the other hand, have used online environments in collaboration with extra plug-in software (i.e. video-conferencing and self-recording functions) to facilitate their students' oral practice. However, the speaking activities that were trialed were not oral presentations except in the case of Linardopoulos. This is indicative of the significant gap in research that employs Moodle environments for the development of speaking skills.

Pereira's (2012) study explored the use of three open source Moodle plug-ins for speaking practice: NanoGong, PoodLL and Moodle Language Laboratory, analysing each one's advantages, limitations and some shortcomings. Her study also introduced Babelium, a new plug-in that allowed to record and share interactive video exercises where learners could record their own answers, either using their microphone or their webcam. The learners could also receive advice and tips, for their oral production, watching a parallel, exercise-synchronized video that demonstrated images, texts and words that could be useful for the oral communication effort.

Following from this, Silva's (2012) study within a Portuguese University aimed at enhancing the students' learning experiences and communication skills by introducing as many 2.0. Web tools as possible to make learning through ICT an interactive process. Through the use of podcasts and video/audio tools, learners in this study could produce material integrating text, image and voice in their individual or group projects. Although the learners were studying different languages (some groups were learning English and others Portuguese), all students perceived these tools as essential for their progress. This study was encouraging for the current project, since in our case students also had to

integrate materials such as mind maps and diagrams and develop actual presentations from them.

Tang (2013) also acknowledged the fact that the real experience of speaking a foreign language calls for a real time communication. She suggested that practitioners can upload documents of relative background information that are frequently used on the Moodle platform, which can help to arm the learners with more knowledge to use during talking. These documents successfully functioned as models for orienting the learners' actions online to help them frame their oral outputs. Similarly, in the present study the students gradually produced documents with article comprehension questions to guide their understanding of concepts that would later on be used in their oral presentations.

The final study to be discussed is by Linardopoulos (2010) who has also noticed the little attention given to the opportunities and challenges of the online delivery of skills-based courses (that require the mastery of a practical component in addition to theory). His study in the teaching of a public speaking course in English was delivered in a fully online setting provided by the Blackboard interface which is very similar to Moodle. Students were required to view Powerpoint lectures with audio and participate in discussion boards weekly. The evaluation for the online section also included three quizzes consisting of multiple choice, true-false questions during pre-announced regular intervals within the quarter (weeks 3, 6 & 9 of the 10-week quarter system). Students were also required to submit, either streaming video online or via VHS/DVD, an informative speech and a persuasive speech. There were no face-to-face meetings and no synchronous conversation or discussion options. This is the only study that employed an environment very similar to the one of the current project for the training and delivery of oral presentations online and revealed the positive student performance and attitudes towards the training.

2.3.4 Evaluating pedagogical approaches in EAP

According to Brindley and Ross (2001), assessment within an EAP context is conducted for a variety of purposes and can be distinguished into achievement and proficiency assessment. Proficiency assessment concerns “the extent to which learners can use the language for their intended purposes” (Brinley and Ross, 2001: 149). A proficiency test measures the use of skills in the context of current effort, the implication being that there has been practice. Achievement tests, though, are used to determine “the extent to which learners have learnt what has been taught during a course of instruction” and to “sample the specific skills or knowledge which forms the basis of the course objectives” (Brinley and Ross, 2001: 149). An achievement test measures performance in relation to recognition from past success. In the present study, the students were required to perform tasks which assessed the individual learners’ attainment of the course objectives and subsequent progress.

2.3.5 Evaluating conceptual development within an EAP context – Adjusting Bloom’s taxonomy

Bloom et al.’s (1956) taxonomy of cognitive abilities (henceforth referred to as Bloom’s taxonomy) is still very influential in university L2 pedagogy (Table 2.2) (Bloom, 1984; Bloom et al., 1956). Much of the discussion and understanding of the place of critical thinking and conceptual development in the late twentieth century has arisen from this taxonomy, and similar taxonomies appear in descriptions of learning strategies in EAP as those presented by Chamot and O’Malley (1994). The taxonomy was

also created to raise classroom teachers' awareness regarding the tasks they set. With categories having "precise and usable definitions" (Bloom et al., 1956: 11) the teacher can not only recognize if their tasks fall predominantly into one single category, but in this case, can also see possible alternatives (ibid: 3). However, for the purposes of the current SCT project, the process of development is seen as closely linked to the use of higher order cognitive processes such as reasoning, problem solving, development of concepts, decision making, planning, voluntary attention, etc. Thus, Bloom's taxonomy was selected and revised to reflect the principles of the STI approach. The taxonomy was used as it offers various levels of conceptual development and with appropriate adaptation the students can be easily classified to different levels.

The original taxonomy comprises of 6 levels of cognitive abilities and it is presented in a cumulative hierarchy beginning with easier, less cognitively challenging tasks and involves moving progressively through each level to arrive at a final level of highly sophisticated thinking. In the context of reading for instance, higher order thinking could incorporate the ability to take textual information and combine it with extra knowledge to perform a variety of functions. This order remained the same in the revised version for the same reasons.

The first category in Bloom's taxonomy was Knowledge and at this level the learner is required to recognize, remember and memorise information. There is also a hierarchical scale of what is to be remembered with three sub-categories: specifics, ways and means of dealing with specifics and universals and abstractions in a field. Each category is deemed more cognitively challenging than the previous one. At this initial level a learner would recall what these are without engaging with information at a deeper level i.e. locating and recognizing specific data in the EFL reading classroom. Similarly,

in the revised version Knowledge was substituted by memory and the process of remembering.

The second category was Comprehension which involved the reader not only in information recognition but also in discovering relationships among data. The category was also divided into translation, interpretation and extrapolation. Translating referred to transforming data from one medium to another (i.e. table data to words), interpretation referred to re-arranging information along with exhibiting summary skills, and extrapolation, was the ability to predict a continuing trend from the given data. In the revised version, the category is understanding based on conceptual understanding which involves grasping meaning, gathering information, interpreting, etc.

The third category was Application, and it had no categories. It referred to cases where the learner could carry out problem solving tasks or put theory into practice in terms of transferring an abstract idea to a concrete situation. In the revised version this is Problem solving which involves using information and methods to address a problem.

The fourth category of Analysis required from the reader the skill to break down the information into its constituent parts, classify its individual properties and identify the underlying structure of an argument. Analysis also involved the ability to understand the relationships between ideas. In the revised version this is Reasoning, which involves paying voluntary attention to patterns, formulating hypotheses based on the previous, etc.

The fifth category was Synthesis, which was a combination of sourcing, integration and creation. It involved developing new plans or processes or designing programs. Synthesis also referred to combining information from various sources to constitute a new “entity”. In the revised version this is Thinking in the sense of evaluation which involves comparing, assessing theories, etc.

The final category was Evaluation, which required that the learner made judgments against set criteria. This category related to personal opinions which would be at the comprehension level. To qualify for evaluation, sophisticated criteria were required to carry out a review of options and assessment of implications. Anderson and Krathwall (2000) revised Bloom's taxonomy to meet SCT and the new category names were Remembering, Understanding, Applying, Reasoning, Evaluating and Creating. In our revised version the final level is Decision making, which involves combining, generalizing information, etc. The exact original and revised version are presented in Table 2.2 and Appendix 3. How the taxonomy was adapted and used in data analysis is explained in 3.9.2.1.1.

Table 2.2: Summary of Revised Taxonomy of Educational Objectives

Bloom	Revised	Indicators
Knowledge	Remembering (memory)	• Observation and recall of information • Knowledge of dates, events, places • Setting goals / orienting attention • Knowledge of major ideas • Mastery of subject matter
Comprehension	Understanding	• Understanding / gathering information • Grasp meaning • Translate knowledge into new context • Interpret facts, compare, contrast • Order, group, infer causes • Predict consequences
Application	Applying	• Use information
	(problem solving)	• Use methods, concepts, theories in new situations • Problem solving required skills or knowledge
Analysis	Reasoning	• Seeing patterns (voluntary attention) • Organization of parts • Recognition of hidden meanings • Identification of components
Synthesis	Evaluating	• compare and discriminate between ideas • assess value of theories, presentations • verify value of evidence • recognise subjectivity
Evaluation	Creating (decision making)	• use old ideas to create new ones • generalise from given facts • relate knowledge from several areas • predict, draw conclusions • decision making

Moreover –and as will be further detailed in Chapter 3 - during Session 2 of my study, which was the main treatment session, various activities were developed that matched the stages of the STI approach. Table 3.3 (p.112) also indicates the various stages and tasks of the training session and how the STI model enabled learners to work both from an abstract to a concrete level and vice versa. Tables 3.8 and 3.9 (p. 145-147) also offer information on how the revised Bloom’s taxonomy was applied to indicate the

cognitive development that learners would achieve upon completing the various tasks of the training.

2.4 Open-source Learning Management Systems (LMS)

2.4.1 Introduction to LMS

Computer-Assisted Language Learning or (CALL) as a subfield of applied linguistics for language teaching has received considerable attention over the past few decades and a wide range of studies have identified specific characteristics and limitations of research taking place in the field. All the generated studies in the field have varied significantly in their objectives and their focus. A brief review of the types of technologies that are appearing in these CALL studies, when treating CALL as a technological field, reveals that it is a highly technical field indeed.

Foregrounding pedagogical objectives for the selection of a specific type of technology means that it offers specific enabling features. For example, through experience in the classroom, teachers may identify a need to develop a particular application for use in a given environment to achieve specific pedagogical goals, and develop this either by themselves or as part of a team. Nevertheless, decisions about the technologies that are employed are often beyond the control of the classroom guidelines, which are required to keep in line with institutional decisions. Institutions select the implementation of specific technologies, such as a decision to bring in a course management system such as WebCT, Blackboard or Moodle, and expect teaching staff to incorporate these technologies into their courses (Levy & Stockwell, 2006).

2.4.2 Learning management systems

Moodle was introduced as a learning management system about more than a decade and a half ago and its infrastructure has been constantly improving our learning settings since the explosive growth of the Internet in the mid 1990s. In the domain of foreign language learning, OSS (open source systems), which offer a variety of management functions for learning records, multimedia materials and interactive communication have popularized WBTs (web-based training environments) such as *WebCT*, *Blackboard* and *Moodle* in higher education worldwide. The UK is not an exception to adopt this ICT for educational environments under financial support from various institutions and funding bodies such as the Joint Information Systems Committee (JISC). This offers learners the opportunity to attend blended learning style classes of EFL (English as a Foreign Language) while attending at CALL laboratories, for example.

There are different expressions used to describe educational computer applications, including among others e-learning Systems, Learning Management Systems (LMS), Course Management Systems (CMS) or even Virtual Learning Environments (VLE). Within these settings, learners can access course contents in different formats (text, image, sound), and interact with instructors and classmates, via message boards, forums, chats, video-conferencing or other types of communication tools (Sanchez & Hueros, 2010). These environments offer a set of configurable features, to facilitate the creation of online courses, work groups and learning communities (Paulsen, 2003). Apart from the pedagogical functions, these platforms provide a set of management features for learner registering, monitoring and evaluation activities, enabling the contents' management via Internet. Following Piotrowski's approach (2010), "an e-learning platform represents a system, which provides integrated support for six different

activities: creation, organization, delivery, communication, collaboration and assessment”. There are also different types of LMS, some of them representing commercial solutions (such as Blackboard/WebCT) and others open-source solutions (such as Moodle). Regardless the type, several studies revealed the existence of strong advantages for using e-learning platforms (Mahmood, 2008; Mellow, 2005; Moura & Carvalho, 2009), their adoption though, entails some challenges for the institutions.

Regarding open-source environments, certain studies identify Moodle (Modular Object-Oriented Dynamic Learning Environment) as the most utilised platform in higher education, and the easiest to use (Paulsen, 2003; Alexander, 2006; Bremer & Bryant, 2005; Campanella, 2008; Cavus & Momani, 2007; Miyazoe, 2008; Cole & Forster, 2008). The next section will outline some of the definitions and characteristics of the platform.

2.4.3 Definitions and characteristics of Moodle

2.4.3.1 *Introduction*

Due to the disappointment of practitioners with the functions offered by previous learning management systems (i.e. WebCT, First Class, Lotus Learning Space etc.) Dougiamas (1999), presented a different perspective by designing a platform whose construction was based on enabling richer forms of dialogue by combining content and communication through which teaching and learning can occur. These tools that were offered by Moodle enabled both teachers and learners to construct online environments within which they could develop representations of their understandings of the subject and share them with peers in a variety of ways (Dougiamas: 1999). The prototype of this

new system, based on a new pedagogical approach, was trialed in 1999 and on the 15th of November 2001, the start of Moodle was announced (Moodle Docs, 2008b).

The innovative force behind Moodle was the fact that although educational resources were usually labeled according to the educators' curricular goals, Moodle, initially proposed the labeling of four different approaches which enabled the learners to gain access to any educational resource which could support them in terms of defining and achieving their own goals (Illich, 2008). The first approach was the (1) Reference Services to Educational Objects -an approach which facilitated access to items or processes used for formal learning. The second was termed (2) Skill Exchanges--which permitted individuals to list their skills, the conditions under which they are willing to serve as models for others who want to learn these skills, and the addresses at which they can be reached. The third approach was (3) Peer-Matching--a communications network which allowed individuals to describe the learning activity in which they wished to engage, in the hope of finding a partner for the inquiry and the final approach was (4) Reference Services to Educators-at-Large--who can be listed in a directory giving the addresses and self-descriptions of professionals, along with conditions of access to their services. The previously mentioned steps reflect the initial axes around which the Moodle platform was developed and can be considered as important antecedents of the constructivist, social constructionist philosophy which was adopted by the developers of Moodle.

Constructivism asserts that people actively build new knowledge as they interact with their environment. *Constructionism* extends the ideas of constructivism and maintains that learning is particularly effective when constructing something for others to experience. *Social constructivism or constructionism* extends the above “isms” into a social group building things for one another, collaboratively creating a small culture of

shared artifacts with shared meanings. However, as it has already been outlined, the theoretical framework of the present study is provided by SCT and not by social constructivism. The aim is to use this online environment as a space that can support (scaffold) the learners' development while interacting with the courses' tasks and tools to help them develop conceptually.

2.4.3.2 Features of Moodle in short

Moodle is one of the most commonly used open-source e-learning platforms, which allows the creation of a course website, ensuring access only to enrolled students (Cole & Foster, 2008). This online environment allows for distance interaction and exchange of information, by employing mechanisms of synchronous (chats) and asynchronous communication (discussion forums).

Moreover, the Moodle platform offers a set of functionalities grouped in two different types: resources and modules (Blin & Munro, 2007). Resources refers to instructional materials that are usually created in digital formats and then uploaded to the platform. Examples of resources include links to Web pages, PowerPoint files, etc.. Modules, are elements developed on the Moodle platform to support the interaction among learners and teachers towards manipulation and content transformation (Blin & Munro, 2008). Moodle as a platform offers several modules or else termed activity/task types, such as Database, Lessons, Assignments, Workshops, Chats, Forums, News, Glossary, Wikis, Choice, Quiz, Survey, Feedback, SCORM (Sharable Content Object Reference Model) and External tools (Moodle, 2012).

The task types of the learning platform can be categorized into six classes based on the model of Piotrowski (2010) which described the basic functions of these modules:

Creation, Organization, Delivery, Communication, Collaboration and Assessment. Appendix 4 presents these activities in a table with their correspondence to the Moodle modules, and a brief description based on the way Costa, Alvelos and Teixeira (2012) matched the modules with Piotrowski's classes.

The Moodle platform deployed in the University of Essex (Version 1.5) offered three main course formats. The social format which was generally used for courses focused on dialogical activities, and for nonteaching activities, such as committee work. The weekly format, which enabled content and interaction to be organised on a weekly basis, thus matching the academic calendar (i.e. all Essex modules are 10 weeks long) and the weekly face-to-face course structure and content. Resources, such as lecture notes and additional reading material, along with activities, such as self-assessment quizzes could be added to reinforce or verify the knowledge and skills covered in lectures. The topic format enabled a more flexible organisation of the course for the purposes of the current project and it was particularly appropriate to SCT approaches to teaching and learning, which both place the realization of a given task at the core of the learning process to facilitate the gradual understanding and assimilation of specific content and concepts. Furthermore, the different types of Moodle tasks also offered opportunities to design and built-in scaffolding assistance to enable the learners' progress with the completion of their tasks (section 2.4.2).

Moreover, Moodle allows users to assume specific roles online – each with an associated set of permissions. During the academic years 2012/14 the University of Essex employed version 1.5 of the Moodle platform. In this version, five user roles were available and included the following: Administrator, Course creator, Teacher, Non-editing teacher and Student. Administrators for instance, have 'super user' access by implementing changes that affect the configuration of the whole site, have access to user

details and can modify all courses. Course creators on the other hand as in the present case, have limited administrative permissions, including the capability to create new courses on the system. Teachers can do anything within a course that they are assigned to, including modifying the course layout and structure, creating activities, adding content and grading students. Students have no editing rights within a course.

Each module offered at the University of Essex is allocated a dedicated Moodle course as in the present case. Prior to the start of each academic year, module co-ordinators are automatically made the instructors of the appropriate course(s).

2.4.3.3 *Moodle support to SCT pedagogies*

In this section I will demonstrate how the various mottos of Moodle can be interpreted from a SCT perspective to serve the purposes of STI (Moodle Docs, 2008c):

a) *“All of us are potential teachers as well as learners - in a true collaborative environment we are both”.*

Lots of activities in Moodle are constructed to allow students to control the shared, common content of courses, such as forums, wikis, glossaries, databases, messaging etc. This could potentially stimulate students to share course experience for others and it also encourages more capable peers to assist / scaffold the development and learning process of their peers by engaging in collaborative activities. Thus, learners mediate their activities, can verbalise their thoughts by relying on the online tools available (object regulation) or on the help provided by others (other-regulation) until they achieve independent strategic functioning (self-regulation) and gradually internalize new knowledge. Development is, therefore, seen as the ability of individuals to make use

of the tools of mediation – originally made available by the tutor on Moodle—to increasingly control physical and mental activity (section 2.1.3). This developmental mechanism is known as *internalisation* (Lantolf & Thorne, 2006: 152-155).

b) *“We learn particularly well from the act of creating or expressing something for others to see”.*

Moodle offers various ways for creating representations of student knowledge and sharing it. These include the following (Moodle, 2008b):

- The course structure itself is an important way to construct a shared representation of the learning “path” that everyone can go through.
- Forums are spaces for discussion and sharing of media and documents (media plug-in filters, attachments, hyperlinks).
- Wikis are outstanding tools for group work and other discussions.
- Glossaries are collaboratively-built “cyclopedias” that can then appear throughout the course.
- Databases allow participants to enter structured media of any type.

From an STI approach, this signifies that the learners can work at a material level within the Moodle unit and create concrete visualizations of the concepts to be acquired. Learners can also progress from the abstract characteristics of a concept to a more concrete and specific version of it by modeling it and by adapting their models.

c) *“We learn a lot by just observing the activity of our peers”.*

The participants’ pages, the “online users” blocks, the “recent activity” blocks are the main places where learners can observe everyone’s activity in their courses. This is very important from an SCT perspective as the learners’ profile and capabilities need to be taken into consideration by the instructors with a view to developing and adjusting activities and tasks to meet their specific needs. Simultaneously, this perspective assumes

that the learners are active participants in the construction of how they learn. They relate themselves to others and to the learning task based on their educational background, their individual goals, their motivation, and what they perceive as important in a task within a Sociocultural context (Lantolf & Pavlenko, 2001; van Lier, 2008).

d) *“By understanding the contexts of others, we can teach in a more transformational way”.*

There are many different ways to find out about the participants:

- The user profile includes fields where participants can provide information about their background.
- Blogs allow people to express thoughts in a public but reflective way.
- Activity reports show all the contributions from a participant in a course.
- Log reports show detailed logs of every action taken by a participant in Moodle.
- The survey modules provide a variety of questionnaire tools.

This is a crucial aspect within the Vygotskian sphere of pedagogy since instruction is argued to precede and shape development. Instruction leads to the re-organisation of mental behaviour by guiding the interaction between theoretical conceptual knowledge, e.g., scientific concepts, and knowledge derived from our everyday experience, i.e., spontaneous concepts, which are empirically and implicitly learned (Lantolf, 2008; Brooks et al., 2010). Therefore, the Moodle environment allows practitioners to design instruction which ‘...foster[s] conscious awareness of conceptual form and structure’ and “foster[s] the interaction and development of everyday concepts with scientific concepts’ for the learners’ benefit (Daniels, 2007: 312). Importantly, the pedagogical principle of *praxis*, as defined by Lantolf (2008: 22) involves actively establishing ‘the connection between conceptual knowledge and practical activity’ and should play a primary role within the L2 teaching context.

e) “*A learning environment needs to be flexible and adaptable, so that it can quickly respond to the needs of the participants within it*”.

Flexible and easily adaptable courses can be designed in different ways:

- The course page itself allowing the instructors to structure and restructure activities if necessary.
- The roles from Moodle 1.5 can be applied individually in every context.
- Preferences of appearance and behaviour allow instructors to fine-tune the behaviour of Moodle in many ways.
- External systems can be integrated into Moodle, to maintain authentication, enrolments etc.

From a learning environment perspective, to support *internalisation* a Moodle course unit can foster several processes such as role playing, and scaffolding which have been identified as enabling resources to assist the individual to become self-regulated through the ZPD (Vygotsky, 1978; Lantolf & Thorne, 2006). The Moodle unit can therefore be seen as the environment that fosters the learners’ ZPD. Moreover, the ZPD is an important concept which Vygotsky (1978: 86) defines in terms of actual and potential development. Actual development can be translated into individual ability to act independently (i.e. self-regulation) whereas potential development is what is beyond the independent understanding capabilities of that individual. Within one’s potential development, the Moodle ZPD setting serves as a context for observing the distance between how the learners perform independently and what they achieve with assistance, till independent action levels are achieved; it also serves as a context for developing tasks to pave the learners’ progress towards independent conceptual thinking (Poehner & Lantolf, 2005; del Río and Álvarez, 2007).

Table 2.3 below presents the SCT principles for online Moodle training and the Moodle affordances for online training.

Table 2.3: An STI framework for Moodle-mediated EAP training ~ The case of Learning**Management Environments**

STI principles for online EAP training	Moodle affordances for online EAP training
Learners <i>-Activities generating tasks</i>	• Realistic academic study environment • Ability to navigate in the lesson format and locate tools and external links with information
Language <i>-Activities should offer learners the chance to associate language with conceptual meaning</i> <i>-Activities should support language use for the learners individual purposes (i.e. delivery of oral presentations)</i>	• High quality asynchronous and synchronous communication • Academic activities that meet the needs of the higher education environment • Supportive links with examples of activities
Learning processes <i>-Tasks should promote materialization / modeling</i> <i>-Tasks should promote verbalization</i>	• Provision of tasks that encourage visualization through the creation of concept maps • Provision of multimedia tasks
Instruction <i>-Activities should support learners through their ZPD</i> <i>-Activities should offer scaffolding features for successful completion</i> <i>-Activities should offer opportunities for interaction where conceptual knowledge guides and shapes the construction of meaning.</i>	• Tasks with in-built supportive features (i.e. pop up feedback windows, etc.) • Ability to use web browsers, word processors etc. with simultaneous use of Moodle • Possibility to engage in asynchronous communication and receive peer-feedback on student work (i.e. workshops, discussion forums, etc.)

2.4.4 Studies on Moodle environments in the L2 context

LSM researchers and practitioners in the world have been participating in further development and improvement of *Moodle* in a collaborative style. Teachers or practitioners are not required to have advanced knowledge and skills while *Moodle* is easy to use and stable. Harashima (2000a, 2000b), Robb (2004a, 2004b), Brandl (2005), Su (2003), Cole & Foster (2009) and Yamada (2010) have all introduced the basic features of *Moodle* and discussed their usefulness in establishing social interaction between instructors and students and among the students in language education with sample learning tasks and tools.

The first two studies compared Moodle with other LMS environments and have resulted in that Moodle's instructional design is suitable for L2 training. Miyazoe (2011),

for instance, has reported a comparative study of two LMSs (*Blackboard Academic Suite 7.1* and *Moodle 1.7.2*) in four online courses of ESP and EAP (English for academic purposes) at two different universities in Tokyo. The two courses used a semi-identical instructional design and LMS usage for comparative purposes to make the most of synchronous oral interaction (verbalisation tasks) and asynchronous written interaction in the target language. The post-course questionnaire focusing on students' evaluation of the course design, online interaction, and LMS usability revealed a higher usability of *Moodle* over *Blackboard* in terms of course design while the correlation analysis revealed that such a result was related to the students' participation in online interaction and appreciation of the online course delivery over traditional learning.

Al-Jarf (2009) has compared the effectiveness of *WebCT*, *Moodle* and *Nicenet* within an EFL instruction setting by teaching freshman students at a Saudi Arabia college. She reports that *Nicenet* enabled students to get the best results in post-test scores and the post-treatment questionnaire revealed the positive attitudes towards it while the learners using *WebCT* and *Moodle* were not motivated and had negative attitudes towards online learning. However, these learners had a low level in English and no prior experience in online instruction. Hence, if they were more sophisticated linguistically as well as technically, the results would be different by introducing more online activities under clear instructions with useful tools such as forums, quizzes, and additional resources. This study has informed the current project since it clearly indicates the components that practitioners should take into consideration to ensure that environments like Moodle will be effective.

Although *Moodle* is not designed particularly for language teaching purposes, it offers a number of useful learning tools that can be employed in EFL/ESL contexts or teacher training projects (section 2.4.3.2). For instance, Suvorov (2007), Su (2003) and

Meurant (2008) suggested its use for ESOL (English to Speakers of Other Languages) writing classes since the typical *Moodle* course affordances offer a set of tools that enable the integration of a broad range of assignments, activities, and multimedia resources, and delivery of teaching materials. Similarly, Su (2003) has also introduced the basic features of *Moodle* within a pedagogical background and has implemented it in a collegiate writing environment. The findings indicated that it effectively helped English writing teachers organize their teaching materials, improve their means of communication, and retrieve their records of interaction with students. Nevertheless, among the drawbacks were found issues such as technical breakdowns, and inadequate computer facilities (Su, 2003: 23). These two studies are indicative of the environment's applications but also of the possible disadvantages that could be encountered in similar projects.

Furthermore, concerning the emerging significance of second language (L2) digital literacy within EFL, Meurant (2008) discusses that *Moodle* has a special potential in EFL education to promote students' development of L2 digital literacy in Korea because *Moodle* forces English to be used exclusively throughout a course website and the meta-language can be made the target L2. This has significant impact on aspects such as designing verbalisation tasks which can encourage learners to reflect on target language use only and internalize knowledge.

Turning to the topic of enriching the L2 Moodle environment with available tools, Berggren et al. (2006), Williams (2003), Stanley (2003) and Bateson (2008) have researched the use of these tools. Berggren (2006) has documented the discussions and experiments of a team of teachers active in the *Moodle* community who were researching the development of international standards in the future versions of *Moodle*. After analyzing the implications of integrating the learning design (LD) specification into *Moodle* and the operation of various tools within the *Moodle* context, they argued that

continued and open dialogue between practitioners and developers of both LD and *Moodle* is necessary to achieve transparent integration. This has thus made it necessary for the present study to seek feedback for the effectiveness of Moodle tools.

Williams (2003) reported a training course for pre-service Educational Technology teachers focusing on a *Moodle* quiz project and survey results. The trainees' comments indicated an increase of self-motivation by a series of creative tasks and cognitive benefits with new ICT and teaching skills. The exact same task formats were also used with the participants of the present study to orient the learners at a basic level during the initial instruction levels and to expose them to contrasting views of the same concepts.

Moreover, Stanley's (2003) study focused on vocabulary acquisition in an intensive reading course at Kanda University of International Studies while using *Moodle*. He reported the summary of a student generated glossary, similar to the one created by the learners in the present study, that provided students with information necessary vocabulary items and a variety of opportunities to see the items in different contexts. He concluded that *Moodle* and its glossary module in particular have been of immense help to practitioners while enabling learners to learn vocabulary well beyond the classroom even with limited class hours of learning. In the present study, the creation of the glossary was also a type of materialization task which allowed learners to concretise abstract concepts and create a list of the most essential ones to direct their learning process and focus.

When turning to the issue of educational praxis and task design, Bateson's (2008) research offered nine ideas for language teachers to incorporate into their teaching with *Moodle* that ranged from small tips to more fundamental changes in the way *Moodle* was used. He suggested exploring new types of *Moodle* activities such as using modules like

the HotPot, Glossary, Choice, and Database, linking single resources into a cohesive set of tasks, using Windows *Notepad* as a whiteboard, using invisible text to line up conversations, using grades to motivate students, using groups to save duplicating course. All of these ideas did not only facilitate course delivery for language teachers but have also engaged participating students in a variety of task formats and have shown that Moodle offers a multifaceted L2 teaching context.

Regarding the effectiveness of specific Moodle activity types, Bateson (2008) has paid special attention to QuizPort module for *Moodle*. This was concerning the creation of adaptive online learning materials to match with students' ability and preferences by detailing examples step by step. The specific module has also been employed in the present study to gradually lead learners to specific tasks and feedback messages according to performance.

Regarding Moodle as an environment that fosters ESP teaching, Baskerville & Robb (2009) have reported a summary of how *Moodle* has successfully been implemented at Kyoto Sangyo University for the purposes of an English for Specific Purposes and Business English course with an emphasis on written communication. It was a hybrid course with a published textbook and *Moodle* offered the interactive aspects. These included successful implementations of asynchronous communication via forums that enriched the students' experience and motivation similar to those of our current project.

Finally, Hinkelman & Grose's (2005) study focused on examining the assessment/evaluation affordances of Moodle by conducting a pilot listening/reading comprehension placement test in 2004 at Sapporo Gakuen University. They discussed testing approaches, test design, hardware and software selection, test administration, placement procedures, and evaluation of results with item analysis. They concluded that

with sufficient hardware resources, *Moodle* was successful in providing a practical technical platform for administering placement tests to large numbers of students in a short time with time savings in the making and analysis of test results. This study has also informed the present study's design of task scoring from a technical perspective since it suggested presenting feedback gradually, right after each item and using a progress bar indicator to maintain the students' motivation.

Some of the previously discussed research on Moodle has traditionally compared systems, explained the affordances of various types of Moodle tasks or indicated in general the environments' use within an L2 teaching context. There is though a significant lack of work which carefully addresses the issue of utilising Moodle in such a way to foster work within ZPD or uses Moodle traits to scaffold the learners' understanding at a conceptual level. These are the gaps that the present study will attempt to bridge. The following section (2.4.5) will outline the ways in which scaffolding has been implemented thus far in various platforms within an L2 teaching context. Some of the following characteristics have provided the basis for the formulation of this study's online scaffolding framework.

2.4.5 Studies on scaffolding and online environments in the L2 context

Online learning environments that host real-time communication between users within the framework of an online environment have long been of interest to CALL researchers. At the initial stages, extended research focused on the use of multiuser

object-oriented domains (MOOs) that used text-based virtual worlds (Schwienhorst, 2002; Shield, 2003).

Recently, researchers have studied alternatives to designing and using technologies to scaffold learning. Hill and Hannafin (2001) classified technology-enhanced scaffolds for open-ended, student-centered learning into four types: conceptual, metacognitive, procedural, and strategic. Hadwin and Winne (2001) contrasted implicit and explicit scaffolds. Saye and Brush (2002) distinguished between hard (fixed, stable, pre-set) and soft (dynamic, flexible, adaptive) scaffolds and Azevedo, Moos, Greene, Winters, and Cromley (2008) conceptualized fixed and adaptive scaffolds to promote self-regulated learning. These types of online scaffolding were adapted according to the basic features that were defined by Bruner (2.1.5) but were also adjusted to the affordances of the online environment in which they were offered (i.e. by addressing anonymization issues, forum posts, etc.).

Consistently, research on metacognitive tools has underscored the significance of adaptive, human scaffolding in facilitating among many other subjects science learning with technologies too. This research reflects a balance between domain content knowledge and self-regulated learning processes. Azevedo (2005) indicated that such adaptive scaffolding enhances student problem solving by fostering “(a) shifts in their mental models, (b) gains in declarative knowledge from pretest to posttest, and (c) process data regarding students’ self-regulatory behavior”.

In Tiangtong & Teemuangsai’s (2013) study, the feature of scaffolding was imported in the Moodle platform within a problem-based learning (PBL) context. The researchers developed four scaffolding modules for collaborative PBL with undergraduate students. The four modules consisted of metacognitive, conceptual scaffolding, strategic and procedural scaffolding and each of the modules was represented

by a 3D animated cartoon teacher to attract the students. The findings indicated that the degree of satisfaction towards the scaffolding from the experts and towards the scaffolding from the students was also high.

Furthermore, computer-enhanced scaffolding can assist students in structuring complex tasks by “problematizing” (Reiser, 2004: 282) content knowledge. In this study scaffolding has enabled learners articulate and act upon problem solving processes and learning activities. Given the wide range of examples and uses, researchers seek to understand the differences among and the nature of numerous types of scaffolds and the conditions under which they are effective: “what to scaffold, when to scaffold, how to scaffold, and when to fade scaffolding” (Lajoie, 2005: 542). Scaffolding research rarely reflects the dynamic and holistic nature of classroom interactions (Kim, Hannafin, & Bryan, 2007). Rather research typically focuses on particular features and affordances of technology in a bound setting. In our case scaffolding will be further conceptualized according to its purposes, interactions and sources by taking into consideration the following.

Among scaffolding purposes, procedural scaffolds guide the student in addressing operational aspects of the learning environment rather than investing cognitive resources in negotiating routine procedures and navigation. Conceptual scaffolds help students to identify essential knowledge gaps between what they already know and what they need to know. They guide students’ understanding about the problem content and relate knowledge and gradually fade as students negotiate the knowledge and skills needed to solve the task. Metacognitive scaffolds assist students in assessing their state of understanding, reflect on their thinking and monitor their problem solving processes. Strategic scaffolds help students to consider alternative approaches to addressing

problems and they prompt students to consider alternatives to framing, addressing and resolving tasks.

Scaffolding interactions according to Kim and Hannafin (2011) are typically static or dynamic. Static scaffolding is provided in the form of fixed directions, procedures or information that typically do not involve negotiation between the students and the scaffold source (e.g. text, tool, or technology). Dynamic scaffolds provide interactive methods to assess learners' progress and provide feedback in response to differential learners' needs (e.g. cues and prompts). Learners assume responsibility for regulating the amount and pace of scaffolding or this could depend on their performance and they determine which and where scaffolds are deployed (i.e. in case further explanation is required during a task).

More specifically, many tools and guidelines have been developed to assist learning and teaching in technology rich classrooms (Demitriadis, Papadopoulos, Stamelos & Fischer, 2008; Lindh and Holgersson, 2007). Research however, suggests that they fail to either reflect the process through which individuals learn or to optimize technological affordances (Hannafin, Kim and Kim, 2004). In practice, students experience difficulty utilizing technology scaffolds to inquire in problem solving inquiry environments and often require considerable assistance (Kim and Hannafin 2007). Practitioners tend to use technology scaffolds to enrich ongoing teaching approaches rather than contextualizing and integrating the scaffolds to facilitate student problem solving (Cuban, 2001).

While scaffolds used to be provided by practitioners or peer learners they can now be programmed into computer software and educational applications. Researchers who have analysed the use of computers for assisted learning scaffolding include Davis and Miyake (2004), Demetriades, Papadopoulos, Stamelos and Fischer (2008), Hmelo and

Day (199), Yelland and Matsers (2007) and Zydney (2010). Sale and Zimmerman (2004) describe the instant feedback, computation power, graphical representation and interactivity of digital environments as positive characteristics in terms of user data collection and rule induction. They believe that users who are given sufficient support and guidance are less likely to become frustrated by repeated failures or to give up under excessive cognitive loads.

Moreover, Lin et al. (1999) suggested four kinds of scaffolding in e-learning environments: reflective social discourse, (a form of a commentary tool for evaluation), process prompts (i.e. a set of built-in criteria embedded on the tasks and guiding the learners in their attempt to form questions, for example by providing generic question forms and sample questions) and process displays (options for different versions of the questions to be consulted by the learners) and frustration control options (to enable the learners to overcome technicalities when using the platform).

Finally, Gardner, Gánem-Gutierrez, Scott, Horan, and Callaghan (2011, 2009) reported on a study which aimed at investigating the technical feasibility and pedagogical value of a virtual space called SIMiLLE to provide a realistic Sociocultural setting and content for EFL interaction; two tasks were compared: a role-play and a treasure hunt. Based on analysis of introspective data obtained by means of questionnaires, observations, focus groups, and screen video recordings of the participants' interactions (N = 11) while carrying out the tasks, it was concluded that both tasks provided opportunities for collaboration, co-construction of cultural and linguistic knowledge, and cultural awareness. The tasks provided learners with opportunities to practice listening, speaking, reading, and writing in the L2 as well as opportunities to work on vocabulary. Importantly, the participants and their language tutor considered the experience in SIMiLLE highly relevant for their L2 development.

2.4.6 Conclusion

This chapter has introduced key concepts and principles of SCT, the main pedagogic models that have informed the design of the present study and the ways in which the previous could contribute to enhancing higher order mental processes involved in the development of reading and speaking skills for academic purposes. The advantages and limitations of various studies that have employed mechanisms such as the ZPD and scaffolding have also been discussed. Since previous studies have not focused on designing online pedagogic units to promote work within the ZPD for EAP learners and scaffold their progress towards conceptual development, there is therefore need for research involving the reading and speaking training of learners within this framework. In the following chapter, the research questions will be introduced and a detailed account of methodological procedures will be presented.

3. Research Design and Methodology

3.1 Introduction and overview of the chapter

This study aimed to investigate how knowledge at a conceptual level (see 2.1.2.) can be fostered and supported online, and examine the effectiveness of an online (Moodle-based) Pedagogic Unit to enhance reading and speaking skills for academic purposes. This chapter will explain the research methodology in detail, including information about the participants and the context, the instruments used, and the procedures for data gathering and analysis.

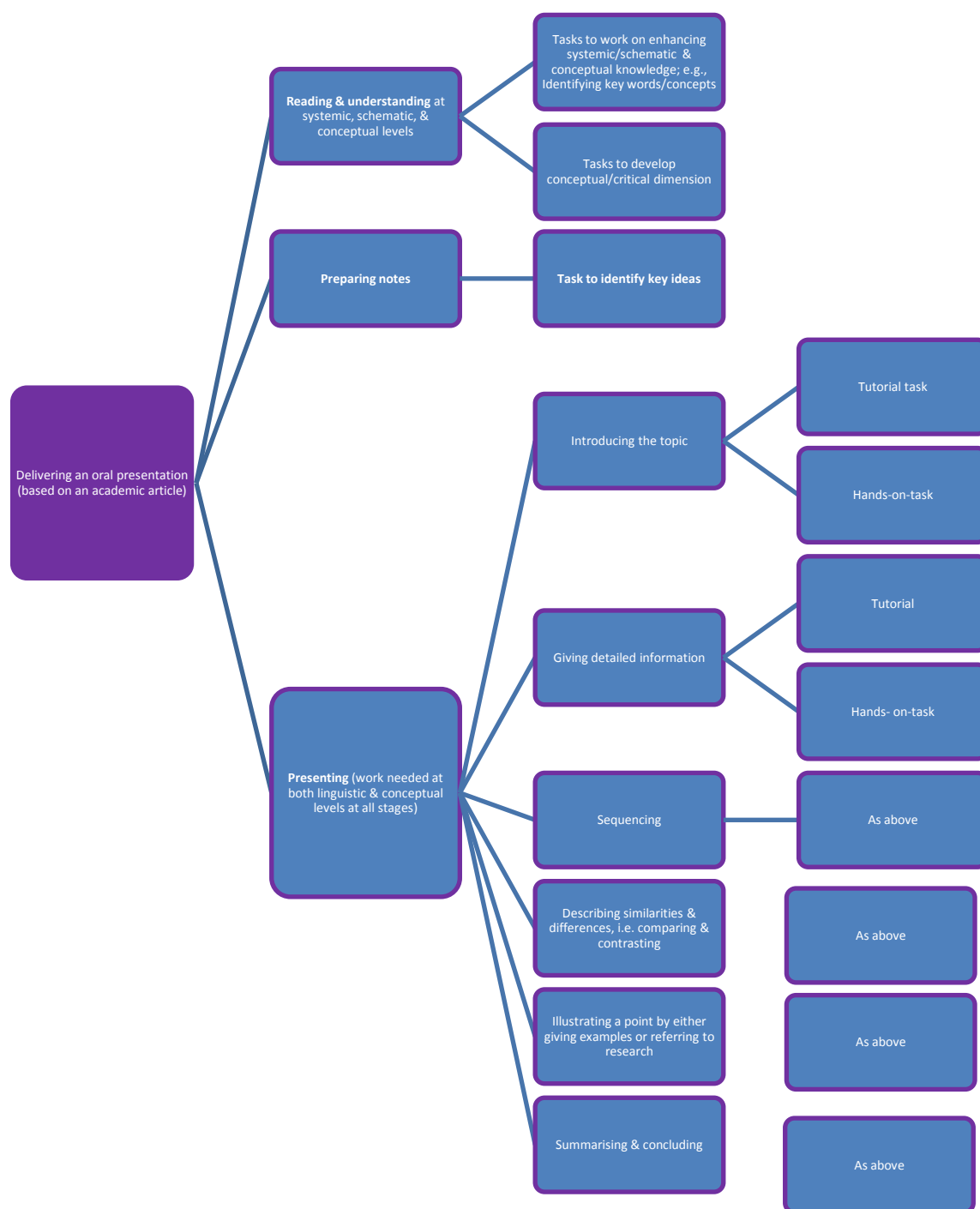
3.2 Research questions

The present study aimed to investigate an online (Moodle) Pedagogic Unit designed to foster understanding at a conceptual level, with specific focus on reading and speaking skills in an L2 academic context. Moodle is an online open-access Learning Management System (LMS). For this purpose, the following research questions were addressed by implementating an exploratory qualitative design:

- RQ1: How has the Pedagogic Unit (implemented on Moodle) fostered understanding at a conceptual level by users of L2 English in an academic context?
- RQ2: How have the Moodle Pedagogic Unit's affordances for academic training (comprising of academic reading tasks and speaking advice) enabled participants to:
- (a) Understand academic texts at a conceptual level
 - (b) Effectively deliver an oral presentation for academic purposes
- RQ3: How have the various scaffolding mechanisms in each task supported:
- (a) The successful completion of the tasks
 - (b) The participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes
- RQ4: What were the participants' opinions and attitudes towards:
- (a) The Pedagogic Unit
 - (b) The pedagogic environment, i.e., Moodle
 - (c) The pedagogic tasks (i.e. reading tasks and oral presentation)
 - (d) The scaffolding mechanisms

The general main aims of the training provided by the Pedagogic Unit were to enable students to deliver an oral presentation after having worked on their academic reading skills and conceptual knowledge (see 3.5.3). Given the complexity of the research design and Pedagogic Unit, Figure 3.1 below provides a schematic representation of the latter:

Figure 3.1: Main target skills and structure of the pedagogic training unit



3.3 Rationale for the research design

To ensure that the research design was appropriate to address the outlined research questions within the theoretical framework discussed in Chapter 2, the present study has adopted an exploratory qualitative approach (Dornyei, 2007: 94). The theoretical background for the present study is primarily based on Galperin's work, one of the major figures in the socio-cultural school of thought, who was influenced by Vygotsky's theory of mind. The central aspects of his theory concerned how human mental activity is formed from the transformation of "external" activity. Based on Galperin's framework I sought to explore and, eventually, demonstrate how individuals internalise external activity to internalise a deeper understanding of academic texts and concepts using a procedure called "stepwise formation of mental actions" (Galperin, 1989: 34, see section 2.2.1).

Following Vygotsky's argument about the leading role of instruction within the ZPD, Galperin developed an instructional approach to foster development. According to Arievidt and Haenen (2005: 157), Galperin developed a research methodology that "favoured the active construction of actions in the external form and guided transformation of those actions into mental processes". From a similar standpoint in the present research and by focusing on conceptual thinking and development just like other Galperian studies (1965), his conceptual framework has also been used here. Galperin conceptualized internalisation as a transformation of certain (material) forms of individual external activity into mental forms of that same external activity and as a specifically human form of appropriation of new knowledge and skills.

Based on this, he classified each concrete form of an action into three Basic levels of abstraction which were called the material, the verbal and the mental levels. Furthermore, Galperin's teaching strategy suggested that any kind of knowledge is

mastery of different kinds of actions (activities - tasks). According to Arieviditch and Haenen (2005: 160), this was feasible by involving the learner in a “spiral model” of teaching through which the learner passes from all the previous levels: first by undertaking a task materially in detail so that all the aspects become apparent, then by performing the task verbally and finally by being able to perform the task automatically.

This model was essential in this study so that I could *foster* as well as *document* the students’ process of internalisation of their actions while they moved along a sequence of levels in mastering a given task. This instruction process according to Arieviditch (2005: 160) entails gradual improvements of the sub-actions performed by the students, “an ability that leads to better understanding, execution and acquisition of action at a particular level” and allows students to orient themselves in and out of an action.

Following this pedagogical approach, I acted as a teacher facilitator with support from the Moodle environment. I have used an exploratory qualitative approach since a major part of my research was exploratory, using cyclical and recursive qualitative data analysis procedures and quantitative data such as task scores and online feedback questionnaires that the students were required to complete. To address all four RQs, qualitative data were collected through audio recordings of academic oral presentations, introspection tasks, semi-structured interviews, audio and video recordings, screen-captures from online activities and analysis of concept maps. I also used semi-structured interviews to gain insight from the participants, about their opinions on their training (RQ 4). I have also used introspection tasks since Galperin’s position supports self-regulation, described as the students’ capacity and willingness to skillfully monitor and evaluate their learning (RQ 1). As outlined in section 2.2.2.1, the model employed to support the participants’ conceptual development is structured as follows (Arieviditch and Haenen, 2005: 160):

1. Orienting at a basic level
2. Acting at the material level (operative and figurative thinking)
3. Acting at the verbal level (verbal thinking)
4. Acting at the mental level (conceptual thinking)

Another reason behind adopting a primarily qualitative design is that, in line with sociocultural theory, the emphasis is on the process of learning rather than exclusively on the product (Merriam, 2001; Schrire, 2004). The paragraphs below describe the creation of the Pedagogic Unit and its various components.

The project relied on the design of a Pedagogic Unit with in-built scaffolding features (section 2.4.5), to enable students to develop their conceptual understanding (with specific reference to Applied Linguistics terminology) and their processing of academic articles through a series of exercises on Moodle (see 3.5.6) given the academic context of the study. The Pedagogical Unit was implemented through Moodle. Emphasis was placed on the participants' development of academic reading and speaking skills (i.e. for academic presentations). A more detailed analysis of the design of the tasks, the materials, the scaffolding features and the general structure of the unit will be presented later. Apart from the Moodle Pedagogic Unit whose content was taught within 3 days in 2 hour sessions, there was a pre and a post session meeting with the participants of the study. Given that most of the current published studies to date that follow an STI approach are also short-term and that in the EAP field interventions tend to be of a smaller scale (i.e. pre-sessional courses), this short course is useful and necessary. This is in order to speculate about the effectiveness of similar programs in situations where students are required to develop skills within a short period of time.

At the pre-sessional stage the participants were asked to read an academic article; then engage in introspection by reflecting on their academic article reading strategies with access to the article to refresh their memory.

After reading the article (on giving feedback in second language acquisition - SLA), participants were asked to create a mind-map of the article's main ideas to prepare for the delivery of an oral presentation. Then, the students worked on a second academic article as part of a 3 day training module (the treatment) and they followed a series of tasks whose design and objectives will be analysed later. Their activities were recorded with digital audio recorders and by using screen – capture software. The Pedagogic Unit on Moodle also contained feedback questionnaires for each session. After the final three day training, the students submitted their presentation of the academic article online and they delivered it orally. The students were also invited to attend a post-interview with exactly the same pre-interview format but on a different reading article and topic. They were also interviewed on their whole experience of the course (see 3.5.7, Table 3.5, for a chart summarising the procedures).

Therefore, a variety of research instruments were employed including introspection techniques, recorded interviews, pre-post interview tasks, online tasks and questionnaires, screen-captures and audio recordings of the online tasks. All the selected research instruments and methodology will be detailed in the following sections along with the rationale behind them.

3.4 Participants and context

As mentioned earlier, the present study was conducted at the University of Essex over a period of 2 weeks. The research participants were volunteers who agreed to participate when invited (Appendix 5). As shown in Table 3.1, the participants were 13 MA students. All of the participants were studying towards their degrees and their country of origin and age varied: 4 Greek female students (aged 22-26), 1 Russian female student (aged 22), 6 Chinese female students (aged 22-28), 1 male student from Hungary (aged 24) and 1 British male student (aged 20). Their familiarity with computer enhanced learning (CEL) ranged from none to some familiarity but they were all computer literate, familiar with Moodle, which is the course management platform used at the University of Essex. The participants' study interests differed since they specialised in different areas of Linguistics such as SLA, Bilingual development and evaluation of course materials.

Table 3.1: Biodata of the participants

Participants	Gender	Origin	Age	MA	CEL
S1	Female	Greek	22	Applied Linguistics	None
S2	Female	Russian	22	TESOL	Some familiarity
S3	Female	Chinese	25	Linguistics	Some familiarity
S4	Female	Greek	23	Linguistics	None
S5	Female	Chinese	26	Applied Linguistics	None
S6	Female	Chinese	28	TESOL	Familiar
S7	Female	Chinese	25	Applied Linguistics	Some familiarity
S8	Female	Chinese	22	Applied Linguistics	None
S9	Female	Greek	26	Applied Linguistics	Familiar
S10	Female	Chinese	24	Applied Linguistics	Some familiarity
S11	Male	Hungary	24	Linguistics	Familiar
S12	Male	British	20	Linguistics	Familiar
S13	Female	Greek	25	TESOL	Familiar

The participants for the study were guided by the researcher who also acted as facilitator of this pedagogical intervention unit. Student selection was based on their level

of studies (postgraduate level), their interests (i.e. Applied Linguistics, etc.), and availability to participate in the project after a brief discussion about it.

Besides the students' opinions on delivering teaching via online virtual environments and their insights from their personal research and study of Academic English and research articles, their perspectives as students were also indispensable for this study. They are valuable data for a comprehensive analysis of the teaching techniques and the effectiveness of the designed Pedagogic Unit. The reasons for choosing postgraduate students of Linguistics rather than other undergraduates or students from a variety of study backgrounds are summarised below.

The importance of using EAP reading and speaking skills within an academic environment according to Hyland (1997: 89) is more evident at a postgraduate level mainly because this level of students focuses on consulting academic journals for their studies or delivering presentations in conferences. However, the ability to engage in conceptual understanding and knowledge necessary to successfully understand sophisticated, academic texts and deliver effective academic presentations varies considerably. Students at this level seem to understand text but rather superficially, focusing on the basic meanings and there is still considerable ground to be covered especially by international students with lower IELTS levels (BALEAP, 2011).

In this study, the students were at a minimum IELTS 6.5 level which is the requirement to enter a master's degree in the Department of Language and Linguistics. Participating in this project enabled the participants to understand their weaker points and learning needs regarding the target academic skills through practice and self-assessments. Their explicit opinions and concrete suggestions based also on their experience with the pedagogical unit and the teaching focus, materials and teaching models, was also sought and provided valuable information. Given the theoretical underpinnings of the study and

the type of information necessary to address the research questions, having a cohort of 13 participants in the study was deemed to be appropriate to render both quantitative as well as a rich, but manageable, amount of qualitative data.

3.5 Design of the Pedagogic Unit

A number of considerations were taken into account in order to design the online course and to ensure that the teaching of the target academic skills would be successful by leading to the development of conceptual understanding and progress of the learners. For all these purposes a needs analysis (section 3.5.1.) was conducted by approaching postgraduate students who had to deliver their presentations. A list of key areas where the students should focus but also a list of the skills required for understanding academic articles and delivering oral presentations was compiled. This along with an EAP task model (section 3.5.3) formed the basis for the design of the Moodle tasks that could facilitate the students' activity and serve towards developing specific skills. To foster this development the tasks were based on a carefully selected academic article topic. The tasks were later on organised/grouped into 3 sessions which lasted 1.5 hour each and their online design was initiated on Moodle. While developing the tasks the researcher reviewed a number of scaffolding models that have been presented in the literature review (section 2.4.5). The Pedagogic Unit included a series of scaffolding mechanisms based on a specific model which informed the creation of a unique scaffolding construct and this will be presented in section 3.5.5.

3.5.1 Carrying out a needs analysis

To decide on the areas of reading and speaking skills that the students would most probably need to focus on, an analysis of their needs was essential (Jordan, 1997: 20). To determine the needs of the students a target – situation analysis was followed (Munby, 1978). The end product was a profile of the students' specific language skills (EAP), also partly formulated by observing the students. The researcher in collaboration with a CALL module senior lecturer observed and recorded the academic oral presentations of three Masters students (not participating in the main study) that had to deliver oral presentations based on academic articles as part of their examination procedures. The students were asked by the module leader to deliver a 15-20 min oral presentation where they had to cover the main ideas of an academic article that they were assigned to read for one of their modules. The researcher, with the informed consent of the participants, recorded the presentations of the three students. The rubric shown in Appendix 6, was used to assess the students' academic oral performance and was based on an existing rubric that was used by the Language Centre of the University of Auburn (2010) to evaluate the oral presentations of students from various disciplines (see 3.5.3). Its main purpose was to identify the potentially weak areas of the observed students by using the scale at the top and the weights in order to classify students in the appropriate band.

From analysing the participants' oral presentations, areas of work for further improvement (see 3.5.3) were identified which led to the development of a list of skills that the students needed to develop to first understand an academic paper and then to deliver an academic presentation based on that paper. The identified areas included the following:

Figure 3.2: Delivering a presentation

a. Reading and Understanding at conceptual levels This consideration led to the creation of tasks to work on systemic knowledge and identifying keywords and concepts which will be outlined in more detail further on but also on tasks which aimed to develop the critical thinking of the learners. b. Preparing notes: This was considered as an important skill that could enable students to progress from the academic article format to the creation of presentation content through the identification of key ideas, for example. c. Presenting (work needed at both linguistic and conceptual levels at all stages): This involves the following areas as they were outlined by Anderson (2004): 1. Introducing the topic (tutorial and hand on task), 2. Giving detailed information 3. Sequencing 4. Describing similarities and differences (i.e. comparing and contrasting) 5. Illustrating a point by providing examples or referring to research 6. Summarising and concluding.

3.5.2 Selection of treatment texts

To proceed with the design of the tasks that were previously mentioned, it was necessary to base the training on materials which the target students would have to read for their studies, like an article on an academic topic. This could serve the purpose of designing realistic practice tasks for the learners when engaged with the Pedagogic Unit. Moreover, since one of the purposes of the project was to evaluate conceptual knowledge (section 3.2) and this would take place by a pre and a post reading test design (see 3.5.7), three different treatment texts were required. Furthermore, the researcher selected three key concepts in the field of SLA that would be essential, within the students' academic background due to their studies. The three selected texts (Appendix 1) focused on three concepts and were selected from an edited collection of articles on SLA. These included: noticing, feedback and motivation. Each article was assigned to three different phases of data collection. The article on feedback was selected for the pre-teaching phase, the article on the concept of noticing was selected as the main treatment text and then one

article on the topic of motivation was selected for the post-teaching phase. The articles were selected from the Routledge Handbook of Second Language Acquisition (2012) and included the following: “Motivation” by Ema Ushioda and Zoltan Dornyei, “The role of feedback” by Shawn Loewen and “Attention and awareness in SLA” by Robinson, P. et al.

In accordance with Meara (2014) and to ensure that all the texts were similar in terms of length, complexity and level of difficulty, the Type Token Ratio (TTR) and D software were used to calculate the lexical variation of the 3 texts and to ensure they all contained an equal variety of active vocabulary. *D_Tools* is a program that computes a statistic reflecting the lexical richness of a text. It is based on work by Malvern and Richards, e.g. Malvern, Richards, Chipere and Durán (2004). The statistic that the program computes is essentially the same statistic that is computed by Malvern and Richards' **vocd** program, but **vocd** requires that the data are formatted according to the conventions used by the CHILDES system (MacWhinney 2000). *D_Tools* therefore makes it possible to work directly with raw text. Malvern and Richards' approach to lexical richness is more complex than the simpler methods that have been used to address this issue (Meara & Bell, 2001a). They accept that texts of different lengths will produce different TTR values, and argue that a text is best described not by a single TTR value, but by a set of TTRs, each describing text samples of different sizes. These values can be presented as a curve and this can then be summarised by a single parameter, D.

The process by which D is computed is complex. According to Meara (2001b: 58), “D typically varies between 0 and a figure that is around 50 but values of D can go higher than this i.e. values which exceed 50 are usually found only with more advanced texts”. Low values of D indicate that the source text contains a lot of repetition, and is not lexically rich. High values of D indicate that the source text is lexically rich, and tends

not to repeat the same words over and over again. This means of analysis has been used to evaluate text richness by a number of researchers (Read, 2005; Skoufaki, 2008) and was therefore deemed an appropriate way of ensuring the three articles shared textual richness but also a good measure for the level of difficulty for the texts. Based on this analysis the result was that all three treatment texts had very close textual richness (for further details see Appendix 7).

3.5.3 Informing the EAP task design

Certain EAP task models have informed the design of the tasks that were employed during the training online. These were in line with the specific initial objectives and the information about SCOBAs (see 2.2) which link to what was considered necessary for the learners at this academic level to achieve conceptual understanding and advanced oral presentation skills. Based on Dunworth's (2008) study who analysed 360 different types of EAP tasks to define criteria for selecting EAP tasks, I also followed the criteria and chose from the task types that were suggested. To define the criteria for task selection, Dunworth's study took into consideration a number of previous studies into university-level tasks, such as those of Bridgeman and Carlson 1983), Hale et al. (1996), Horowitz (1986), and Moore and Morton (1999). Reference was also made to taxonomies of language proficiency, such as the Common European Framework (Council for Cultural Co-operation Education Committee, Modern Languages Division, Strasburg, 2001) and the model devised by Bachman (1990), so that the final classification system would be of particular use in an EAP context. The six criteria are shown in Figure 3.3:

Figure 3.3: Six EAP task criteria

1. Nomenclature of the task as named in the unit outline, for the insight it provided into the academic's intentions
2. Quantity of output, as measured by the number of words
3. Time allocated to task completion
4. Predominant macro-skill required for completion, selected because many EAP courses are skills based
5. Source of information for task fulfilment, selected in order to recognise the contribution of all macro-skills to the task
6. Cognitive demands, evaluated through the use of Bloom's (1956) still frequently cited Taxonomy and the work of Hale et al. (1996). For example, tasks could be categorized as belonging to a domain of "knowledge of specifics," which required the linguistic skills of describing, explaining, listing, or summarizing; or to a domain of "knowledge of universals and abstractions in a field" (Bloom, 1956: 202), which required the functions of evaluating, extrapolating, and analysing abstraction

Based on the previous criteria, the researcher examined various EAP tasks and focused on classifying them under three general types of tasks which included: Predominantly speaking and listening based tasks, Predominantly writing and reading based tasks and Practical tasks. Then, from this pool a range of tasks that followed the general skills that the designed Pedagogic Unit was to develop (as outlined in section 3.2), were selected. A more detailed list which states the aims to be achieved for each skill is provided below:

Figure 3.4: Target reading skills

- For reading**
- To enable students to read and understand the keywords and main concepts of an academic article.
 - To help students develop conceptual and academic critical thinking through reading comprehension.
 - To help students prepare presentation notes and practice note – taking, summarizing and key word finding for slide creation.

A detailed list of target speaking skills is presented in Figure 3.5 below:

Figure 3.5: Target speaking skills

- For speaking**
- To enable students to create an academic oral presentation and introduce a topic
 - To help students develop and plan the steps of giving a presentation
 - To assist students in sequencing, comparing and contrasting information, illustrating points by examples and summarize / conclude in academic speaking situations.

Then, the aims that were to be achieved by the Pedagogic Unit were translated into objectives and, finally, the tasks to support these objectives were designed. Here is how the general aims were interpreted as reading and speaking task aims and Figure 3.2. (p.102) shows the identified areas from needs analysis:

Figure 3.6: Reading and speaking task aims

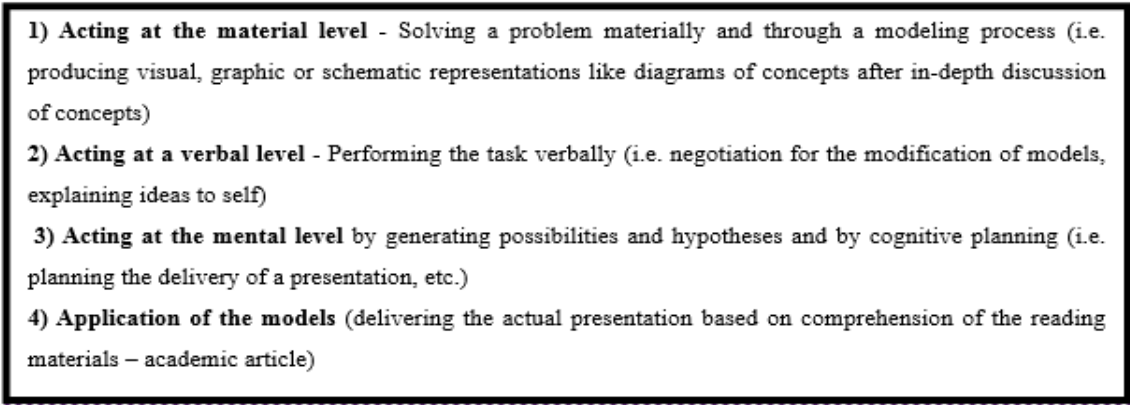
Task aims
1) General orientation for the treatment phase 2) <i>Understanding keywords and concepts (pedagogic aim of online teaching Unit 1)</i> • Skills to enhance topic and genre knowledge ○ Identify the structure of written texts and academic articles ▪ Prediction skills ▪ Identify a purpose for reading and use reading strategies (skimming, scanning), to extract relevant information for topic and text comprehension ▪ identify the function of the sentences in the different article parts (e.g. trace cohesion, etc.) ▪ vocabulary (i.e. concept comprehension and keyword identification) ▪ processing difficult sentences 3) Reading and understanding to develop conceptual and critical thinking (pedagogic aim of online teaching Unit 2) • Skills to enhance critical and conceptual knowledge ○ Distinguish between formal and informal language ○ Identify purpose and tone ▪ Purpose and background ▪ The author and the text ○ Distinguish between factual and non – factual information ▪ Identify the use of evidence ○ Drawing inferences and conclusions ▪ Formulating assumptions ▪ Article evaluation 4) Preparing presentation notes – Note-taking (pedagogic aim of online teaching Unit 3) ○ Summarizing ○ Distinguishing key ideas ○ Creating a presentation plan ○ Introducing a topic ○ Structuring a presentation ○ Preparing for and delivering a 10 minute presentation of the treatment academic article (“Noticing” (see appendix 1)

3.5.4 Pedagogic Unit design and theoretical alignment

The pedagogical unit which will be detailed below was designed based on the theoretical framework underpinning this research project (see section 2.2.2.1). The present study employed a theoretical approach for the creation of the Pedagogic Unit and the training of the students that included principles of STI and more specifically Galperin's spiral model (see 3.3). This is how the spiral model phases translate into the 2 main phases of the Pedagogic Unit:

1. *Orienting within the Pedagogic Unit*; that is, explaining to students the importance of distinguishing between academic genres, involving them in the process of creating an accessible collection of step-by-step guidelines for academic reading comprehension and speaking production to better orient themselves.
2. *Main training* (i.e. the tasks and the simulated presentation). These phases encompassed general problem situation questions for the training, for example, how can we best understand academic articles and how should an academic presentation be delivered. Moreover, the spiral model inspired the sub-goals for the tasks that were explicitly outlined in the previous section but which can be classified underneath as the following:

Figure 3.7: Sub-goals for the tasks

- 
- 1) **Acting at the material level** - Solving a problem materially and through a modeling process (i.e. producing visual, graphic or schematic representations like diagrams of concepts after in-depth discussion of concepts)
 - 2) **Acting at a verbal level** - Performing the task verbally (i.e. negotiation for the modification of models, explaining ideas to self)
 - 3) **Acting at the mental level** by generating possibilities and hypotheses and by cognitive planning (i.e. planning the delivery of a presentation, etc.)
 - 4) **Application of the models** (delivering the actual presentation based on comprehension of the reading materials – academic article)

3.5.5 Scaffolding model

A number of scaffolding models were reviewed in order to find the most suitable ones for this study (see section 2.4.5). According to Whitehouse (2007: 1-2) scaffolding the students' performance through Moodle tasks can be achieved on two levels: the "vertical" and the "horizontal" ones. Scaffolding on the vertical level refers to the "total project scope" scaffolding –structural information on the whole task, the sequence, relevance, timeline – the meta-task. On the other hand, horizontal scaffolding differs to a horizontal plane in that it provides blueprints of what to do at each stage in the sequence described by the vertical scaffolding (Whitehouse: 2007: 2). As well as considering this differentiation, Lin et al.'s (1999) and Fu's (2009) four suggested kinds of scaffolding in e-learning environments were also adopted: reflective social discourse, process prompts, process displays and process models. More specifically, the scaffolding techniques and associated designs included the following:

- Reflective social discourse (i.e. comment boxes, peer-evaluation, notification system with message alerts)
- Process prompts (i.e. built-in hints for the completion of the tasks)
- Process displays (i.e. task completion and progress indicators, learner portfolios)
- Process models (i.e. accessing exemplary answers, concept maps, external links, etc.)
- Customizable options: sets of criteria for peer – assessment, sets of exemplary answers

Specific scaffolding mechanisms from the list above were used selectively at a Pedagogic Unit level, at a teaching unit level or at a task level. For the purposes of the Pedagogic Unit and the 3 day training programme design for the main data collection stage (see section 3.5.7) scaffolding procedures and tools were designed at two levels, according to Whitehouse (2007):

(1) At a pedagogic and teaching unit level (macro-level), scaffolding was provided by means of a variety of resources: the forum discussion area, the glossary that the students were asked to create, and the workshop area that was used for peer-assessment of the students' submitted work. At the teaching unit level, a combination of Lin et al.'s (1999) and Fu's (2009) scaffolding frameworks were implemented:

Table 3.2: Scaffolding at a pedagogic and teaching unit level

Scaffolding at a Pedagogic Unit level	Scaffolding at a teaching unit level		
	Teaching Sessions	Aims	Scaffolding types
1. Forum discussion area			
2. Glossary with key terms	Session 1	1. Developing reading and understanding	Reflective discourse, prompts, displays, social process process models
3. Workshop peer-assessment area	Session 2	2. Reading and understanding to develop conceptual and critical thinking	Reflective discourse, prompts, displays, social process process models
	Session 3	3. Preparing presentation notes and note-taking	Process displays, process models

(2) At a task level (micro-level), the design for each task included a series of scaffolding mechanisms in order to provide graded and contingent assistance (Wood, 2001: 280) to the participants. There were clear instructions for task completion, there were examples of how the task should/could be completed and feedback comments were programmed to be provided by Moodle in certain cases right after students completed the whole task (i.e. for a quiz where the students had to select the correct answer) or after each task stage (i.e. when the students completed a maze task and each question and answer would count). Moreover, the tasks (section 3.5.3.) were designed in such a way as

to help learners attempt the task 2-3 times until they would answer it appropriately. In some cases, scaffolding would be offered by re-directing students at an external link where they were able to view an example of a mind – map for instance.

For a more detailed account of the specific types of scaffolding that supported the completion of each task see section 3.5.6, Table 3.3.

3.5.6 Matching the tasks with theory and scaffolding

The purpose of the training was presented to the students as a chance for them to create a collection of guidelines for students attempting to read comprehensively an academic article and produce a presentation on one of the key concepts outlined in the article. By being involved in this activity, the students would be supported throughout the training to develop their conceptual understanding of the academic articles they were focusing on and to deliver academic oral presentations on these articles.

The reading articles, which were the basis for the participants to carry out the tasks, were provided on Moodle on the book section (Appendix 8) where they were uploaded along with other activity related materials and advice on academic reading and presentations. To match the Pedagogic Unit with the general scaffolding construct as it was outlined in the previous section, it is worth mentioning that this involved forum instructions and forum meetings with the students, diagrams of mind maps and concept maps to guide the learners creations, task instructions and external links to examples of activities. All these opportunities offered students the chance to orient themselves within the Pedagogic Unit but also to be involved at a material level (by producing tasks that were uploaded in the forum area) and at a verbal level (by looking at each other's work to give and receive feedback). The following extended chart describes the theoretical

principles, task goals and scaffolding that was employed each time at each of the three teaching sessions:

Table 3.3: The training sessions and tasks along with their aims, theoretical alignment and scaffolding

Session	Skills for training	Sub goals	Tasks designed to achieve these goals as they appeared on Moodle	Galperian principles upon which the tasks were based	Scaffolding for the particular task
Session 1: Developing reading and understanding skills	Skills to enhance topic and genre knowledge.	-1: identify the structure of written texts and academic articles	1. Imagine you have to present the structure of an academic article visually. First decide on the elements you would need to focus on with your partner and then draw a diagram of the article's structure to be uploaded on the Moodle forum area for peer feedback.	orientation, verbalisation, materialization	peer feedback in the forum area, comments online
Session 1			2. Prediction warm up on Moodle– quick poll with the question being “Why would you read a given academic article?” The following bullet points would be the available options (Think about your reasons for reading the text: ☐ you are interested because it is about your subject, or it is related to your subject ☐ you want detailed background information on a topic ☐ you want to know what the writer's views are ☐ you are going to have a discussion ☐ you are going to write an essay on this subject later	orientation, verbalisation	help button, peer comments online
Session 1			3. Text elements and topics: the students take a survey on Moodle with questions and statements to be ranked: “On a scale from 1-10 which of these article elements would give you more information about the article?” “Which element contributes more in enriching what you already know about the article's topic?” “From the topics provided, can you choose what you think the text is going to be about?”	Orientation	feedback from looking at peer answers
Session 1			4. The structure of your article: Use the pictures provided to indicate the structure of the article and match them against the relevant parts of the article abstract that you are given: door, window, bridges.	verbalisation, materialisation	comments when doing the task, instructions, marking and feedback
Session 1			5. Case study: Imagine you are going to prepare a student about the information they should be receiving from this article. Create a short questionnaire with questions that you would expect every reader to have before reading this article and to which the student should be able to provide an answer for after reading it. Submit to the workshop area.	verbalisation, materialisation	peer feedback, comments on forum
Session 1			6. Follow a maze activity on Moodle where different words / definitions / terms are presented for the students to choose the ones related to the article's topic, in addition to gapfil exercises, etc. While they progress students are not able to go back and they will have to upload this list on the forum area for feedback by the teacher.	verbalisation, mental level	instructions, feedback, marking, re try attempts
Session 2 Developing the reading and understanding of keywords and concepts – Reading and understanding to develop conceptual and critical thinking		2Identifying the structure of written texts, identifying a purpose for reading and using reading strategies (skimming, scanning) to extract relevant information for topic and text comprehension	1. Reading strategies: Think of the steps one should take in order to create a step by step guide into checking predictions about a text. Which parts to be checked, etc. and draw a step by step process to be uploaded on the workshop area.	materialisation	instructions, feedback in the forum area

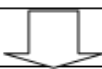
Session 2			2. Checking predictions - Attempt to answer the student questionnaires created above and check if the text matches your answer / expectations.	materialisation, mental level	peer feedback from classmates on forum, teacher feedback
Session 2			3. Write a sentence that explains what the article is about and summarise each paragraph in one sentence. Match these to the structure of the article that you have already created, make the appropriate changes and upload at the forum for feedback.	verbalisation, materialisation	peer and teacher feedback on forum, instructions
Session 2			4. General idea - Write down in 1 or 2 sentences: • what you think the <u>main ideas</u> are • <u>what your first reaction to the text is</u>. Do you find it interesting, informative, well-argued, boring, illogical, inaccurate? - (main ideas poll) - feedback questions or poll about the previous	orientation, verbalisation	view peer results, instructions
Session 2			5. Multi-task (involving a quiz and a glossary) In the student comprehension guide you will need to create a list of all the essential ideas and concepts that one needs to be familiar with in order to understand the article. Take the quiz about the concepts / terms and definitions, check your score and then enter your list of concepts with definitions on the glossary.	<u>orientation, mental level</u>	<u>instructions, feedback, marking</u>
Session 2			6. In a mind map indicate how the main ideas from your article link / include each other and how do they finally relate to the main idea of the text. This will serve as a conceptual guide to understanding this academic article alongside your previously constructed structure map. To be uploaded on the forum.	verbalisation, materialisation	peer and teacher feedback on forum, instructions, one to one workshops
Session 2			7. Identify the function of the sentences in the different article parts (e.g. cohesion) Hot potatoes exercise where the students have to find the differences in the purpose of each sentence.	orientation, verbalisation	test feedback, marking
Session 2		1. keywords and concepts Vocabulary	8. Rate the terms – Look at a list of key terms extracted from the article, rate them in terms of importance and produce a list with the terms you would focus on if you were to give an oral presentation about the article.	orientation, verbalisation, materialization	peer and teacher feedback on forum
Session 2			9. With your partner draw a diagram to show how these concepts are interrelated.	materialization	peer feedback and comments, additional example of diagram
Session 2			10. (Quiz) Students provide a description of a variety of key terms from the studied article, search them up on the glossary that they have already created and consider which ones they would focus on and why (if they were to talk about the article)	verbalisation, practice (within MAC's modeling stages)	comments, feedback, marking

Session 3	Reading and understanding to develop conceptual and critical thinking	Skills to enhance critical knowledge: a. Identifying level of Formality	1. Formality: Distinguish between a formal or informal text? -a lesson activity where students have to choose between examples showing formality and then come up with a definition of the term to be added in the glossary and a list of characteristics of the term ranked. 2. Activity: (task) These four texts differ in formality. One of the reasons for this difference is the different audiences they are targeting. Read the texts below carefully and then rank them from most formal (1), to most informal (4). When you have finished ranking the texts, submit your answers.	materialization, verbalisation	teacher and student feedback on forum, example to guide the students
Session 3		b. Identifying the author's purpose and tone:	3. Identify the author's purpose and tone: -Hotpotato multiple choice task (the author's intention is to..) 3 selected sentences from the article's Future directions section	Orientation	feedback on tasks, example, instructions
Session 3	Preparing presentation notes - Note – taking	c. Summary practice	4. Summary practice - Hands on activity: If one asked you to produce a summary and bullet points with key points of the article which steps would you follow? Create a step process for each case and upload on workshop for feedback.	verbalisation, materialization	example, instructions, forum
Session 3			5. Presentation content outline - Present a summary model for the student guide -Which of the previous elements would you focus on for a presentation? Make a list of points and keywords that you feel should definitely be mentioned, show schematically in which order and justify.	materialization	example, feedback from students and teacher, instruction, forum
Session 3			6. Preparation for the presentation: Locate the article sections and highlighted terms and summarize the key content from each section in 3-5 lines.	materialization	forum area, instructions, link to another site

3.5.7 The teaching cycle: description and overview of data collection procedures

The purpose of this section is to present an overview of the project within which the teaching cycle stands which is of crucial importance in order to understand the instruction process. The general structure of the model for course learning design was the following:

Table 3.4: Model of course learning design

Day 1	Course orientation - 1. Developing reading and understanding of keywords		
			
Day 2		Day 3	
Tutor facilitated activities and student peer feedback sessions			
Reading and understanding to develop conceptual and critical thinking	Vocabulary	Preparing presentation notes and note-taking	Learning activities
Concept map creation, Quizzes, Gapfil exercises	Review quizzes, multiple choice tests, Open-ended tasks	Concept map creation, Multiple choice questions, Quizzes	Tutor marked or reviewed tasks
Day 4 - Final outcome:			
Online course completion // Progression to face-to-face delivery of an oral academic presentation			

The Pedagogic Unit – Scaffolding Advanced Academic Skills (SAAS) was organised into 3 teaching units on Moodle (Table 3.5). The first teaching session was an introduction to the topic, the treatment text and understanding the main ideas. The second session was a hands on practice where the students experimented with identifying specific text details, concepts and with peer - evaluating work online. In the final session the students were trained on summarising text parts, reducing content for presentations, note-taking and creating a presentation structure. The students worked on an academic article on the notion of noticing during the 3 day training and they went through a series of tasks

whose design and objectives will be analysed later. Their activities were recorded by digital recorders and by using screen – capture software. The Pedagogic Unit on Moodle also contained feedback questionnaires for each session. At the end of the session the students were asked to submit their presentation of the academic article online and deliver it orally.

Apart from the Moodle Pedagogic Unit whose content was taught within 3 days, in 2 hour sessions there was a pre- and a post-treatment session meeting with the participants of the study. At the pre-treatment stage the participants were asked to reflect on their academic article reading strategies by answering some guiding questions (Appendix 9) and were recorded when talking about them for an average of 10 minutes by relying on an article in front of them (that intended to motivate the students' introspection) (Cohen, 1987). Then, all the participants were asked to read an academic article on the topic of giving feedback in SLA and to create a mind-map with the main article ideas that would help them deliver a recorded 10 minute oral presentation in front of the researcher. The pre-treatment (1st session) acted as a 'baseline' for measuring progress as a result of the pedagogical treatment. Finally, after the 3 day training (see details below) the students were invited to attend a post-session with exactly the same format of the pre-treatment phase for a third reading article. The post (3rd session) was used as a measure to compare against the 'baseline'. The learners were also interviewed in order to gather their views on the whole experience.

Table 3.5: Overview of the pre and post-treatment sessions and the main teaching cycle

Session	Article	Activities
Session 1: Pre-treatment	'Feedback' article	• Introspection – Think aloud task • Concept maps • Oral presentation
Session 2: Treatment (3 days, 3 sessions, 2h per session)	'Noticing' Article	General activity types: • Moodle features: forum, glossary • Individual online Moodle type tasks • Oral presentation
Day 1 – Teaching session: Developing reading and understanding of keywords		Introduction to the topic, the treatment text and understanding the main ideas
Day 2 – Teaching session: Reading and understanding to develop conceptual and critical thinking		Hands on practice where the students experimented with identifying specific text details, concepts and with peer - evaluating work online
Day 3 – Teaching session: Preparing presentation notes and note-taking		Training on summarising text parts, reducing content for presentations, note-taking and creating a presentation structure. Online submission of presentation and oral delivery
Session 3: Post-treatment	'Motivation' article	• Introspection – Think aloud task • Concept maps • Oral presentation • Semi structured-interviews • Task questionnaire • Scaffolding questionnaire

The whole structure of the data collection phase resembles the 3 levels of action that were outlined by Galperin at a macro-level: the pre-session enabled the students to work at the material level and familiarize themselves with the use of concept maps, the 3 day training offered participants the opportunity to verbalise the acquired concepts and internalise knowledge. The result of this was to enable participants to act at a mental level during the post-session and successfully deliver a well-structured and organized presentation. Additionally though, at a micro-level, the 3 levels of action took place during each of the pre-, while and post- sessions. During the pre- and post-session the

students went through the 3 levels of action: the material level when creating a concept map, the verbal level when introspecting and the mental one when delivering a presentation.

3.6 Data collection instruments and procedures

For the purposes of the study an ethics approval application was approved by the Faculty before data collection. The students' permission to participate in the study was requested and information about the project requirements was also offered (Appendix 5 and 3.4). In addition, to protect the students' identity the data were anonymised (3.9.1.1).

The data collection during the training cycle took place at three different stages: the pre-treatment session, the main 3 day teaching cycle and the post-treatment session (see previous section). The students were audio recorded during the pre- and post-interviews and they also had to complete a task and deliver a presentation. During the teaching cycle the students were audio and video recorded, their online activities were captured by using screen capture software and the materials that they created on Moodle and their online tasks and questionnaire answers were also considered for analysis. A more detailed analysis of the tools used during each phase, the rationale behind them, and the data collection procedure will be detailed in the following sections (3.6.1).

3.6.1 Data collection instruments

The following table presents an overview of the various study phases and the different tools that were employed in order to collect data.

Table 3.6: Overview of study phases and data collection tools

Session	Article	Tools for data gathering	Mode
Session 1: Pre-treatment	'Feedback' article	Retrospective think aloud task	Audio recording
		Concept maps	Written
		Oral presentation	Audio recording + written evaluation
Session 2: Treatment (3 days, 3 sessions, 2h per session)	'Noticing' Article	Moodle features: forum, glossary	Screen captures and audio recordings
		Individual task scores and answers	Screen captures and audio recordings
		Online General Feedback questionnaires after the end of each session	Screen captures
		Oral presentations	Screen captures and audio recordings
Session 3: Post-treatment	'Motivation' article	Retrospective think aloud task	Audio Recording
		Concept maps	Written
		Oral presentation	Audio recording + written evaluation
		Semi structured-interviews	Audio-Recording
		EAP and generic task questionnaire	Written
		Scaffolding questionnaire	Written

These tools were selected for a variety of purposes and they each contributed a different perspective on the data and the factors that were researched to address the research questions.

3.6.1.1 Rationale for the use of retrospective think aloud tasks and verbal protocols

Think aloud protocols are obtained by having participants report verbally their thoughts while performing a task: therefore, they are expected to reflect mental behaviour

as in introspection (Cohen, 1987). Think aloud protocols have their potential strengths and weaknesses. Olson, Duffy, and Mack (1984: 256 ctd. in Katalin 2002) regard ‘think-out-aloud’ as a tool for collecting “systematic observation about the thinking that occurs during reading” about the otherwise unseen, unobservable processes, such as inferencing or the use of prior knowledge. This is the closest way to get to the cognitive processes of learners. Nevertheless, only the conscious processes are available for verbalisation and the rest of the unconscious thoughts might remain hidden. Moreover, the “respondents may differ with respect to their verbal skills” (Cohen and Scott, 1996: 97). Some might be more competent than others at contributing the appropriate amount of data at the appropriate level of explicitness.

Think aloud protocols require careful setting up and preparation on the part of the researcher. Katalin (2002) emphasizes that the purpose of the research should be in harmony with what can be retrieved with the think aloud protocol. Moreover, the instructions that will be given to the participants should be neatly worded and focused to the research aims. The selection and training of participants for the study purposes should also be carefully considered by the researcher. Rankin (1988: 127 as ctd. in Katalin 2002) states that participants should, first of all, familiarise themselves with the purpose of the study and they should be shown what they are expected to do. Another issue is the language of verbalisation. During the preparation stage the researcher should decide what language the participants will use when doing the think aloud. Katalin (2002) cites an argument raised by Rankin (1988: 122-123) that “Requiring the subjects to switch back and forth between languages while reading and verbalising would seem to encourage translation...”. On the other hand, if participants are asked to use the target language while performing the task, the participants might worry more about speaking and concentrate less on the task itself. Furthermore, their target language oral production

skills might be limited too. To avoid these complications, Katalin (2002) suggests that “subjects should be instructed to verbalise in their mother tongue”. Another alternative is to “let the participants decide which language they would feel comfortable with when doing verbalisation” (Katalin, 2002: 4).

Regarding this specific study, to strengthen the procedures, the participants were asked to verbalise after taking some time to think about the process they follow when they read an academic article, what some of their difficulties are and they were also given the option to have a look at an academic article (not the one they were going to verbalise on) before they verbalised and performed the actual task (retrospective report) (Appendix 9).

3.6.1.2 Rationale for the use of concept maps

Concept mapping is one broad family of graphic organising tools, that includes mind mapping (Buzan and Buzan 2000) and spider diagramming (Trowbridge and Wandersee 1998). Yet Novak’s method (Novak, 1998) has some very specific rules that set it apart from other techniques. These are a consequence of the careful definition of learning as change, and facilitate the use of the method for the measurement of learning quality. Novak’s use of concept maps is grounded in one of the most widely used general models of adult learning: Kolb’s learning cycle (Kolb and Fry 1975). Kolb and Fry (1975) describe learning as a cycle. First, the person has an experience, then, they observe and reflect upon it. This is done in order to form new ways of thinking about the subject, so that finally what has been newly understood can be tested before the phases of the cycle are repeated. Although Kolb’s learning cycle has its origins in the literature of continuing education, it can contribute to an understanding of learning at an academic and

conceptual level. This is because it takes ‘experience’ as the starting point for learning, and suggests that learning occurs by similar and sequential processes. Thus, individuals must experience, reflect, theorise and test new knowledge in order to learn. Kolb and Fry (1975) suggest that this is true of learners in all situations, including the classroom experience of formal teaching. Jarvis (2006) has extended Kolb’s approach by arguing that learning experiences enable the learner to change and learn from them and the absence of change could indicate non-learning. H also mentions that learners tend to employ strategies that could affect the quality of their learning.

Novak has developed an empirical framework for assessing the quality of any change that may have occurred. He describes learning as change and more specifically as a cognitive change within a single continuum that extends between rote and meaningful learning. He defines meaningful learning in the following ways:

- (1) *Relevant prior knowledge.* The learner must know some information that relates to the new information to be learned in some nontrivial way.
- (2) *Meaningful material.* The knowledge to be learned must be relevant to other knowledge and must contain significant concepts and propositions
- (3) *The learner must choose to learn meaningfully.* The learner must consciously and deliberately choose to relate new knowledge to knowledge the learner already knows in some nontrivial way (Novak, 1998: 19).

Therefore, a concept map uses the basic linguistics elements. Concept maps consist of concept labels that identify specific ideas (concepts) and the links between them, which explain how concepts are related to form meaning. A pair of concepts and their link create a single proposition, and a concept map is made from any number of

propositions to give a personal definition of any particular idea or phenomenon (Novak, 1998). Each proposition is a statement of understanding and the validity of each assertion is open to criticism. Thus, the method is much more stringent than mind mapping, for example, and actively differentiates between knowledge (of appropriate concept labels) and understanding (that is the product of concept linkage). For the present study, concept maps were selected as there are specific frameworks that were developed (i.e. Novak, et al.) and can be used to capture learning change unlike mind maps.

Analysis of large numbers of maps can be time consuming (although quicker than the analysis of, say, individual interview transcripts), but Kinchin, Hay, and Adams (2000: 300) show that “a considerable amount of information can be gleaned very quickly indeed using structure alone as an indicator of prior knowledge”. More stringent methods of analysis are described by Hay (2007) and Hay, Wells, and Kinchin (2008), and can be combined with a simple sampling strategy. Most importantly, concept mapping can be used to make abstract knowledge and understanding visible.

For the present study, the use of concept maps as data collection tools was very closely aligned with socio-cultural theory and concept creation and is a powerful way of capturing conceptual development by involving participants at performing actions at the material level. Then, the use of the concept maps during the pre and post sessions as the basis for delivering an oral presentation on an academic topic can enable the participants to verbalise concepts and perform at a mental level. The task instructions that were given to the students for concept map creation are in Appendix 10 and examples of concept maps can be found in Appendix 11. Most importantly though, concept maps can offer an insight into the establishment of “valid” or “non valid” links that reflect the students’ higher mental functions such as planning, organising and classifying key concepts. The concept maps therefore function as tangible evidence of the learners’ progress from lower

to higher levels of conceptual development when comparing their pre and post-treatment concept maps.

3.6.1.3 *Rationale for the use of oral presentations*

In section 3.5.3. the main academic speaking skills that the participants received training for and the relevant task aims were outlined as follows:

Figure 3.8: Main academic speaking skills

- To enable students to create an academic oral presentation and introduce a topic
- To help students develop and plan the steps of giving a presentation
- To assist students in sequencing, comparing and contrasting information, illustrating points by examples and summarize / conclude in academic speaking situations.

The development of these speaking skills can contribute to the creation of effective presentations, which ultimately, is considered to reflect good understanding at a conceptual level. In this way, the link between the exploration of the academic reading texts and the presentations is clearer. Moreover, producing a good presentation demonstrates deep/conceptual understanding which in Galperian terms is translated as ‘acting at a mental level’. The students, having acted at material and verbal levels, should be in a position to deliver a strong(er) presentation hence demonstrating development promoted by the previous training stages. More specifically, the previously mentioned speaking skills are translated into the following more specific ones:

Figure 3.9: Preparing presentation notes

Preparing presentation notes – Notetaking (pedagogic aim of online teaching Unit 3)

- Summarizing
- Distinguishing key ideas
- Creating a presentation plan
- Introducing a topic
- Structuring a presentation
- Preparing for and delivering a 10 minute presentation of the treatment academic article (Noticing)

In order to ensure that the students would be in a position to employ all the relevant taught information it was important to require the production and evaluation of relevant and academic oral output by means of audio-recording mini-oral presentations that would reflect the students' comprehension of the academic articles they were required to read. The delivery of an oral presentation also provided additional information about the students' conceptual ability by constituting a means of verbalising key ideas and concepts. This also constituted an exercise of demonstrating use of higher mental functions such as summarizing and critically synthesizing content to create a presentation.

3.6.1.4 Rationale for the use of audio and video screen captures of online activity

Though screen capture technology has been applied in only limited ways to research strategies (Smith, 2008), researchers are now trying to explore its potential in assessing language learning. Screen capture “programs can be used to collect information either with or without the learner’s awareness” (Cohen and Scott, 1996: 103). Such tracking might be used to identify the language learning strategies and online behavior associated with the use of resource functions such as a dictionary, a thesaurus, tutorials on how to complete given language tasks, etc., the sequence of processing of elements in reading text for comprehension, and the speed in reading and writing tasks. Cohen and Scott (1996) assert that there might be some problems with the results of other assessment methods such as interviews, diaries, etc. for various reasons. However, by recording a learner’s use of a resource function, the computer eliminates the problem of distortion because of human inaccuracy or unawareness. The screen captures have certain disadvantages as well. A major limitation of the method pointed out by Cohen and Scott

(1996) is its inability to describe language learning use strategies or use strategies which do not result in the use of a resource function on the computer. For instance, if a learner uses inferencing to understand the meaning of a word, the computer would not be able to report this. Another limitation is that the use of screen captures may not be practical since some participants may press wrong links when performing online tasks that could interrupt the recording of their actions.

In the present study, the screen-captures of the students' online activity on Moodle were an essential data collection tool that allowed the researcher to examine the learners' actions unobtrusively. The learners' recorded reactions revealed information about their preferences, their personal manners of performing or understanding task instructions and the process of thinking while performing the tasks which revealed information about conceptual thinking. Moreover, screen-captures offered an insight into the effectiveness of the scaffolding features of the tasks and the students' response to them.

3.6.1.5 Rationale for the use of Moodle and online tasks

Moodle (see 2.4) has good potential for facilitating scaffolding mechanisms and supporting regulation at object and even self-regulation levels. It has a particular focus on the learning that can occur while learners are actively involved with the process of constructing artefacts for use by others ("Background", 2012). With this view in mind, Moodle aims to offer students control (regulation) of shared content in many of its core activities, to construct and co-construct learning artefacts, and contribute towards the provision of learning experiences in the online sphere.

It warrants strong mention that the drive for adopting Moodle as the institutional LMS was pedagogical because “the eLearning Strategy was predicated on the need for pedagogic change and for teachers to reflect on their own teacher identity, views of knowledge, and the place technology has to play in facilitating these beliefs” (Keesing Styles & Ayres 2011: 50). According to Siemens (2006: 3), “A clear definition of learning vision and desired future states, created through input from stakeholders (administrators, faculty, students, and information services) should provide the foundation for decision making, and the boundaries of platform selection”. The foundations of Moodle complement the transformative practices proposed in the e-learning Pedagogic Unit. Moreover, the use of an LMS provides structure and a safe starting point for embarking on an e-learning journey. It was also an environment that the students were already familiar with because Moodle was the platform used for uploading and accessing academic materials for other courses. Additionally, the structure and design features of Moodle offered the opportunity to experiment with the creation of a variety of tasks to achieve the academic aims that were outlined earlier and also to incorporate a variety of scaffolding features that were supported by the system. Furthermore, Moodle also offered assessment options (i.e. tests, quizzes, peer-assessment options, etc.) that could assist with evaluating the progress of the participants. For the purposes of this training unit, a total of 22 tasks were offered to students: six during Session 1, ten during Session 2 and six during Session 3. A specific and detailed description of the online tasks that were offered during each session of the training has already been provided in section 3.5.6, Table 3.3.

3.6.1.6 Rationale for the use of questionnaires

Making use of questionnaires in a research study is one of the most commonly used techniques to collect data since they “can be objectively scored and analysed” (Oxford, 1990: 199). Similar to interviews, they vary from more structured, in which the items can range from “yes or no” answers or indications of frequency, to less structured questions asking respondents to depict or explain the language learning strategy in a detailed way. The data obtained from highly structured questionnaires are uniformly organised because of the standardized categories provided for all respondents and they lend themselves to statistical analysis (Cohen and Scott, 1996). Oxford (1990), also asserts that the more structured questionnaires “might miss the richness and spontaneity of less structured formats” (199). Figure 3.10, provides an example of an item in one of the online questionnaires used in this study which was the following:

Figure 3.10: Sample item from the online questionnaire (Session 1)

The screenshot shows a web-based questionnaire interface. At the top, the title "What did you think?" is centered. Below the title is a "Continue" button. A red note states: "(*)Answers are required to starred questions." The questionnaire contains five items, each with a text input field and a "Continue" button at the bottom of the form:

- How would you rate this session in terms of the new content you have acquired? (1-bad - 10 very good)* (1 - 10)
- What did you think about the tasks you completed?*
- How would you rate the time available for the training? (1-bad - 10 best)* (1 - 10)
- Did this session help you improve in your academic reading? How? If not, why?*
- Any general suggestions?*

Each item has a corresponding text input field for the respondent's answer. The "Continue" button is located at the bottom of the entire questionnaire form.

In general, the present study used three types of questionnaires which included, online feedback questionnaires on Moodle (Appendix 12), a questionnaire to gather information about the tasks and their EAP content (Appendix 13) and a final questionnaire about the scaffolding features of the online training unit (Appendix 14). Each of the three questionnaires is described below.

3.6.1.6.1 Online feedback questionnaires

In the present study, a series of three online questionnaires (see details above) were used as a means of collecting the students' feedback on the various elements of the teaching unit and each questionnaire was offered at the end of each training session. The questionnaires were administered online since Moodle was used as the platform of delivery and the questionnaires were also tools supported by the platform. The data collected via this type of instrument were analysed to answer the research questions about the effectiveness of online scaffolding and in order to collect the students' views about the teaching unit, the platform, their performance and the tasks in general (RQs 3/4). The questionnaires consisted of five items in total from which three questions were open ended and two required students to rate the content of the units and the time that was allocated for their completion. The open ended items invited the students to comment on the tasks, provide suggestions and reflect on whether the session enabled them to improve their reading / speaking skills. An overview of the online Moodle questionnaires is provided in Appendix 12.

3.6.1.6.2 Task questionnaire

The task questionnaire (Appendix 13) was administered to collect data about the online training tasks and how supportive the students found them in terms of enabling them to develop their conceptual understanding (RQ3). It also served the purpose of evaluating the affordances of Moodle to offer a course with a focus on EAP instruction and whether the EAP content of the designed online Pedagogic Unit was appropriate. The views of the students were collected by employing a written survey questionnaire with questions adjusted from Leo Yu (2002) and Hirschel (2012). To objectively evaluate the unit content, the evaluation criteria included in the questionnaire were mostly adapted from the following four CALL evaluation guidelines with some modifications to suit the unique nature of the Pedagogic Unit: (a) CALL Software Evaluation Questionnaire by Peterson (1999), (b) Software Evaluation Guide by Barlow et. al, (c) Hubbard's Methodological Framework for CALL Courseware Development (1992) and (d) English 3 Courseware Evaluation – Fall 1996 by Towndrow (1996). There were statements and participants were asked to choose one of the following options: Strongly Agree, Agree, Disagree and Strongly Disagree for each statement.

Furthermore, they could note their comments on the lines provided when necessary. The first part of the questionnaire included overall questions whereas the second part included questions about specific tasks during the training. The questionnaire consisted of four sections. The first one included ten generic statements about the tasks, the instructions and the online materials that the students should strongly agree, agree, disagree or strongly disagree with. The other three parts matched the three training sessions and the students had to rate six statements about the tasks that were offered in training Session 1, ten statements about the tasks of Session 2 and six statements about

the tasks of Session 3. The rating was exactly the same as the first part of the questionnaire and the statements of Part 2, 3 and 4 of the questionnaire were formulated according to the objectives of each task (Section 3.5.6, Table 3.3). This instrument was implemented during the post-treatment session and after the students had already participated in the semi-structured interviews (see 3.5.7, Table 3.5).

3.6.1.6.3 Scaffolding questionnaire

The purpose of this questionnaire (Appendix 14) was to gather information about the students' opinions regarding the eight different scaffolding features that were employed during the training and see if the features contributed to the students' understanding and completion of the tasks. The questionnaire consisted of eight statements about the features that scaffolded the students' learning process during the training. The statements of the questionnaire were revised following a similar sample that was administered by Fu (2009) (Appendix 15). The students were asked to evaluate the helpfulness of the scaffolding features by rating the statements. Their ratings were within the range of 0 (not at all helpful) to 4 (very helpful). A five point Likert scale was selected to avoid neutral responses and receive positive or negative opinions about the features. The questionnaire was followed by a general statement to be rated which was the following: "During the course, being able to perform the tasks with scaffolded assistance helped me learn the covered content". The students' responses could vary between strongly disagree, disagree, no opinion, agree, strongly agree.

3.6.1.7 *Rationale for the use of semi structured interviews*

Interviews provided an additional way of collecting data regarding the participants' views towards the pedagogical unit, the online environment, the tasks and the scaffolding mechanisms. Interviews range from unstructured to structured types. Since there is no particular questioning technique in unstructured interviews the data obtained from such an interview is difficult to interpret and categorise. Whereas the data gathered from a semi-structured interview are “uniformly organised for all respondents and provide relative freedom to the interviewees to express their own views” (Cohen and Scott, 1996). The guiding questions used in this study can be found in Appendix 16 and they were designed to collect data about the students' views on the Pedagogic Unit, the platform, the tasks, the scaffolding that was provided and the overall EAP training.

Regarding the EAP content of the Moodle Pedagogic Unit, the related questions guiding the interview about the tasks were the following:

Figure 3.11: EAP content related interview questions

1. Have the Moodle vocabulary exercises been helpful for your learning of academic English? Please explain why or why not.
2. Can your teacher improve the Moodle vocabulary exercises so that they better match your needs? If yes, please explain how.
3. Have the Moodle quizzes been helpful for your learning of academic English? Please explain why or why not.
4. Can your teacher improve the Moodle quizzes so that they better match your needs? If yes, please explain how.
5. Has the Moodle forum been helpful for your learning of academic English? Please explain why or why not.
6. Can your teacher improve the Moodle forum so that it better matches your needs? If yes, please explain how.
7. What additional opinions do you have with regard to Moodle and your learning of academic English?

An open-ended interview format was specifically chosen to receive a more robust picture of participant attitudes and to allow for the emergence of unpredicted responses (Dörnyei, 2007). With the interview, the researcher has investigated the participants' perceptions about the CALL activities and their potential for scaffolding, academic reading and speaking training and supporting conceptual development.

Regarding program evaluation, the systems model was employed to formulate interview questions (Rossi, Freeman & Lipsey, 1999). Moore and Kearsley (1996: 5) suggested that a systems approach is very helpful to understand online education and that “the systems model provides a tool that not only helps us recognize many of the issues that separate online education from conventional education, but also helps us distinguish good online education from bad”. The present study has specifically focused on the process and output evaluation interview questions as these would be the questions that the students could answer from their perspective and experience.

The process evaluation interview questions included the following: to what degree were students satisfied with the program? Did they think the program was equally effective for all participants? Why or why not? Did they think there were characteristics that distinguished satisfied and dissatisfied students? What program components or activities appear to better support their development at a conceptual level? The output evaluation interview questions included the following: did the students feel the program and course objectives were achieved? What program and course design components appeared to contribute the most and least to the attainment of these objectives? Did the students feel that they gained the desired knowledge and skills? In general, the question extracted both information about the affordances of Moodle as a platform but also the students’ opinions (RQ2/3).

Moreover, the interview questions offered learners the opportunity to reflect on their own progress and to report any problems or advice that could improve the teaching unit.

3.7 Data collection procedures

The following three sections aim at providing a detailed account of the procedures that were followed for data collection during the pre, post and main treatment sessions. The data collected during the pre and post-treatment sessions served as a means of comparing student performance before and after the main treatment to observe any changes or improvement in conceptual development.

3.7.1 Pre-treatment session

The aim of the pre-sessions was at first to record the students' way of approaching academic articles by asking them to complete an introspective task (Appendix 9). The students were invited to meet individually with the researcher, they were given the task and they had a few minutes to think about it, make notes on a piece of paper and prepare by consulting an example article that was brought for the interview by the researcher. Once ready, the students were informed of the time they had at their disposal to reply (10 minutes max) and they were recorded while speaking. The researcher used the Audacity audio recording software (by BETA) and provided a notebook and a microphone in the interview room. After this stage, all the participants were invited to the classroom for the second part of the task. They were asked to read an academic article about feedback (Appendix 1) and then to create a concept map that they would use in order to present the article in front of their peers for 10 minutes max. The students were given the task instructions, a piece of paper for notes and copies of the pre-test article. They were given one hour for reading the article, taking notes and creating a concept map and then 20 minutes for rehearsing their presentation. Before creating their concept maps, the

researcher showed concept map examples to the students and discussed their use to provide models. Then, one by one the students were invited to deliver their presentation in front of the other students and their speech was recorded.

3.7.2 The teaching – treatment cycle

The duration of the teaching cycle was 3 days over a period of 2 weeks. Each session lasted for 2 hours (see 3.5.7) and was offered in a computer lab with projector facilities for all students while they worked on an individual basis. All the sessions and all computer-based activity was recorded by using freeze screen-capture software and digital audio recorders.

The first session focused on introducing the students to the second article (i.e., treatment article) that they would work on (the first one being the article of the pre-treatment session), the Moodle unit and the scaffolding features at a pedagogic and teaching unit level (macro-level) and at a task level (micro-level). The participants logged into their Moodle courses and worked individually in front on their computers. The instructor gradually revealed the exercises for the students to complete in order to scaffold the submission of tasks and answers. The same process and teaching approach was followed in the following 2 sessions that focused on helping the participants to think critically, i.e., work on conceptual development (session 2) through completing a series of online tasks and on preparing and delivering a presentation on the second, treatment article (session 3). At the end of each training session the students were invited to complete an online feedback questionnaire (section 3.6.1.6.1 a) which appeared on the course as a final task to do. Therefore, the students completed three online feedback questionnaires in total.

The researcher's role was to facilitate the process and guide the students through the various tasks rather than to "teach" the actual module, which was all contained within Moodle. After the third session the students submitted their PowerPoint presentations online in the Workshop area and delivered them orally in front of the class. The time given for the presentations was 10 minutes maximum with 20 minutes rehearsal time.

3.7.3 Post- treatment session

The post treatment session followed the exact same structure as the pre-session. The only difference was that for the second part of the task, after the retrospection think aloud task, the students were asked to work on a third academic article whose topic was motivation (Appendix 1) to create a concept map and deliver a presentation.

Moreover, the students were interviewed (Appendix 16) to collect their views regarding their participation in the training and all the phases of the project. The interview was recorded in a similar way as the pre-treatment session. The duration of the interview was twenty minutes, the students were interviewed individually and were able to access the online training course to discuss specific aspects of it.

Finally, each student received two paper format questionnaires to complete (about the tasks and about the units' scaffolding features) after their individual interview (3.6.1.6)). The first questionnaire was the one for task one (Appendix 13) and the time allocated for this was 10 minutes. The second questionnaire was about Scaffolding (Appendix 14) and the time allowed for this was 10 minutes. The students completed the questionnaires in the same place where all the other phases of the post-treatment session took place (a university classroom).

3.8 Pilot study

In order to ensure that the research design, data gathering, procedures and the treatment materials were sound (see Cohen, Manion, and Morrison, 2007: 341) a pilot study was conducted. The participants for the pilot were volunteers who agreed to participate when invited, and were two PhD students and one MA student in Linguistics. All of the participants were studying towards their degrees and their origin and age varied: 1 Greek female 3rd year PhD student (aged 35), 1 male 1st year PhD student from Jordan (aged 24) and 1 Dutch male MA student (aged 20). Their familiarity with CEL ranged from none to some familiarity but they were all computer literate, familiar with Moodle, and academic article reading. The participants' interests differed in terms of their studies since they specialised in different areas of Linguistics such as SLA, Bilingual development and evaluation of course materials.

Besides the PhD students' opinions on delivering teaching via online virtual environments and their insights from their personal academic research and study, their perspectives as students were also indispensable for this study. Their views were valuable as data to make a more comprehensive analysis of the teaching techniques and the effectiveness of the designed Pedagogic Unit. The pilot participants were selected according to the same criteria for selecting the participants of the main study (see 3.4).

The pilot study was conducted by the researcher who acted as both the researcher and as teacher/facilitator of the course. Although the number of participants in the pilot study was small, the underlying information provided by pilot data was sufficient to inform the revision of tools and procedures for the main study.

3.8.1 Changes for the main study

Based on the implementation and results from the pilot study, a number of issues were considered when preparing for the main study. For example, the students mentioned that they found the pre- and post-test activities very demanding and time consuming mainly because they had to read and create a concept map within a classroom environment while they felt that it would have been better if they could have read it at home. During the main teaching cycle they felt that some of the activities were not necessary as they already knew how to perform a number of things (i.e. identify the tone of the author). Therefore, some of these tasks were subsequently kept on hidden mode and only introduced as part of the scaffolding techniques, e.g., on demand. Additionally, during the pilot, the screen-capture program that was chosen was not the appropriate one as it could not record 2h sessions.

Therefore, a new piece of software was chosen and installed on the main study computers. Another omission was that the researcher did not collect biographical details about the participants and because of this reason a new brief questionnaire was introduced during the pre-tests that collected information about their origin, level of studies and areas of interest as well as about their reasons for taking part in the project.

3.9 Data analysis procedures

The following two sections focus on describing the data preparation and procedures for analysis.

3.9.1 Data preparation for analysis

This section outlines how the data from the various instruments were managed and prepared for analysis as well as the data analysis procedures themselves.

3.9.1.1 *Oral data*

The recorded data from the pre and post think aloud tasks were exported from the audio-recorders and analysed by using an audio software (Audacity by BETA) which facilitated the creation and editing of the individual students' audio files (13 files for each two-hour session, i.e., 26 hours of data in total per day). The audio data were then transcribed in full to produce protocols for analysis and numbers instead of names were allocated to each student to ensure anonymity. The same applied for the individual pre and post oral presentations of the students (26 presentations in total; approx. 260 mins). For the thirteen semi-structured interviews each student's audio file was also exported on Audacity software and then the data were transcribed to produce protocols. Transcription conventions were based on Ohta (2001) (Appendix 17).

3.9.1.2 *Data from the concept maps*

Once the concept maps of the students were collected (hard copies), electronic scanned copies of each student's work were created. Then, any student work that could not be classified as a concept map was excluded based on the criteria outlined in Appendix 18. Then, the next step was for the researcher to apply the numerical and

qualitative scoring schemes to classify the maps into levels of conceptual understanding as detailed in section 3.9.2.1 (p. 144) and 3.9.2.2.1 (p. 172) below.

3.9.1.3 Data from the video screen captures

The data from the video screen captures was collected by using Freeze screen-capture software which created video files of an approximate duration of two hours each. As there were three computer training sessions and each student was working on his/her own computer, thirteen screen-capture videos were created at the end of each session resulting in a total of 39 videos (78 hrs). Every video was saved on a folder under each student's assigned number, the videos being clearly marked for each session.

During the students' online work their oral comments were also recorded (apart from the screen-captured activity) by using audio-recorders as the current Freez software version did not enable audio recording. The audio files (39 in total) were initially exported onto video folders but to bring the audio and video together NVivo software was used. Both the audio and video files were imported onto NVivo and each video was matched to the relevant audio file. Then, right next to each video, the software provided an area for transcription of the auditory part and this is where the transcription took place. This also allowed for correctly matching the audio to the relevant visual input so that coding could take place at the next stage. Given the duration of each student's video, their online action was analysed by deciding that the unit of analysis would be considered the moment that each student started working on a task till the moment they completed the requirements of each task. Therefore, every video of the three sessions was divided into smaller parts equal to the number of tasks that the students had to perform for each session

The most important part of the screen-capture analysis relies on the transcription phase. The idea is to aggregate very elementary action into more significant events, more suited for the intended level of analysis.

The screen capture allows detecting all visible changes appearing on the screen, whether they are produced by the user using the keyboard or the mouse, or by the computer application or the operating system as a response to an action. To demonstrate how the unit of analysis was decided, the particular case of the transcription of interaction occurring during a multiple choice task (Task 3, Day 1) will be discussed with the whole set of visible events.

An excerpt of such a transcription is given in Table 3.7. First, all student actions were reported in detail, except for some of them that were combined into one. For instance, “click on A7” followed by “track to V7” was combined into “select range A7:V7”. The feedback given by the spreadsheet software was also recorded with the action. For each action or event, a comment giving additional details or suggesting an interpretation was often added. If no action occurred during a significant period of time, (10 seconds for instance), this “event” was also recorded in the transcription. Then, if a sequence of actions seemed to be performed to reach a particular sub-goal, the sequence was aggregated into one *step*. The duration of the step was calculated from the start time of the first action of each step. The number of detailed actions could vary from 5 to 30 for transcribing one task, depending on the complexity of the task and the activity of the student.

Table 3.7: Indicative unit of analysis during Day 1 – Task 3

Start time (h;min;sec)	Action/Event	Result of action	Comment	Duration	Step
0:01:52	No mouse move		Reads question?	0:00:21	Reading
0:02:13	Click on first multiple choice item	Mouse cursor appears		0:00:34	Selecting the answer
0:02:17	Selects answer	The cursor goes over the question once more	Thinks a bit about it		
0:02:47	No mouse move	Mouse cursor stops	Thinks of the correct answer?	0:00:16	Thinking
0:03:22	Submits the answer	Wrong answer	Pop up window appears	0:00:05	Result
0:03:23	Reads the feedback comment	Mouse cursor moves over the feedback		0:00:17	Feedback and scaffolding

Overall, three main characteristics oriented the transcription process. Examples are taken from task 3 (see Table 3.7).

Time

Using the start time of actions, it is possible to calculate the time spent on every task, the duration of every step and also of inactive periods, and observe possible increases or decreases in the rate of actions during the whole test. For instance, student P8 has spent 7' on task 3.

Sequence of performed tasks

The sequence of tasks which are successively studied can show navigation between tasks with forward or backward moves. For instance, student P8 left task 3 after several attempts lasting 3' 21'', solved task 7 in 1'07'' then returned to task 3 for 3'46''.

Unsuccessful attempts

All unsuccessful attempts that leave no traces in the files can be observed. For instance, when working on task 3, student P8 first made a wrong choice and then tried to fix it, and finally consulted the feedback that was shown to make the necessary changes. User preferences in using software interface features can also be easily observed. For instance, student P8 in task 3 preferred to make use of the feedback pop-up windows; student P2 chose to consult both the feedback pop-up windows and the extra advice that preceded the task.

3.9.1.4 Data from the Moodle online tasks

The online tasks included both numerical (quiz format) responses and qualitative answers (open-ended questions). All the responses were saved and then exported onto individual Excel spreadsheets (the format allowed by the Moodle platform). Thus, the data from each task was exported on a different Excel spreadsheet and was saved in a folder for the specific online task. The students' names were anonymised and all the data were checked for missing values or for unintelligible responses (verbal responses). For some of the more complicated tasks the students were also required to produce work on a Word document (i.e. a concept map, diagram, etc.) after taking an online quiz and then upload it in the Forum Area. Therefore, the students' word doc or pdf attachments were also downloaded and stored in the relevant folders. Finally, for the glossary entries, each of the students' terms and definitions was exported to an Excel spreadsheet with the students' number, the term and relevant definition.

3.9.1.5 *Data from the questionnaires*

When the two questionnaires for which hard copies were used (Task and scaffolding questionnaires) were collected, the data and answers were imported manually onto SPSS spreadsheets. Numbers were used instead of student names and then each column represented a question and the values entered represented each students' answers to each question. Given that the questions of these two questionnaires employed Likert scales the students' answers were numerical. The online feedback Moodle questionnaires included both open-ended and rating questions (1-10), therefore the student answers included both numerical and verbal responses. All the data from the questionnaires were exported from the Moodle platform in the form of Excel spreadsheets which included all the types of student answers. The qualitative answers were checked for unintelligible or missing entries and the numerative entries were also checked for missing entries. As the student names were imported as well it was ensured that the data were anonymised by assigning numbers instead of names.

3.9.2 Development of coding and scoring schemes

This section will focus on explaining how the various coding schemes were developed instrument by instrument given the complexity of the study and the amount and types of data collected, i.e., a large amount of qualitative data. Moreover, it will also explain how the scoring schemes for each of the employed instruments were developed.

3.9.2.1 *The development of coding schemes and analysis*

3.9.2.1.1 **Measuring development at a conceptual level (RQ1)**

As discussed in chapter 2, development at a conceptual level is understood as the increased ability of the participants to perform higher mental functions. Table 3.8 outlines

these mental functions which are considered core elements of critical thinking (Bloom, 1956; Anderson et al. 2000) that were used as the designed task aims and for which the participants received training (see 3.2 and details above).

Table 3.8: Aspects of critical thinking per teaching session

<i>Main teaching session focus</i>	Core skills	Sub-skills
Teaching session 1: Understanding and identifying keywords and concepts	Ability to identify key ideas	
	Understanding key concepts	
Teaching session 2: Identify the structure of written texts and academic articles critically	Predicting	
	Identifying a purpose for reading	
	Using reading strategies to extract relevant information for topic and text comprehension	Skimming Scanning
	Identifying the function of the sentences in the different article parts (e.g. trace cohesion, etc.)	Tracing cohesion
Teaching session 3: Enhance critical and conceptual knowledge – Delivery of presentation	Distinguish between formal and informal	
	Identify purpose and tone	Purpose and background
		Author and text
	Distinguish between factual and non factual information	Identify the use of evidence
	Drawing inferences and conclusions	Formulating assumptions
		Article evaluation
	Decision making	Summarising
		Planning and structuring

A conceptual development rubric was adapted by combining elements from Bloom's taxonomy (Appendix 19) as used by Gunawardena, Lowe & Anderson (1997) to evaluate the social construction of critical knowledge in online environments (Appendix

20). The rubric for this study (Table 3.9) was modified to focus on the specific EAP indicators that were relevant for this project. All these were mapped against the three basic levels of action from Galperin's theory that was outlined in 2.2. In order to simplify referencing during the data analysis process and the reporting of the results each level of conceptual ability in the modified rubric was labelled as Level 1 to Level 5 (Comprehension, Analysis, Synthesis, Evaluation and Creation).

Table 3.9: Conceptual ability Rubric

Level	Stages	Indicators	Galperian action Levels
Low 1	1. Comprehension	Understanding the definitions of key concepts	Material
		Predicting	
		Identifying a purpose for reading	
		Using reading strategies (skimming, scanning), to extract relevant information for topic and text comprehension	
		Identifying the function of the sentences in the different article parts (e.g. trace cohesion, etc.)	
Intermediate 2	2. Application	Distinguishing key ideas and concepts of academic texts	Material
Intermediate 3	3. Analysis	Identify purpose and background	Verbal level
		Identify author and text	
		Identify the use of evidence	
Higher 4	4. Evaluation	Formulating assumptions	Mental Level
		Article evaluation	
Higher 5	5. Creation / Synthesis	Summarising	Mental Level
		Planning and structuring a presentation	

Conceptual ability was assessed by analysing and evaluating the students' audio and video recorded and online performance during the training based on the rubric and on the indicators above. A student's level of conceptual ability was determined by taking into consideration the indicators mentioned earlier and whether for instance the ability to

plan or formulate assumptions was evident in the pre and post introspection tasks, the pre and post concept maps, the pre and post oral presentations, the audio and visual screen captures of online activity and in the task scores and outcomes. This will be further explained in the following sections for each instrument.

3.9.2.1.2 Coding the retrospective think aloud tasks and analysis (RQ 1)

Following from the data preparation for analysis, a ‘broad category’ scheme was compiled based on the preliminary cycles of analysis of the recordings. The emphasis was on retrieving the general paths that students would follow when reading an academic article, identifying the steps and then trying to break their steps/actions down into strategies, procedures, article elements that caught their attention, mention of difficulties and solutions. Then, the protocols were segmented and coded according to the previous and this rendered a list of the processes, strategies and other elements shown in Table 3.10. This offered an indication of each participant’s mental activity as reflected in the retrospective task. More specifically, the coding scheme was developed along with the necessary indicators for the evaluation of the retrospection task. The coding scheme took into consideration the elements of the retrospection task such as the process that the participants went through in order to understand the academic paper, its main points, the paper elements that helped them understand the paper and the parts that they found difficult to understand. Based on this task the researcher coded the introspection tasks for the following areas that arose by examining the recorded data:

Table 3.10: Introspection task codes – Broad categories

Reading processes
• Top down
• Bottom up
Reading strategies
• Connect what I already know to what I'm reading
• Connect what I'm reading with other sections of the text
• Connect co-textual elements (i.e. graphic illustrations, charts, and highlighted concepts"
• Identify main ideas and concepts (i.e. underline, highlight, italicised terms)
• Predict the reading content (i.e. look for concepts, charts, titles)
• Ask questions about the content (i.e. turn titles or headings into questions)
• Identify the organisation of arguments (i.e. follow the outline of the article)
• Identifying a purpose for reading the paper
• Skimming
• Scanning
• Identify the article type (Seymour, 1996):
○ Explanation
○ Definition
○ Sequence
Academic paper structure
• Abstract
• Introduction
• Review of the research / literature review
• Methods and materials
• Procedures
• Results
• Discussion
• Implications
• References
Paralinguistic elements
• Glossaries
• Tables / Graphs / Charts
Paragraph structure
• Topic sentence
• Supporting arguments
• Summary sentence
• Extension of the idea
Discourse markers
• Classification (i.e. categories / bullets /headings)
• Process (i.e. cardinal numbers / adverbs such as next, as soon as, while)
• Illustration (i.e. for example. For instance, etc.)
• Cause/ effect (i.e. consequently, therefore, for these reasons, etc.)
• Comparison (i.e. similarly, in the same way, etc.)
Difficulties
1. Deducing unknown Vocabulary / Terminology
2. Interpreting Charts
3. Identifying the topic
4. Identifying the paper's topic and relating to their purpose for reading
Solutions to difficulties
• –dictionary use
• –further exemplification reading
• –consultation of glossary with terms

A full list of the above aspects and the coding scheme can be found in Appendix 9. A total of 42 codes were used to investigate the introspection task data further (Appendix 9). To test the reliability of coding, a second rater, an English native speaker and PhD holder specializing in the field of Applied linguistics and with good knowledge of the qualitative paradigm and methods of research, was provided with a randomly selected 10% of each dataset (i.e. three samples of the students' introspection tasks). The second rater was also provided and familiarized with the lists of codes for the datasets, their definitions, and examples from data (Appendix 9) and was asked to apply each provided list of codes on the related data (this was applied for the coding and rating of all the tasks and types of data of the study). The final procedure was to check the number of similarities between the researcher and the second coder regarding the application of the codes. This was achieved by using Scholfield's (1995) formula (Figure 3.12). The results of the inter-rater reliability tests are presented as follows:

Figure 3.12: Scholfield's Formula for Inter-rater Reliability Agreement

Number of items coded the same by the two raters
X 100
Number of items (stretches of data assigned a code) coded by the researcher in the data

The inter-coder reliability was found to be satisfactory for each variable and the agreement percentage was 84.6%. In addition, Scott's Pi was 0.69, Cohen's kappa 0.698 and there were 11 agreements and 2 disagreements.

Following from the coding of the data, the frequency of specific reading strategies and procedures among students when analysing the recordings of the 13 participants during pre and post-treatment retrospection tasks was calculated. For a full account of the way strategies link to specific skills please consult section 3.2. Our main focus and

interest here is not only the frequency with which students employed a specific strategy for instance but also evidence that revealed awareness of specific strategies when approaching an academic article and how many of the participants could report or evidence strategy use.

Therefore, raw numbers were calculated per student (and overall) on which students used which strategies. When the students' strategies and procedures were identified these were then mapped onto the Table 3.9 rubric. Then, a student's level of conceptual ability (Table 3.9) was assessed by examining each student's map of strategy use at a pre and post treatment phase. For instance, if a student's retrospection report consisted of references to only Low-Comprehension level strategies such as "understanding key concepts" without any reference or indication of awareness of synthesizing or evaluating information (higher conceptual levels) such as reporting strategies of formulating assumptions about the article's content or summarising information from various sections then the student was classified as having a low conceptual ability. The students who reported the highest numbers of strategies at an evaluation or creation level were classified as having a high conceptual ability. Finally, the students which reported mainly low level strategies in their reports and Level 2 and 3 strategies were classified as having an "in between" level of conceptual ability.

From the analysis of the recorded student retrospection data, various patterns that described the students' combination of preferred reading steps, strategies and habits were also reported. These patterns reflected their skills, strategy use and eventually grouped the students of similar conceptual ability together. Each student's account of the order in which strategies were reported was compared to that of other students; those accounts which were similar in terms of the order in which the strategies were mentioned were then grouped together. Then, the strategies were evaluated according to Table 3.9 to

decide on the level of conceptual ability in the way that was reported earlier. The patterns were generally meant to demonstrate the order in which the students reported on using specific strategies and processes (top-down) when reading and processing an academic article.

3.9.2.1.3 Coding and analysing the audio and video files from the screen-captures (RQs 2, 3, 4)

Initially, to code the screen-captures and to evaluate Moodle as a learning management system, I took into consideration that online, resource-based learning environments are most likely to be effective when they are designed and utilized in ways consistent with the research on how people learn. Bransford, Brown, and Cocking (2000) base the following key dimensions of effective learning environments upon current educational and cognitive neuroscience research. Knowledge-centered environments focus on developing knowledge of the field or discipline and of strategies to develop expertise. They incorporate the language, artifacts, and essential principles on which learning in the discipline is based and model how experts work with those principles to gain increased understanding. In a Web-based environment, this might translate into digital, discipline-specific materials that are up to date, authentic, and accessible to the target audience (Greenhow, 2006).

Community-centered environments evolve a community of practice among like-minded professionals where members develop common goals and work toward achieving them. The community-centered environment provides opportunities for active participation and the development of a shared knowledge base. In a Web-based environment, this could be expressed as Internet-based conferencing environments that

assist communication over distances, or a repository of artifacts of members' practice (Bransford, Brown, and Cocking, 2000).

Assessment-centered environments support learners' testing of ideas by promoting ongoing reflection and feedback on practice. Effective online environments might include Internet-based networking to promote ongoing reflection and feedback on field experiences in a manner that is sustainable, wide reaching, and affordable.

Learner-centered environments focus on learners, building on their strengths, interests, and needs. They take individual learning styles and prior knowledge into account. One of the most promising and underappreciated qualities of new information technologies is their interactive capacity (Bransford, Brown, and Cocking, 2000).

The four dimensions or environments outlined here can be visualized as interdependent and overlapping spheres. Therefore, we might expect all four dimensions to be present and functioning in a quality learning environment. Research suggests Web-based technology capabilities can be used as tools to scaffold, motivate, and enhance thinking (Chan, Burtis & Bereiter 1997; Gordin & Pea, 1995; Jonassen, 2000). By referencing Bransford et al's conceptual framework about effective learning environments, I developed a list of the desirable features one would want to see in an effective online learning environment (Table 3.11). The purpose of developing a list is to guide a focused content analysis of the online, resource-based learning environment being evaluated when examining the activities of the screen-captures in order to identify its relative strengths and weaknesses.

Identifying which items are absent or present is a helpful first step in taking a critical look at how present items support the site's educational purpose and intended audience. This also helps to clarify utilization and development strategies, such as which contexts are most promising for improving the learning environment. Thus, the purpose

for the key dimensions in Table 3.11 is not about the number of elements, but rather how this systematic review, against established criteria, highlights the support for learning that Moodle provides or does not provide. The coding of the screen-captures is derived from the parts of this checklist and can be found in Appendix 21. Each code was inserted as a transcript annotation when analyzing the videos with NVivo by entering the relevant code for the specific video minutes (color coding).

Table 3.11: Key Dimensions of Online Learning Environments Checklist

Possible Features of a Knowledge-centered, Online Learning Environment
• Digital content-area, curriculum or resources focused around specific issues or themes that is up-to-date, authentic, accessible and generative • Electronic networking forums to support knowledge sharing (e.g., links to additional resources; student work) • Interactive design tools (e.g., curriculum design tools) with electronic prompts to scaffold thinking
• Interactive survey instruments encourage reflection on workplace practices
Possible Features of a Community-centered, Online Learning Environment
• Workshop environments that assist communication over • Synchronous mechanisms (e.g., via “chat” rooms, multi-user virtual environments or asynchronous e-mail, bulletin boards, threaded discussion forums) • Asynchronous mechanisms (e.g., e-mail, bulletin boards, etc.) that allow anytime-anywhere communication and archiving of discussions to assist the development of a group understanding over time
Possible Features of an Assessment-centred, Online Learning Environment
• Tools for or tools that encourage self-assessment, reflection, metacognition, Feedback such as pop-ups or text boxes to write selected information (e.g., electronic feedback forms, etc.) • Tools for or tools that encourage peer exchange, constructive critique, networking, such as collaborative design tools (e.g., shared online spaces for posting and editing group work, etc.)

Moreover, the screen-captures helped to examine the value of the affordances of Moodle as a platform for delivering academic training (RQ2). This was achieved by calculating the frequency of consulting a list of Moodle characteristics by the participants when performing the tasks via examining the screen captures and more specifically the participants’ online actions. This was not only about which scaffolding elements they consulted but in terms of overall task design and which features enabled them to complete the tasks. Quantifying the number of uses of specific Moodle characteristics in relation to

the requirements of each task and the student's comments can reveal the affordances of Moodle as a platform for academic training. Its characteristics included among others the use of the Forum area, the glossary, consultation of embedded external links and proceeding through tasks. This Moodle unit also offered the opportunity to create peer-assessment tasks, tasks that combined text and pictures, mazes and importing Hotpotato exercises.

Regarding scaffolding (RQ3), the adopted model for coding and analysis was outlined earlier in this chapter (3.5.5) and the screen capture units of the participants' online activity were coded according to the following two categories:

a. Scaffolding features used at a Pedagogic Unit level

1. forum area: positives / negatives
 - a. notification system with message alerts
2. glossary: positives / negatives
3. workshops: positives / negatives
4. suggestions

Examples of the coding and how this was applied can be found at Appendix 16.

b. Scaffolding features at a task level

• Session 1 1. Process models: ▪ Task examples ▪ Task Instructions 2. Quiz feedback 3. Maze feedback 4. Process prompts: ▪ Built in hints ▪ Retries ▪ redirections 5. Process displays: task completion indicators 6. Reflective social discourse ▪ Comment boxes ▪ Peer- assessment	• Session 2 1. Process models: ▪ Task examples ▪ Task Instructions 2. Quiz feedback 3. Maze feedback 4. Process prompts: ▪ built in hints ▪ Retries ▪ redirections 5. Process displays: task completion indicators 6. Reflective social discourse ▪ Comment boxes ▪ Peer- assessment	• Session 3 1. Process models: ▪ Task examples ▪ Task Instructions 2. Quiz feedback 3. Process prompts: ▪ built in hints ▪ Retries ▪ redirections 4. Reflective social discourse ▪ Comment boxes ▪ Peer- assessment

Each of the above codes was inserted as a transcript annotation when analyzing the videos with NVivo by entering the relevant code for the specific video minutes (color coding).

Inter-coder reliability

Two coders coded 10% of the screen-captured data and the relevant audio recordings using the coding scheme (Appendix 22). The result for inter-coder reliability was 76.9%, Scott's Pi 0,544, Cohen's kappa was 0.567 and there were 10 agreements and 3 disagreements.

3.9.2.1.4 Coding the content answers of the Moodle online tasks (RQs 1, 2, 4)

The online tasks facilitated the process of collecting data mainly in answer of research question 1, 2 and 4. However, the online feedback questionnaires also offered information relating to research questions 3 and 4. For more information about the latter see section 3.9.2.1.5.

The online tasks of Session 1 included tasks 2 and 6. Task 2 was to familiarize learners with the treatment reading article and ask them to decide on the elements they would need to focus on. Then the output would be to draw a diagram of the article's structure. The students experimented with a variety of formats but their outputs were mainly focusing on the structure of the article either representing it by using headings or concept maps and not so much on depicting relations between concepts. This indicated that the students' conceptual ability was not at the stage of synthesizing information from a critical and evaluative perspective. A general outline of the students' concept maps at

this stage can be found in Appendix 23. However, the purpose of the task was not to evaluate the participants' conceptual level but simply to help them reflect on that.

Task 6 was an exercise that asked students to think of and prepare a number of pre-reading questions that could best enable readers to read the academic article and predict its content. For the student responses to be considered well-formed and demonstrate the students' evaluative and creative abilities they should fulfill the purpose of the task and be employed as guiding article comprehension questions (Appendix 23). An example of failing to complete the task were the students who misinterpreted the meaning of the exercise and created questions which would gather information from the students about their reading strategies rather than guiding them towards extracting the necessary article information themselves. Apart from this, all the other questions were considered to have a guiding function and reflective character for the students.

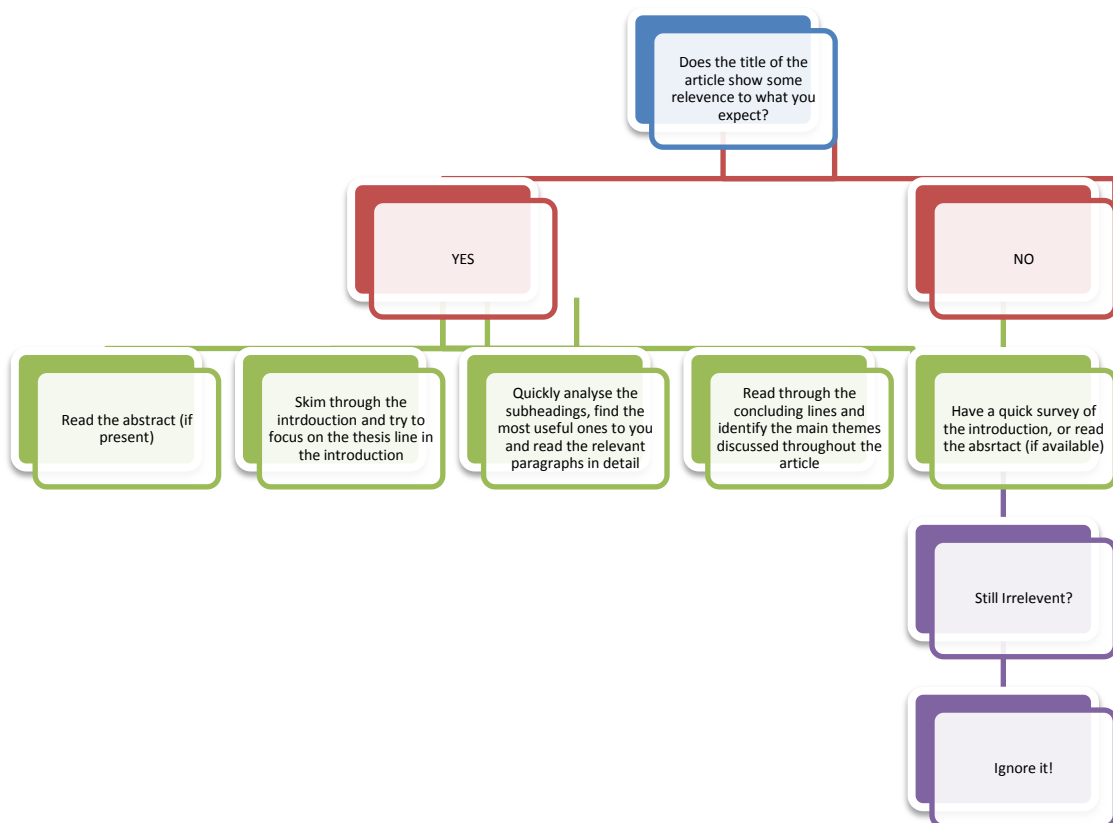
Online tasks in Session 2 included sub-tasks 1, 2, 3, 4, 6 and 8 (3.5.6). Task 1 asked students to create a five step guide with instructions for the students that would attempt to read the academic article. The students experimented with a variety of steps and their work was evaluated against the answer that the expert provided and by bearing Bloom's taxonomy in mind to evaluate conceptual development. Below you will find the work of a high and a low achiever and how their work was evaluated.

The first example is the expert answer that was provided when a Lecturer in Applied Linguistics volunteered to perform the task. This example was considered as a guide for evaluating high and low achievers and below is the expert's answer. The answer provided includes a series of steps that were deemed to be important with the performance of a high achiever in mind:

1. Make mental/physical notes on what you are hoping to gain from the text (an overview, arguments, quotations etc.)
2. Skim the text, make note of headings, sub headings and key words, and think about what the text could contain.
3. Skim the text again; make a mind map/concept map of information relevant to you. Also look up any key words or concepts you have not come across.
4. Depending on the information you need from the text, read the whole or just part of the text in detail.
5. Once you have read the text note down any questions you have about the topic and check if they can be answered within this text, if not look into some further reading.

According to our expert the answers of high achievers should demonstrate their ability to work at a high conceptual level based on Bloom's taxonomy and when designing their steps their work should indicate that they invite the reader to evaluate the article, employ strategies for formulating assumptions by gradually planning and structuring a series of steps to achieve this. An example of a high achiever who worked at this level can be seen below (Figure 3.13):

Figure 3.13: High achiever example – Task 1



The student of Figure 3.13 has managed to structure an academic article reading process in a graphic way which represents the available options for the students and then in each case several steps which lead to article evaluation and the formulation of assumptions in terms of content are presented. The steps clearly reflect the options that were provided by the expert.

On the other hand, the student work that is presented below demonstrates that their level of conceptual understanding was at an intermediate level since they focused mostly on providing advice that related to article comprehension and not on critical application of reading strategies to result in analysis and evaluation:

1. Read the title and subtitle and guess/assume if and how this could be related to your topic (topic in question)
2. Read the abstract. A good abstract will always give you a very good insight.
3. Read the conclusion. There will hopefully find a good summary of the article.
4. Check the methodology section to identify the methods (headings, sub-headings)
5. Read the main body.

Apart from the fact that the first 3 steps focus on the lower levels of Bloom's taxonomy, steps 4 and 5 do not promote critical thinking and the general focus on the features that would enable the readers to evaluate article content and structure a comprehension strategy.

Task 2 (Day 2) invited students to answer the comprehension questions that their classmates had created during Day 1 for task 6. The students' answers were collected and were evaluated with regards to factors such as whether the answer focuses on the question. The evaluation was also based on the answer key that was provided by the expert which will be shown below in Figure 3.14. Below I provide examples of a high and a low achiever and how their answers to their specific questions were evaluated. The answers that were provided by the expert were the following:

Figure 3.14: Expert answer for Task 2 – Day 2**What is the article about?**

The article is about attention and awareness for students and how it affects language learning, it discusses the history of the topic, arguments that researchers have regarding the effectiveness of attention and awareness for SLA. It also discusses methods to measure attention and awareness as well as the different results; then it discusses where to go in the future.

What is the writer's main argument?

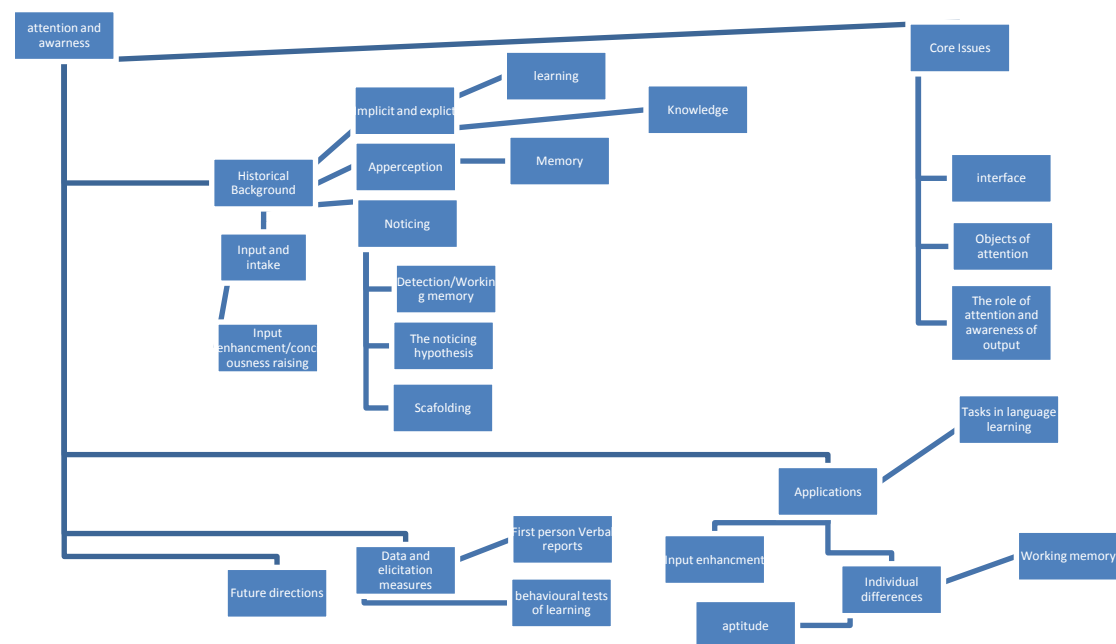
The writers stay relatively neutral throughout; they discuss both sides of the argument equally however they do suggest that attention and awareness is an area that deserves more focus.

Do you agree or disagree with the author?

Generally I agree with the authors.

What is the most important topic of the article?

The most important part of the article for me was the methods of measuring as well as the factors that can affect SLA, such as individual differences. A clear argument is also important.

Create a concept map

According to the expert, the students' answers to their given questions should demonstrate first of all comprehension of the question and for high achievers, answers should also indicate that they have covered most of the aspects of the question. An example of a high achiever is presented below:

Figure 3.15: Example answer from a high achiever – Task 2, Day 2

Why are attention and awareness important for in SLA?

- Because attention “conceptualized” in ways that it can affect our learning and subsequently leading to different levels of performance. It is important for SLA because as they are acquiring a new language, there are a lot of information available for them to learn but whether they intake these into further processing is dependent on the amount of attention and awareness they provide during acquisition.

How are they connected to cognition?

- Attention and awareness is connected to cognition as it is said that attention and awareness can be applied consciously as well as sub-consciously.

What do the SLA research findings say about them?

- Attention and awareness can be spoken in terms of consciousness and explicitness in terms of acquiring new knowledge and more specifically different areas of linguistic knowledge.

What are the main issues of attention and awareness in SLA?

- Distinction between implicit and explicit knowledge; attention paid to aspects of language; role of attention of awareness output

How can we apply the findings to improve attention and awareness in SLA?

On the contrary, the answers presented below indicate that the student did not understand some of the questions and his answer resulted in repeating key words which reflected a performance at a Knowledge level and therefore indicative of a lower achiever:

Figure 3.16: Example answer from a low achiever – Task 2, Day 2

1. What is the main topic of this article?
Attention and awareness in L2
2. What are the research questions?
Attention and awareness
3. What are the main points in core issues?
Interface between implicit and explicit knowledge
Consciousness raising and input enhance
apperception
4. What are the main methods to research?
First person verbal reports
Subjective behavioural tests of learning
5. What are the findings?
Input enhance

After checking their predictions about the articles, the next step for the students was to read the first three paragraphs of the article and focus on identifying the main idea and summarise the content of the first three paragraphs (Day 2, Task 3). The work of a low and high achiever is presented below along with an example of how the work was marked. A key answer was provided by the expert which was the following and which focused on what a successful high achiever answer should cover:

Figure 3.17: Expert answer – Day 2, Task 3

This article is about attention and awareness in a SLA context, more specifically it discusses previous research, methods on how to measure and record results of research, the core issues of attention referring to previous research then it discusses how the information can be used to help second language learners followed by ways to expand in this area in the future.

The first paragraph is a quick introduction into attention and awareness in an SLA environment and it gives a quick summary of the implications it has on learning.

The second paragraph further details how attention mechanisms work in the brain, it then introduces the idea that attention leads to awareness and the processes that go on within the brain.

The third paragraph goes into greater detail on the cognitive processes of attention, it emphasises the importance of attention on our actions then goes on to list many researches on models of attention that have guided the research that will follow in the text, lastly it introduces the fact that there is much debate over which models are most effective.

High achievers provided an answer of the following format, indicating cohesion and a personal way of understanding article ideas, by mentioning the main points of each paragraph briefly:

Figure 3.18: High achiever answer – Day 2, Task 3

1. This article shows the core issues of attention and awareness in language acquisition, especially in second language learning, introducing the historical discussion and the common data measures, the applications and future suggestions in this field.
2. It is shown that attention has been affecting SLA in different contexts and researchers have been investigating attention in learning in both experimental and classroom settings.
3. Attention can be studied in neurobiological level, which means how attentional networks in the brain give rise to awareness-the subjective, contentful 'feel' of experience.
4. Attention can also be researched at the information processing level, which means implicate mechanisms for attention allocation.

On the other hand, low achievers presented answers which could simply be based on copying information, sentences or key words from the original article, without any critical evaluation similar to the following type:

Figure 3.19: Low achiever response – Day 3, Task 3

• The article is about the level of attention and awareness needed in L2 and how this affects their learning and subsequently their acquired knowledge. • Paragraph 1 – What is attention and how it affects learners • Paragraph 2 – Areas in which attentional mechanism can be studied. • Paragraph 3 – Studying attention at processing level.

Following this, the students were asked about the main ideas of the article and whether they found the article informative (Day 2, Task 4). The students' responses are presented below:

Table 3.12: Student responses to task 4, Day 2

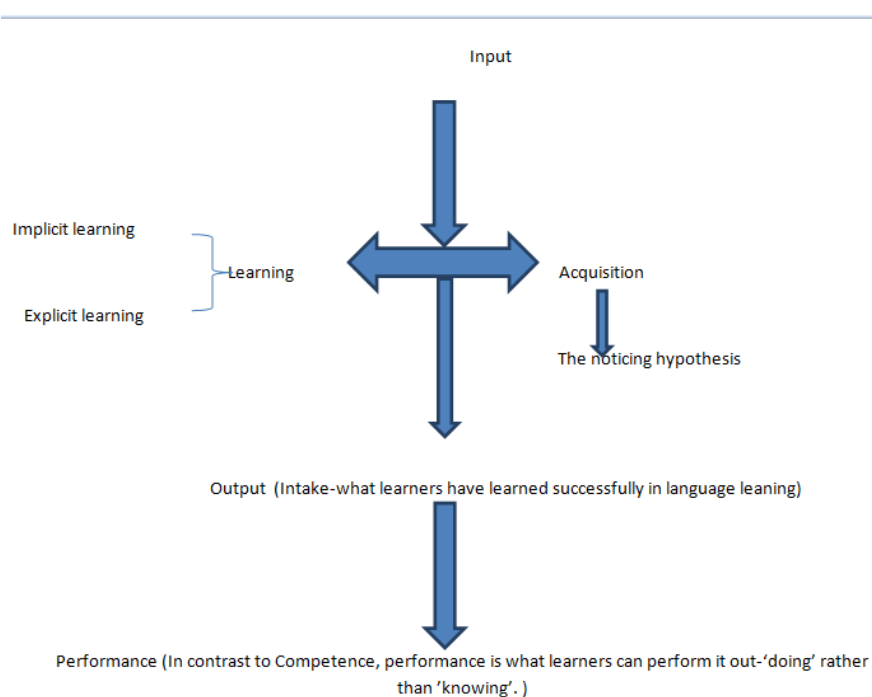
Question: What do you think are the main ideas of the "Awareness" article that you have read?	Responses
S1	The main ideas of the Awareness are mostly referring to implicit and explicit learning and knowledge, as well as contributing with memory
S2	The main ideas of the article is around the ways in which attention and awareness are employed by L2 learners in SLA and the ways in which attention can be tested on SLA learners such as first-person verbal reports.
S3	how students are aware of what they are searching for and what the most relevant parts could be
S4	Noticing input intake implicit and explicit learning
S5	Awareness is vital in processing input.
S6	how attention affects on different aspects of behaviour and learning
S7	the role of attention and awareness played in second language learning
S8	It talks about the implicit and explicit knowledge in SLA from different angles. And it gives application in different aspects about attention and awareness in SLA.
S9	Awareness is that during second language learning process, the learners' intention to try to turn the knowledge into long-term memory.
S10	That attention and awareness are important in the SLA and it is essential its continuous.
S11	there are some arguments about the attention and awareness in different aspects. What is the interface between implicit and explicit knowledge, the objects and the role of input.
S12	that the core issues should be investigated with the particular methods proposed
S13	-input and output -noticing hypothesis -implicit and explicit learning -aptitude -attention

The students who were able to provide responses that did not merely repeat the elements of the article's title as the main ideas that they could locate, were classified at a high conceptual level against Bloom's taxonomy. On the contrary, other student who are either too general or their work reflected that the student responds to a different question than the one asked by the given task, indicate that the students were acting at a lower conceptual level.

The next task for this session was the creation of a mind map (Day 2, Task 6) that would enable the students to represent the major ideas of the article and how these link to each other. The evaluation of the concept maps is described in section 3.6.1.2.

Moving on from this, Task 8 required students to do a vocabulary rating task in terms of how they perceive the importance of specific terms in order to understand an academic article. The relationship of the most important terms was presented by the expert which also provided key criteria for the evaluation of the answers. The expert's analysis can be seen below:

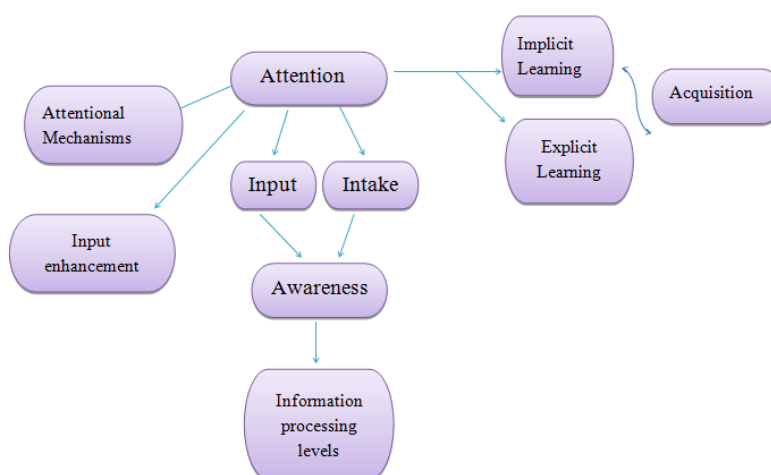
Figure 3.20: Expert answer for Task 8, Day 2



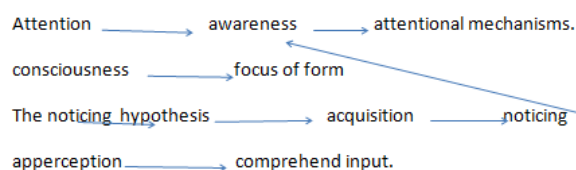
These are the most important article terms according to the expert's opinion and the students' maps were evaluated in terms of recognising these elements. The task had a reflective character and therefore the students were not assigned specific marks for specific features, but were assigned to categories such as 'low', 'medium' 'high' achievers as detailed further on.

The high achiever's map below is very close to the expert's map and includes most of the key/important terms that should be grouped in an appropriate way to demonstrate their relationship. Furthermore, the student has attempted to link the concepts to the central article concept ("attention") and in this way the student demonstrates their ability to critically select the appropriate concepts and synthesize them in order to create a complex relationship depiction.

Figure 3.21: High achiever answer for task 8, Day 2



Moreover, the low achievers' ranking and term depiction did not include the terms that were important nor did their representation reveal information about the relationship between these terms in any way. An example can be seen in Fig. 3.22:

Figure 3.22: Low achiever answer for Task 8, Day 2

This indicates that the specific student did not reach the stage of critically selecting and combining information to plan and create the synthesis of visually representing relationships between terms. Their work is more a random collection of terms that have no common ground as one reads from line to line.

In general, when all the students' ranking of terms were compared to the expert's, three general patterns of ranking and visualisation were identified. The first pattern was the concept map representation of the most important article terms in ways which also depicted their relationship (Appendix 24 - Figure 6). The second pattern was the collection of article terms which were arranged in a linear way with no interconnections between the various levels of the representations (Appendix 24 - Figure 7). Then, the final pattern that was selected was a simple ranking of the article terms from the most important to the least important in a list format with no depiction of any connections between the terms.

These three task patterns were then mapped against Bloom's taxonomy to decide on the individual level of conceptual ability for each student. The first pattern would be indicative of a student working at a high conceptual level by critically selecting and evaluating terminology and by being able to create a visual representation of the relationships between terms. The second pattern though, indicates that the students were working at an intermediate stage by being able to analyse the various article terms while using them in order to do the task (Appendix 24 - Figure 7). On the contrary, the student

who followed the third pattern was operating at a low conceptual level since the creation of a list which ranks the various article concepts without recognising their inter-relations simply represents the knowledge and comprehension of specific terms without being able to critically select the most important though and synthesize a scheme that represents their inter-relationships.

The online tasks of Session 3 included tasks 2, 3 and 4. For task 2 the students were invited to create their own definition of the term “formality” and enter in the glossary section of the Moodle Pedagogic Unit. The students’ definitions of the concept of formality from the Moodle glossary of definitions were compared with the definition provided by the expert. The focus was not whether the students were successful in creating a similar definition to the expert’s regarding vocabulary or to the level of expression. It was rather on the semantic content of their definition, the conceptual understanding that was revealed and the extent to which the definition addressed the key issues that the expert had chosen. In total, the expert resulted in the following nine characteristics that the definition of formality should include (Figure 3.23 below). Then, the number of characteristics that the students found were calculated to decide which definitions were the closest to the expert one. Those who managed to identify more than two were successful and the highest possible was 9.

Figure 3.23: Expert definition

- | |
|---|
| <p>A definition of the concept of formality should include references to at least three or four of the following:</p> <ol style="list-style-type: none"> 1. The authors are authority. 2. The source of texts should be reputable. 3. A conclusion always is drawn with future directions, a summary of finding. 4. Evidence is used to support arguments and all the points. 5. Evidence should be well-known facts or generally accepted opinions. 6. In the conclusion, it should always be related to other similar research. 7. An assumption should be made validly by authors. 8. The initiator of an action and the processes should not be identified with using passive verbs. The nominalisations and pronouns are also seen as a normal to extract meanings. 9. Some emphatic words should be avoided. But hedges are denoted to the way the authors express the meanings. |
|---|

During task 3 the students were asked to reflect on the process that one needs to follow with a view to write a summary and create a step-by step guide with instructions for this. The nature of this exercise had mainly a reflective character and only extreme cases that would yield unacceptable processes would be marked down. For instance, a low achiever would place more emphasis on text comprehension and on the analysis of the various key words prior to summary writing or there would also be emphasis on non-necessary information such as further studies or future implications that are not typically included in summaries. When functioning at these levels the student would be placed at lower conceptual levels according to Bloom's taxonomy. A high achiever which functions at a higher conceptual level would concentrate on the process steps with a view to plan and evaluate steps that would lead to successful summary writing. A high achiever answer would be indicative of these levels and clearly identify the elements of a successful process and the core parts of this type of writing. However, it would also demonstrate the skill to creatively combine information towards creating a concise report of the main ideas of a text.

Finally, Task 4 involved the creation of their presentation outline. Regarding understanding concepts and article evaluation all students were asked to create content outlines for presentations and to evaluate concepts in order to deliver a presentation that could clearly reflect on the main ideas of the article. To evaluate whether the content outlines constituted a proper guide for the creation of full length oral presentations, the outlines were evaluated by using the oral presentation coding scheme and by focusing on these specific elements: 1. Structure (Introduction, Main body, conclusion), 2. Balance of content 3. Emphasis on key terms (as defined by the experts for task 5 (Session 2). Successful outline contents should have all these three elements but at this stage there

was no intention to evaluate the participants' conceptual level. The oral presentations that followed were assessed according to the procedures described in section 3.9.2.2.2.

3.9.2.1.5 Coding the open-ended online feedback questionnaire responses (RQs 2, 3, 4)

The participants' evaluations about the unit's design were after each online training session (Appendix 12) contributed to answering RQ 2, 3 and 4. The numerical data that were collected from the ranking questions and yielded information about the number of students who evaluated various aspects of the course. The open ended questions were coded for the following categories: a. how did the course help them improve (i.e. definitions, explanations, good tasks, feedback, online examples, appropriate content), b. reasons for which they believe they did not improve (i.e. short period of training time, long texts, long session duration, difficult topic), c. suggestions for further improvement with regards to the Pedagogic Unit (i.e. create more sessions with short duration, shorter texts, easier topics to read, no suggestions), the Moodle platform (i.e. enable the anonymity functions, no suggestions), the scaffolding features (i.e. more detailed feedback, shorter feedback, no suggestions) and the tasks (less number of tasks to perform per session, use of more visual prompts, no suggestions). Then, the numbers of students who reported each of the above suggestions were calculated.

3.9.2.1.6 Coding the semi-structured interviews and analysis (RQs 3, 4)

The participants' views about the Online environment (RQ4) were coded when analyzing the interview data according to the Constructivist OnLine Learning Environment Survey (COLLES) that was designed to help teachers assess from a social

constructivist perspective, the quality of their online learning environment (Taylor & Maor, 2000). The codes for the semi-structured interviews were the following six levels:

1. Relevance: how relevant is online learning to students' academic practices?
2. Reflection: does online learning stimulate students' critical reflective thinking?
3. Interactivity: to what extent do students engage online in rich educative dialogue or in peer-feedback activities?
4. Tutor Support: how well do tutors enable students to participate in online learning?
5. Peer Support: do fellow students provide sensitive and encouraging support?
6. Interpretation: do students and tutors make good sense of their communications?

It should also be noted that in order to evaluate the Moodle Pedagogic Unit (as a course – RQ4) a general model of evaluation was also followed which took into consideration that according to Posavac and Carey (2002), “evaluation is a collection of methods, skills, and sensitivities necessary to determine whether a human service is needed and likely to be used, whether it is conducted as planned, and whether the human service actually does help people”. Evaluations of human service programs are conducted to answer questions and the process of identifying and selecting evaluation questions is central to the evaluation and normally represents an early step in the program evaluation planning process. Once selected, the evaluation questions provide a direction for the program. The systems model is an alternative approach to program evaluation (Rossi, Freeman & Lipsey, 1999). Here, one can categorize an evaluation by type, as an input, process, output, and/or impact evaluation. Frequently, all types are included in the same evaluation. This approach is similar to Stufflebeam’s (1971) CIPP model (i.e., context, input, process, and product), where context focuses on planning decisions, input on

structuring decisions, process on implementation processes, and product on outcome attainment. Moore and Kearsley (1996: 5) suggested that a systems approach is very helpful to understanding online education and that “the systems model provides a tool that not only helps us recognize many of the issues that separate online education from conventional education, but also helps us distinguish good online education from bad”. The present study has specifically focused on the process and output evaluation questions as these would be the questions that the students could answer from their perspective and experience to provide information about the evaluation of the affordances of the Moodle Pedagogic Unit.

The process evaluation questions which were part of the semi-structured interview included the following: a. whether the program was satisfactory for the students, b. whether the program was equally effective for all participants and why, c. what the characteristics that distinguish satisfied and dissatisfied students are, and d. what program components or activities appear to better support development at conceptual level. The output evaluation questions of the interview included the following: a. whether program and course objectives were achieved, b. what program and course design components appeared to contribute the most and least to the attainment of these objectives and c. whether or not the students feel that they gained the desired knowledge and skills.

Part of answering RQ 4 was to evaluate the EAP and task content of the Moodle Pedagogic Unit and therefore relevant questions were included during the semi-structured interview at the post-treatment stage.

The content of the questions also served as the coding scheme. The related interview questions about the tasks were the following:

1. Have the Moodle vocabulary exercises been helpful for your learning of academic English? Please explain why or why not.
2. Can your teacher improve the Moodle vocabulary exercises so that they better match your needs? If yes, please explain how.
3. Have the Moodle quizzes been helpful for your learning of academic English? Please explain why or why not.
4. Can your teacher improve the Moodle quizzes so that they better match your needs? If yes, please explain how.
5. Has the Moodle forum been helpful for your learning of academic English? Please explain why or why not.
6. Can your teacher improve the Moodle forum so that it better matches your needs? If yes, please explain how.
7. What additional opinions do you have with regard to Moodle and your learning of academic English?

Finally, in order to understand the coding and analysis procedures, it should be reminded that an open-ended interview format was particularly important in order to seek out a more robust picture of participant attitudes and to allow for the emergence of unpredicted responses (Dörnyei, 2007). During the interviews at the post-treatment session, the students could also see the exercises on the Moodle platform. The researcher employed the interviews to investigate the participants' perceptions about the online activities or the scaffolding options they offered (RQ3), their potential for academic reading and speaking training and for supporting conceptual development (RQ4).

Student responses were therefore coded for one or more of the following broad categories: Task and general unit scaffolding features for RQ 3, and then for RQ4 the students' opinions about their Academic reading training, Academic speaking training, level of conceptual development, Helpful (+), Helpful (-) concerns, Confusion and Suggestions by following the instructions of Appendix 16. These responses were then calculated to discover the number of students which expressed specific views and from this the most prominent issues such as popular task scaffolding features were identified. Moreover, regarding RQ3, nine areas of discussion were identified through the

participants' comments: clarity of instructions and of task examples, the forum area, glossary, peer-assessment workshops, suggestions, adequate task feedback and adequate feedback questionnaires.

The inter-coder reliability was calculated for all 13 transcribed interviews and was satisfactory since the agreement percentage between the coders was 76.9%. In addition, Scott's Pi was 0.554, Cohen's kappa 0.562 and there were 10 agreements and 3 disagreements.

3.9.2.2 Development of scoring schemes and analysis

3.9.2.2.1 The scoring scheme of concept maps and analysis

The concept maps were employed to retrieve data that would enable the researcher to track the participants' progress and answer research question 1. The rationale for the assessment of the concept maps combined a quantitative and qualitative approach. Initially, the concept maps were analysed according to a qualitative approach and for this purpose two models were employed. The first one was adopted by Kinchin and Hay (2006) to classify the different depictions of knowledge structures and the different utilities and propensities for change the concept maps reflect (Appendix 18). Based on this approach, the maps were classified into 'spokes', 'chain' and 'networks' based on the hierarchy and the number of the nodes and then were also characterised as one-centred or several centred maps depending on the links between the nodes.

The participants' concept maps were also quantitatively compared to two "expert" maps, one expert map for each academic article (pre and post sessions). The evaluation of the concept maps was conducted by comparing the students' maps to those constructed by two experts in the field of Applied Linguistics who also underwent the process that the students followed. The specific scoring system that was followed for the present study

A more detailed example of Gowin and Novak's (1989) quantitative evaluation model is provided in Appendix 25 and an example of the application of their framework for the analysis of a student map is offered in Appendix 11. The inter-rater reliability was calculated for all 13 maps and was satisfactory since the agreement percentage between the coders was 92.3%. In addition, Scott's Pi was 0.851, Cohen's kappa 0.852 and there were 12 agreements and 1 disagreement.

To evaluate the conceptual progress and learning quality from a qualitative perspective, Hay's 2007 model that depicts the comparison of student knowledge structures before and after intervention was used (Appendix 24). This model, allowed for the classification of the concept maps to levels of conceptual ability as these were defined by Hay (2007). Thus, a high level concept map would consist of a high number of nodes, hierarchies and cross links (Figure 7, Appendix 24) as opposed to a Low level concept map with a minimum number of cross links (2) despite having a high number of nodes as in Figure 6 in Appendix 24. Following Hay's 2007 model, the concept maps were classified into those that reflected higher and lower conceptual ability only. Thus, in line with the coding scheme in section 3.9.2.1.1 low level concept maps would focus at depicting article terms without cross links (Knowledge level 1 - Low) whereas high level concept maps depict concepts and the cross links between them by synthesizing nodes from different hierarchies (Creation / Synthesis level 5 – High).

Given that the analysis involved a level of subjectivity when conducting the qualitative analysis, a second coder was involved and therefore reliability measures were ascertained. The counts of the traditional measures (i.e. number of concepts, the highest hierarchy level achieved, and number of hierarchies found in the map and the number of cross-links) are presented in Table 3.13:

Table 3.13: Pre-treatment phase Inter-coder reliability (concept maps)

	Concepts		Highest level of hierarchy		Number of hierarchies		Cross-links	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
13	36.23	15.36	2.64	1.33	27.82	17.93	3.09	4.72

A reliability coefficient for each map component of the pre-treatment phase was evaluated. Regarding the total number of concepts the inter-rater reliability coefficient was .99 (nr=2). The coefficient for the number of levels found in the maps was .80 and for each line that connected the central concept with others .83.

The counts of the traditional measures (i.e. number of concepts, the highest hierarchy level achieved, number of hierarchies found in the map and the number of cross-links) at a post-treatment stage are presented in Table 3.14 below:

Table 3.14: Post-treatment phase Inter-coder reliability (concept maps)

	Concepts		Highest level of hierarchy		Number of hierarchies		Cross-links	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
13	35.16	10.37	3.68	1.21	27.82	11.28	5.91	6.12

A reliability coefficient for each post-treatment map component was evaluated. Regarding the total number of concepts the inter-rater reliability coefficient was .98 (nr=2). The coefficient for the number of levels found in the maps was .82 and for each line that connected the central concept with others .87.

3.9.2.2.2 The scoring scheme of the oral presentations and analysis (RQ 1 and 2)

The oral presentations were examined in order to answer RQ1 but also in order to determine whether the Moodle Pedagogic Unit contributed to enhancing the students' oral presentations (RQ2). After producing the concept maps, the students were asked to deliver oral presentations based on the produced concept maps of the academic article

that they had read. During these presentations, which were also audio-recorded, the researcher evaluated performance by using an assessment template which included the presentation ‘evaluators’ that guided the aims underlying the design of the Pedagogic Unit. These evaluators assessed the content of the presentation and its structure, i.e., the six points in the ‘presenting unit’ (Section 3.5.3) for which training was provided to the students during the treatment sessions. Selinger and Shohamy (1989) identify two types of techniques for analysing qualitative data: an inductive procedure in which categories are derived as a result of dealing with data, and a deductive procedure in which the system of categories has already been established and was derived from a conceptual framework.

In my analysis of the oral presentations, a combination of both techniques was used. Criteria based on categories used in similar situations in the past (i.e. Bankowski, 2010) were added to categories derived from the conceptual analyses of the teaching syllabus. The list of different skills and strategies was then tested on a small sample of oral presentations (10%) and some additional criteria were identified in the process, resulting in the development of the Oral Presentation Evaluation Form used for the assessment purposes in all presentations (Appendix 26). In this way, it was possible to examine which oral presentations fulfilled which specific aims of the Pedagogic Unit and to what extent. The presentations received a score with regards to the number of fulfilled aims out of twelve. Furthermore, following Appendix 26 the number of students who were/were not successful at various areas were identified. If a student presentation had received a Yes for one of these areas then the presentation was considered to be successful in this respect.

Once this was achieved, the next step was to evaluate the presentations and decide on the level of conceptual development they reflected. In general, research is ongoing

into methods of assessing student presentations. Mason (1995) and Khidhayir and DuBoulay (1994) have described and discussed the criteria for oral assessment at pre-session courses and their assessment criteria are covered by the following headings: appropriacy, evidence of preparation, delivery (style / tone), structure of talk and use of aids. Therefore, each student presentation was evaluated a second time by consulting Appendix 27 which is a revised version of the previous criteria (including content, delivery, format/structure and preparation) in combination with Jordan's (1996) oral presentation assessment rubric.

The student presentations could then be classified into six different classes and the students that fell into the first two levels were considered to demonstrate higher conceptual ability, the third and fourth level corresponded to intermediate conceptual ability and the fifth level referred to low conceptual ability. After the students' pre and post presentations were analysed according to the previous criteria, then the pre and post presentation results for each student were compared to identify progress between the stages.

The inter-coder reliability was calculated based on all 13 transcribed student presentations for all the available codes and was found to be satisfactory (84.6%). In addition, Scott's Pi was 0.692, Cohen's kappa 0.694 and there were 11 agreements and 2 disagreements.

3.9.2.2.3 The scoring of the Moodle online task (RQ 2)

The tasks from Session 1 which were scored numeratively were tasks 3, 4, 5 and 7. Task 3 was a multiple choice task whose purpose was not to assign a mark but to identify the students' attitudes and therefore there was no correct answer. Likewise, task

4 also employed a Likert scale but there was no right or wrong answer. Task 5 encouraged students to reflect on article structure and associate it with metaphors such as “window”, “bridge” and “door” and for instance to recognize that the introductory part of the academic article is like a window into new knowledge and that the main body for instance functions as a bridge between introductory ideas and main arguments.

For each correct movement of picture 1 point was assigned and no points for wrong answers. Successful completion was perceived as finding all answers and the students were allowed three trials. Task 7 was a lesson activity which was made up of a number of pages and on each page there was a question. Associated with the answer to each question was a jump to another page depending on the answer: if the student was correct he/she could progress to the next question page but if the answer was wrong the next page was a revision page with an extra practice answer and if the practice answer was correct then the student would progress to answering the first question once more. If the student was not correct then he was granted the answer as wrong and would then move on to the next answer. The final mark was percentages of correct answers (4 questions in total).

The tasks from Session 2 which were scored numeratively were tasks 5, 7 and 9. Task 5 was a quiz with various types of four article comprehension questions. The following screen-captures indicate how this task required students to proceed and the tables reveal the student scores for each item. The task was the following:

Task C: Being selective

Imagine that you have to create a student comprehension guide for this article to help more students understand it. You will have to compile a list of some of the essential ideas and concepts that one needs to be familiar with in order to understand the article.

To do this you will need to:

- take the quiz that follows right after about the concepts / terms definitions
- check your score
- enter your list of concepts with definitions on the glossary for your chosen 4 concepts

The students took a quiz at first which involved four tasks that checked the students' understanding starting with one such as checking basic article definitions as follows:

This quiz is not currently available

Question 1
Not yet answered
Marked out of 1.00
Flag question
Edit question

What does the term "acquisition" refer to?

Select one:

- ☐ a. acquisition is a conscious process during which children acquire language being unaware of grammatical rules
- ☐ b. acquisition is a subconscious process during which children acquire language being unaware of grammatical rules
- ☐ c. acquisition is a conscious process during which children acquire language being aware of grammatical rules

Next

The next quiz question asked the students to choose a definition for four terms from a drop-down menu:

Question 2
Not yet answered
Marked out of 1.00
Flag question
Edit question

Try to identify the correct definition for each term below. You can use the help provided below.

Brief terminology:

input
intake
implicit learning
explicit learning

explicit learning Choose...

input Choose...

intake an approach in which learners are made aware of the grammatical form of a language that they can already use communicatively the learning that takes place when one is consciously attempting to acquire knowledge the deliberate teaching of grammar to produce understanding of the grammar, hoping that understanding alone will allow the learner the linguistic forms that are successfully and completely processed by the learner the learning of complex information in an incidental manner, without awareness the linguistic forms that are acquired by the learner

implicit learning Choose...

focus on form Choose...

Focus on forms Choose...

Following from this the students were required to fill in ten gaps of an article section by choosing from the available ten options of a drop down menu the appropriate term:

Question 3
Not yet answered
Marked out of 1.00
Flag question
Edit question

Choose... are the brain-based skills we need to carry out any task from the simplest to the most complex. They

Choose... mechanisms of how we learn, remember, problem-solve, and pay attention rather than with any actual

Noticing Hypothesis be broken down into the different cognitive skills or functions needed to complete that task success-

noticing ages learners need to go through certain stages. The Choose... states that learners

cognitive abilities stages learners need to go through certain stages. The Choose... states that learners

aptitude al features of a language unless they pay attention to them. Choose... alone does

competence ical features of a language unless they pay attention to them. Choose... alone does

performance otomatically acquire language; rather, the hypothesis states that this is the essential starting point for

competence otomatically acquire language; rather, the hypothesis states that this is the essential starting point for

performance otomatically acquire language; rather, the hypothesis states that this is the essential starting point for

metalinguistic otomatically acquire language; rather, the hypothesis states that this is the essential starting point for

acquisition to and selection of input is called Choose... Language learners with high

apperception levels usually have an Choose... for language learning that refers to the "prediction of how well,

relative to other individuals, an individual can learn a foreign language in a given amount of time and under given conditions.

Chomsky separates linguistic competence and performance; he describes 'Choose...' as an idealized capacity

that is located as a psychological or mental property or function and 'Choose...' as the production of actual

utterances. In short, Choose... involves "knowing" the language and Choose... involves

"doing" something with the language. The knowledge of the learner about language is called Choose...

knowledge. More specifically, it is the type of knowledge that offers the learner the ability to consciously reflect on the nature of

language, by using the following skills:

1. an awareness that language has a potential greater than that of simple symbols (it goes beyond the meaning)
2. an awareness that words are separable from their referents (meaning resides in the mind, not in the name) ie. Sonia is

Finally the students were asked to select the sentence that according to them was correct:

Question 4
Not yet answered
Marked out of 1.00
Flag question
Edit question

Select one:

☐ a. In language learning, students have conscious knowledge of the new language and can talk about that knowledge.

☐ b. In language learning, students have conscious knowledge of the new language but they can not talk about that knowledge.

☐ c. In language learning, students have unconscious knowledge of the new language and can talk about that knowledge.

Next

For completely wrong answers 0 marks were assigned and each part of the quiz would account for 25% of the final mark.

Task 7 was a HotPotato exercise which was a quiz about specific sentences in the academic article. The students had to identify what was the function of each sentence within a specific paragraph and choose whether for instance the sentence was stating the main problem or if the sentence presented background information. There were four questions in total and students would gain one point for each correct answer. To fail the task students should have only one correct answer.

Finally, task 9 was a fill-in the gaps exercise. The screen capture below indicates the requirements of the task which focused on “moving” 9 terms at the appropriate place in the text. The highest score to be received was 100 and the points of correct task completion were automatically assigned by Moodle. To fail the task one should have only three correct answers.

Question 1
Not yet answered
Marked out of 1.00
Flag question
Edit question

The 'Noticing Hypothesis'. At about the same time, Schmidt and Frota (1986) published the results of a diary study in which Schmidt [1] for a close relationship between what he had 'noticed' (operationalized as testimony to the [2] of L2 forms, in written diary [3] about a language he was learning (Portuguese), and the subsequent appearance of some of those forms in his own production. Further pursuing the [4] of noticing, Schmidt (1990) pointed out that the term 'unconscious' (the defining feature of Krashen's ' [5] process) is commonly used in three distinct senses: to describe learning without 'intention', learning without [6] 'understanding', and learning without attention and 'awareness'. Schmidt argued that while L2 learning without intention or metalinguistic understanding is clearly possible, there can be no learning without attention, accompanied by the [7] experience of 'noticing', or being aware of aspects of the 'surface [8] of input. All L2 learning is conscious in this sense, since input does not become intake for learning unless it is noticed. Schmidt assumed that focal attention and the contents of [9] are essentially isomorphic. The 'Noticing Hypothesis' continues to promote much research into the role of awareness in second language learning in instructed and experimental settings, using an increasingly sophisticated and sensitive range of measures of awareness, as will be described in the third section of this chapter.

occurrence subjective entries argued structure metalinguistic awareness
acquisition notion

Next

The tasks from Session 3 which were scored numeratively included only task 1. This involved ranking 4 different types from the most informal to the most formal and

students would receive a point for each correct answer. Successful completion involved finding all the correct answers.

3.9.2.2.4 Analysis of the EAP and scaffolding questionnaires (RQs 2, 3, 4)

The EAP task and the scaffolding questionnaires data obtained through the administration of the questionnaires to the participants were entered in an SPSS file in a number of columns equal to the number of questions (32 columns for the EAP task questionnaire and 10 for the scaffolding one). Given that the number of participants of the study was 13 in total the main statistical procedures that could be employed for the analyses of the qualitative data were calculating the number of students which agreed with a specific option from the Likert scales and the frequency with which a specific issue arose among the participants' answers.

3.9.3 Chapter summary: Addressing the research questions

Given the complexity of the research design, instrumentation, procedures for data gathering and analysis, this chapter will conclude by highlighting how the overall research design contributed to addressing each of the research questions informing this study.

3.9.3.1 RQ1: *Measuring development at a conceptual level*

The first research question focused on examining the relative value of a Pedagogical Unit designed to foster understanding at a conceptual level by users of L2

English in an academic context. In the present study, development at a conceptual level is understood as the increased ability of the participants to perform higher mental functions.

Conceptual ability was assessed by analysing and evaluating the students' audio and video recorded data based on their online activity during (see rubric and indicators in section 3.9.2.1.1). A student's level of conceptual ability was determined by taking into consideration the indicators mentioned earlier and whether for instance the ability to plan or formulate assumptions was evident in the pre and post introspection tasks, the pre and post concept maps, the pre and post oral presentations, the audio and visual screen captures of online activity and in the task scores and outcomes. More specifically:

(1) The introspection tasks measured conceptual ability by focusing on the identification of specific themes. Remember that participants had to read an academic paper prior to performing an introspection task (Appendix 9). The target was to encourage the students to perform at a conceptual level and reflect on the reading strategies they employ when reading academic texts in order to approach a text, understand it, retrieve information and ultimately establish an association between the text's concepts and ideas mentally. Thus, the tasks focused on guiding the participants to identify the process of reading an academic paper and understanding its main points but also on the elements and parts of academic papers that enhance understanding while also identifying what they find difficult.

(2) Concept maps, were another tool employed as they offered an insight into the conceptual associations that the students established having followed the process that was described by them during the introspection task. The maps offered insights into the specific academic concepts on which the students focused but were also indicative of the participants' higher mental skills such as classifying and ranking arguments. The

students' conceptual ability was evident when they produced a concept map at an initial stage that was later on enriched and fully developed based on the received training to reflect their final level of conceptual ability. If the students were not able to develop their maps further or enrich them this was equally indicative of their level of conceptual ability. The comparison between the two concept maps (initial and final) from a qualitative and a quantitative perspective contributed to assessing conceptual development.

(3) Moreover, the oral presentations enabled the participants to verbalise the concepts that were schematically depicted on their concepts maps and demonstrate their ability to function at a mental level. This is because, through delivering a presentation on the topic of an article, the participants were asked to summarize, elaborate and structure a well organised oral product.

(4) The final tools that contributed to measuring the participants' conceptual ability were the task scores from a variety of online closed and open ended tasks on Moodle (see 3.5.6 for details).

To conclude, to measure the development and progress of the participants as it was discussed in Ch. 2 from a SCT perspective, L2 development refers to the increasing ability to use the L2 for communicative as well as cognitive purposes. Therefore, the ability to shape and re-shape language as a meaning making tool, being able to go from object and other regulation to self-regulation (i.e., ultimately be able to use language without scaffolding mechanisms, mediation), and the comparison of the pre- and post – session performances were the issues that were taken into consideration to mark the students' progress (section 2.2.1). In more detail, the pre- and post-introspection tasks were compared, the pre and post session concept maps were compared but also the students' presentations on the 3 articles that they were asked to read during the pre- while

and post-sessions were compared. Thus, for this project, the ability to deliver a presentation successfully (success is operationalised as delivering key content, the six points outlined in 3.5.3) was of crucial importance to be able to address the research questions of the whole project. Other measures of development included the student work that was produced during the teaching cycle which was uploaded on the forum area. Moreover, at the end of each training section there was a questionnaire for feedback from the students with questions that asked them to reflect on their progress.

3.9.3.2 RQ2: Measuring the value and affordances of a Moodle Pedagogic Unit

The second research question focused on the value and affordances of a Moodle Pedagogic Unit for academic training first for enabling students to understand academic texts at a conceptual level and secondly for enabling them to effectively deliver an oral presentation. The value of the design of the unit for these two purposes was measured by using firstly data from the task scores that the participants received as indicators of successfully achieving the course goals. The performance of the students at the post – sessions was also conducive to deciding on the value of the designed Pedagogic Unit apart in addition to previously mentioned measures. Apart from this, the participants' views about the design were gathered by means of the online feedback questionnaires (see Appendix 12) that were received after each training session but also from the participants' semi structured feedback interviews during the post-teaching sessions. These were compared to the screen-capture data that recorded visually and auditorily the participants' reactions towards the unit itself.

Importantly, the screen capture data were employed as a qualitative aspect to gain a better understanding of the other data. For instance, the problems or suggestions

mentioned by the students during the interviews were first checked at the relevant video excerpt for the specific student and then for all other students to see if this was a general trend. Then, a list of the problems / suggestions mentioned in the feedback questionnaires was also compared with the ones of the interviews and if there were any differences then the questionnaire items were also checked against the participants' reactions with the screen-captures. In sum, the affordances of Moodle were measured through the students' online feedback questionnaires (Moodle format), by examining screen-captures and the audio recordings but also from the feedback semi-structured interviews.

3.9.3.3 *RQ3: Measuring the value of the scaffolding mechanisms*

The third research question examined the value of the various scaffolding mechanisms in each task to support: a. The successful completion of the tasks and b. The increased participants' ability to understand academic texts at a conceptual level in order to deliver an oral presentation for academic purposes. To answer this research question information was drawn from the audio recordings and screen captures of the students' online activity, the students' task scores and performance and the students' interviews at the post-treatment session. More specifically, the screen-captures were analysed for the types of scaffolding that were consulted by the students, by which students and how many students, how many times was the scaffolding consulted during the completion of a task and for which specific task was the scaffolding used. Then, the task scores of the students who consulted the scaffolding features were compared to the task scores of the students who were observed to not have consulted the scaffolding features.

When a decision was made that a specific scaffolding feature had contributed more to the successful completion of a task (based on task score / task completion) then

the relevant minutes from the audio recordings when the students were using the scaffolding were examined to check if the students' comments were in line with our baselines to assess the successful scaffolding features. Then, the relevant coded sections from the student interviews where a specific scaffolding feature was mentioned were also examined to see if the student comments were still positive about the specific features (given that the interviews took place after the treatment stage).

3.9.3.4 RQ4: Assessing the students views

The last research question focused on exploring the participants' opinions and attitudes towards: a. The Pedagogical Unit, b. The pedagogical environment, i.e., Moodle, c. The pedagogical tasks (i.e. reading tasks and oral presentation) and d. The scaffolding mechanisms. All the relevant information about the students' views was gathered by various tools, including the semi-structured interview (Appendix 16), the task questionnaire (Appendix 13), the online feedback questionnaires (Appendix 12), the scaffolding questionnaire (Appendix 14), but also from the coding of the auditory data from the online activities that were screen captured (Appendix 22).

Thus, to determine what the students' opinions about the Pedagogic Unit were, the students' opinions from the interviews were brought together with relevant comments from the online feedback questionnaires. When the opinions were checked then they were looked at against the audio recordings of online activity (which were colour coded in NVivo) to examine what the relevant opinions were and whether there were any inconsistencies or changes. The same procedure was followed to determine what the students' opinions about the Moodle platform were.

Regarding the students' opinions about the pedagogic tasks the students' interview and feedback questionnaire data were compared first and then these were checked against the task questionnaire responses. Then, once the similarities and differences were identified between the three data sets these were tested against the audio recordings (if there was any relevant reference). The same procedure was followed in the case of examining the students' opinions about the scaffolding mechanisms.

The next chapter will present the results and findings of the project to provide an answer to the four research questions of the study.

4. Results

The present study focused on the creation and investigation of an online pedagogic unit and its accompanying scaffolding techniques and mechanisms to enhance the University students' understanding at a conceptual level in an L2 academic context from a SCT perspective. This thesis addressed four research questions and this chapter presents the results while Chapter 5 is dedicated to the discussion of the results.

4.1 Research question 1

The first question explored how the Pedagogical Unit (implemented on Moodle) fostered understanding at a conceptual level by users of L2 English in an academic context. To assess the development and progress of the participants upon completion of the training from a SCT perspective (Ch. 2), L2 development refers to the ability to shape and re-shape language as a meaning making tool and being able to go from object and

other regulation to self-regulation (i.e., ultimately be able to use language without scaffolding mechanisms, mediation). Part of answering this question also reflects the way the researcher interprets “understanding at a conceptual level” (section 2.1.2). Therefore, it was crucial for the purposes of the study to focus on the students’ exploitation of opportunities to apply and adapt the acquired concepts to new situations accompanied by performing higher mental functions at increasing levels of self-regulation.

A variety of data was collected to determine the conceptual understanding of the students before and after treatment by means of pre and post treatment measures including: 1. pre- and post-retrospection tasks (qualitative data), 2. Pre- and post-session concept maps (qualitative and quantitative data) and 3. Pre and post treatment student presentations on the three articles that they were asked to read during the pre- while and post treatment sessions (qualitative and quantitative data).

4.1.1 Retrospection Tasks

The retrospection tasks measured conceptual ability by focusing on the identification of specific themes. The students had to read an academic paper and then perform a retrospection task (Appendix 9 and Ch. 3) related to the information that participants consult when reading these types of documents, their reading strategies and use of concept formation (how they appear to link concepts and ideas mentally). As detailed in section 3.9.2.1.2, a coding scheme was developed along with the necessary indicators for the evaluation of the retrospection task. The coding scheme considered the elements of the retrospection task such as the process the participants went through to understand the academic paper, its main points, the paper elements that helped them understand the paper and the parts they found difficult to understand.

Table 4.1 below gives an overview of the popularity of specific reading strategies and procedures among students when analysing the recordings of the 13 participants during pre and post-treatment retrospection tasks. For a full list of the recorded strategies and procedures please consult Appendix 28. The presentation of the data from the pre- and post-treatment phases below enables a comparison and reveals the initial stage of the students' level (whether students reported using any of the strategies when reading an academic article) and their progress at the post-treatment stage (which strategies were reported being used and were therefore enhanced, recognised and employed after receiving the training). The table also presents the number of students that have reported using specific strategies or processes at both stages and both are listed in order of popularity. Among the strategies, one specific reading process was reported by students and is mentioned in 9 (Top-down). The term "process" in general is treated here as referring to cognitive processes involved in reading. For a full account of the way strategies link to specific skills please consult Section 3.5.3 and Appendix 29 where it is clearly shown how the emerging strategies (3.9.2.1.2) were classified to specific levels according to the revised taxonomy. Our main focus and interest here is not on the frequency with which students employed a specific strategy, for instance, but on student evidence of awareness of specific strategies when approaching an academic article and how many of the participants could report or evidence strategy use.

Table 4.1: Popularity of reading strategies and processes among students

Conceptual development	Pre-treatment		Post-treatment	
	Strategies and processes	Number of users	Strategies and processes	Number of users
<i>Intermediate</i>	1. Identifying topic sentences	13	1. Identifying topic sentences	13
<i>Lower</i>	2. Predicting reading content	12	2. Predicting reading content	13
<i>Intermediate</i>	3. Identifying the organisation of arguments	11	3. Identifying the organisation of arguments	12
<i>Lower</i>	4. Scanning	7	4. Scanning	12
<i>Intermediate</i>	5. Guessing unknown vocabulary from the context	6	5. Guessing unknown vocabulary from the context	11
<i>Lower</i>	6. Recognising terminology	5	6. Recognising terminology	12
<i>Lower</i>	7. Establishing a purpose for reading	8	7. Establishing a purpose for reading	12
<i>Higher</i>	8. Reading the article abstract	6	8. Reading the article abstract	12
<i>Lower</i>	9. Top down reading process	5	9. Top down reading process	11
<i>Higher</i>	10. Summarising information from each paragraph	7	10. Summarising information from each paragraph	11
<i>Intermediate</i>	11. Consulting bullet points, numbering, lists, etc.	7	11. Consulting bullet points, numbering, lists, etc.	12
<i>Lower</i>	12. Skimming	7	12. Skimming	12
<i>Intermediate</i>	13. Locating example discourse markers (such as i.e., etc.)	6	13. Locating example discourse markers (such as i.e., etc.)	12
<i>Higher</i>	14. Locating comparison discourse markers (i.e. similarly, etc.)	6	14. Locating comparison discourse markers (i.e. similarly, etc.)	11
<i>Intermediate</i>	15. Identifying ideas and concepts	6	15. Identifying ideas and concepts	11
<i>Higher</i>	16. Chart interpretation	6	16. Chart interpretation	12
<i>Lower</i>	17. Dictionary use	6	17. Dictionary use	13

The data above revealed that regarding conceptual understanding during the pre-treatment, the students reported activities that indicated an intermediate level of

conceptual understanding. More specifically, 6 students indicated that they seek to “understand the definitions of key concepts” (No. 15) of an academic article when reading it, a skill that is key to ensure understanding at a conceptual level. However, regarding skills that require creation or evaluation of information at a higher conceptual level only a small number of students responded to this challenge. Only 6 of the students were able to make assumptions about the article’s content by reading the abstract (No. 8), identify the use of evidence (No. 14 - 6 students) or work at a creation level and summarise information from various article sections (No. 10 - 7 students).

However, at the post-treatment stage (Table 4.1), students appear to have improved in their use of strategies compared to their pre-treatment phase even though some students still reported activities that indicated a low level of conceptual development. It appears that 11 students focused on identifying ideas and concepts (No. 15), 12 of the students made assumptions about article content, 11 students focused on locating evidence in the text (No. 14) and 11 students resolved to summarising information from various article sections to develop understanding successfully (No. 10). These numbers include students from the pre-treatment phase plus new students who used the strategies for a first time at the post-treatment phase only. Strategy use improvement was demonstrated when students were successful at realising that they used a specific strategy when doing the retrospection task. This was evidence of the students’ awareness of specific strategies when processing and reading an academic article (especially if students mentioned them at a post-treatment stage but they were not aware of these strategies at a pre-treatment phase, and this was regarded as improvement).

It should be mentioned at this stage that new, additional strategies were preferred by the students, since having received relevant training they began to focus on different or additional parts of academic articles and employed additional reading strategies that

they did not employ at a pre-treatment phase. Table 4. 2 below includes newly introduced strategies that the students reported on using at the post treatment phase and these were not at all reported at the pre-treatment phase. Therefore, the range of strategies that was favoured by the students during the pre-treatment stage resulted in more frequent use of specific strategies or even at enriching the previous range.

Table 4.2: Popularity of newly introduced reading strategies and procedures among students at a post-treatment stage

Conceptual development	Post-treatment	
	Strategies	Number of users
Higher	1. Identifying the article type (i.e. if it develops around the explanation of a definition)	12
Higher	2. Identifying the paper's topic and relating to their purpose for reading	12
Intermediate	3. Consulting the introduction	11
Higher	4. Consulting the literature review	10
Intermediate	5. Reading the summary sentences of each paragraph	10
Higher	6. Attention to discourse markers: cause and effect	8

The data above revealed that, regarding conceptual understanding at this stage, the students reported using strategies that indicated a higher level of conceptual understanding. More specifically, 12 students indicated that they sought to “identify the type” of an academic article, a skill that is considered essential to ensure understanding at a conceptual level (according to the classification of strategies in 3.9.2.1.1). However, for the skills that require creation or evaluation of information and which are at a higher conceptual level (3.9.2.1.1) a very good number of students was able to report using specific strategies. In more detail, 11 students related the article's content to their reading purposes at the post treatment stage and employed a new strategy, consulted the literature review (9 of the students) or worked at a creation level and drew conclusions from various article sections such as from summary sentences (9 students). All the previously

mentioned strategies were reported by the students for the first time at the post-treatment phase.

From the analysis of the recorded student retrospection data, various patterns that described the students' combination of preferred reading steps, strategies and preferences were reported. The two most frequently encountered reading patterns that emerged are presented in Table 4.3 below in the step order in which the majority of the students (12 out of 13 students) reported using them. The patterns generally demonstrate the order in which the students reported using specific strategies and processes (top-down) when reading and processing an academic article. At the pre-treatment phase students reported various strategies which, when closely examined, could be classified into and reflect two general reading patterns. At the pre-treatment stage most students were quite familiar with a number of reading strategies and processes (as defined previously), with the general academic article structure and the commonly used discourse markers. However, specific learner strategies such as being able to identify article type (i.e. state of the art, etc.), extracting information from paragraph structure (i.e. finding the main topic of a paragraph in the topic sentence) or identifying the main article ideas were strategies not widely used and therefore not included in the reading processes below:

Table 4.3: Identified patterns of student reading processes at a Pre-treatment stage

Reading pattern 1 (5 users)	Reading pattern 2 (8 users)
1. Reading process: Top down	1. Reading process: Bottom up
2. Predicting the reading content	2. Connecting co-textual elements
3. Skimming	3. Scanning
4. Reading the abstract in detail	4. Consulting the abstract briefly
5. Identifying the topic	5. Identifying article topic and how it relates to reading purposes
6. Classification (i.e. bullet points, etc.)	6. Classification (i.e. bullet points, etc.)
7. Becoming more aware of dictionary use	7. Becoming more aware of dictionary use

Table 4.3 indicates that regarding the students' understanding at a conceptual level at the pre-treatment stage the students in their majority followed reading processes which indicated their conceptual level to be at the first three lower levels (Understanding,

Reasoning and Creating). By following reading processes which emphasised text comprehension and element identification and not for instance article evaluation, the students did not exhibit higher mental functions that would reveal an evaluative or creative interplay with the article information.

From the analysis of the post-treatment set of retrospection data however, three general reading patterns emerged (similar to the pre-treatment ones in Table 4.1) and are presented in Table 4.4 in the order in which the majority of the students reported using them. At this stage most students experimented further with reading patterns which comprised of strategies they were already familiar with, they introduced new strategies too and reported on creating combinations that worked for them. They also introduced new specific skills that were not employed during the pre-session such as identifying article type, extracting information from paragraph structure or identifying main ideas (Appendix 28). As a result the steps of the patterns, which follow exactly the same format as those at the pre-treatment stage, have now increased from six (at the pre-treatment phase) to 13. It is also worth noting that the students' reading patterns in Table 4.4 increase in terms of the complexity of strategy use preference from reading pattern 1 to reading pattern 3. Thus, at the post-treatment phase, these three reading patterns reflect the three general sequences of reading strategies that the students reported using with Reading pattern 1 reflecting the preferences of students at a lower conceptual level and Reading pattern 2 at a higher conceptual level:

Table 4.4: Identified patterns of student reading processes at a Post-treatment stage

Lower	Intermediate	Higher
Reading pattern 1 (1 user)	Reading pattern 2 (2 users)	Reading pattern 3 (10 users)
1. Reading process: top down	1. Reading process: top down	1. Reading process: top down
2. Connect with what students know already	2. Connect co-textual elements	2. Activate prior knowledge
3. Connect co-textual elements	3. Predict reading content	3. Connect contextual elements

4. Predict reading content	4. Identify the organisation of arguments	4. Identify the organisation of arguments
5. Identify a purpose for reading	5. Consulting the abstract	5. Identify a purpose for reading
6. Identify the article type	6. Reading the introduction	6. Identify the article type
7. Reading the article abstract	7. Reading the literature review	7. Discover a sequence
8. Consult tables. Charts, graphs	8. Consult tables. Charts, graphs	8. Consulting the abstract
9. Consult topic sentences	9. Consult topic sentences	9. Consult topic sentences
10. Consult summary sentences	10. Consult summary sentences	10. Consult summary sentences
11. Look for examples	11. Look for examples	11. Identify papers to read for own purpose
12. Identify papers to read for own purpose	12. Identify papers to read for own purpose	12. Become more aware of dictionary use
13. Become more aware of dictionary use	13. Become more aware of dictionary use	13. Consulting glossary terms

The data of the above table indicate that regarding the students' understanding at a conceptual level the students in their majority followed reading patterns which indicated their conceptual level to cover all the five levels of conceptual understanding (3.9.2.1.1). By following reading patterns such as 3 which emphasised text comprehension, element identification and article evaluation, the students exhibited higher mental functions which involve an evaluative or creative interplay with article information. All reading patterns at the post-treatment phase were enriched by additional strategies however the complexity of each strategy revealed each student's level. Those students who selected Reading patterns 1 & 2 resulted in the use of strategies that did not exhibit awareness of strategies of a higher conceptual level such as those at Reading pattern 3.

4.1.2 Concept maps

Right after the retrospection task (Section 3.6.1.1.) the students were encouraged to read an academic article on the topic of “Feedback” and based on their understanding of the article to create a concept map. The analysis of the concept maps involved a combination of quantitative assessment based on a criterion map (Appendix 25) along with a qualitative evaluation of the concept maps based on Kinchin’s (2000) scheme. This evaluation and the accompanying coding scheme was selected to receive both quantitative and qualitative results about the students’ conceptual ability and development.

The process that was followed during the pre-treatment was also followed at the post-treatment phase where the students were encouraged to create a mind map based on their understanding of the third article that was given to them on the topic of “Motivation” (Appendix 1).

4.1.2.1 *Student scores per map against the expert one*

The expert’s map on the pre-treatment article received a score of 121 with a total of 55 identified relationships, a score of 35 for the level of hierarchies, 30 for the number of crosslinks and 1 mark for the number of examples provided. The students’ scores were compared with the expert’s map score to reveal their level of similarity with the expert map and are presented in Table 4.5 below. Table 4.5 also presents how the pre-treatment student scores compare with their post-treatment concept map scores. Concerning the post-treatment stage, Table 4.5 shows that the expert’s map on the article of “Motivation” received a score of 285 with a total of 30 identified concepts, a score of 30 for the level of

hierarchies, 224 for the number of crosslinks and 1 mark for the number of examples provided.

Table 4.5: Pre and post-treatment concept map (CM) scores (Student and Expert scores)

Student	Pre-treatment concept maps		Post-treatment concept maps	
	Raw CM score	Similarity with expert map (%)	Raw CM score	Similarity with expert map (%)
S1	80	66.1%	70	90.9%
S2	101	83.4%	71	92.2%
S3	90	74.3%	70	90.9%
S4	58	47.9%	71	92.2%
S5	60	49.6%	54	70.1%
S6	92	76%	69	89.6%
S7	62	51.2%	60	77.9%
S8	78	64.4%	68	88.3%
S9	89	73.5%	70	90.9%
S10	44	36.3%	60	77.9%
S11	33	27.2%	53	68.8%
S12	81	66.9%	71	92.2%
S13	65	53.7%	47	61.0%
Average	71.7	58.6%	64.1	83.3%
Expert map score	121	100%	77	100%

The levels of similarity that the students achieved at the pre-treatment stage when their maps were compared to those of experts, revealed the students' level of conceptual ability. For example, a students' map with a score of 53.7% of similarity means that the student did not manage to identify the required number of concepts (according to the expert's map) to create nodes neither the number of levels that their concept map should have against the criterion map or the associations between different concepts and map levels. This is an indication that the student can extract relevant information (understanding) or distinguish key ideas (reasoning) however they cannot identify the connections between the various concepts (evaluating) as the map did not capture that. The low raw scores in Table 4.5 are at this level mainly because of the number of concepts that students used in their maps. An example of a map at this stage and how the number of concepts and the raw scores were calculated can be found in Appendix 11. The average similarity student score at a pre-treatment stage was 58.6% and once more the

indications about the students' conceptual ability centred at the lower levels of comprehension and analysis.

At a post-treatment stage, the students' raw concept map scores have increased in similarity with the expert's map and this is because the maps were more enriched after the treatment phase. The average similarity score that the students got at a post-treatment stage was 83.30% and the indications about the students' conceptual ability at this stage centred around the higher levels of understanding and reasoning (3.9.2.1.1). Student 12 whose post-treatment raw concept map score was 71 and was lower than the pre-treatment concept map has now created a map that is 92.2% similar to the relevant expert map (compared to the pre-concept map which was only 68.9% similar to the relevant expert map). This suggests that the student's map represented the same main and important concepts and the student was successful at identifying the various levels of hierarchy and at establishing links between concepts (cross-links). This can therefore translate into an ability to demonstrate high levels of comprehension since the student is able to evaluate the importance of terms, add them and synthesize a map that depicts the complex relationships between concepts. An example of a student post-concept map and an expert map can be found in Appendix 30.

4.1.2.2 Patterns of student concept map structure against the expert one

The next stage of the analysis of the produced student concept maps was their classification into general patterns that could represent the maps' structure. The types of maps used for qualitative classification purposes were adapted by Kinchin et. Al (Appendix 18 & Appendix 24) and distinguished between unconnected maps, linear, once-centred, several centred and spaghetti (Pearson and Somekh, 2001, Appendix 18).

In Table 4.6 below, a concept map with several centres was the most commonly occurring map at a pre-treatment stage, with a single centred map coming second, as spaghetti maps were relatively rare (1). Moreover, a spaghetti concept map was the most commonly occurring map at a post-teaching stage (11), with several centred maps coming second. This reveals that the students could create complex maps that reflected the relationship between terms and that consisted of various levels after receiving the training. Each student created one map for the pre-treatment and post-treatment stage and the number of maps below are based on the number of students who used/created a specific type of map.

Table 4.6: Types of concept maps

	Pre-treatment concept maps	Post-treatment concept maps
Types of concept maps	Number of maps	Number of maps
One centred	3	0
Several centres	5	2
Linear	0	0
Spaghetti	1	11
Total	9	100
Not a concept map	4	0
Total	13	13

The findings above at a pre-treatment stage indicate that the maps in their majority (9) contained concepts and organised information around the concept nodes. However, no further associations were made between nodes or sub-nodes that could indicate the ability of the students to synthesize information at a conceptual level after critically evaluating it. This is a skill that students would be expected to demonstrate if their concept maps were of a linear or of the spaghetti type. Therefore, at this stage the conceptual ability of only 1 of the students can critically evaluate the content of their concept maps and establish connections between concepts and nodes by creating linear concept maps. An example of a low conceptual level student map that indicates how the concept map was generally classified can be shown in [Appendix 31](#).

Finally, quantitative analyses of the 26 maps (i.e. 13 pre-treatment session and 13 post-session maps) were conducted to assess changes in student conceptual understanding over the course of the training.

Table 4.7: Pre-session and post-session concept map scores for three different Quantitative Factors

Variable	Pre-session		Post-session		T	P
	M	SD	M	SD		
Total concepts	34.6	23.0	56.2	14.5	7.14	<.01
Total cross links	4.3	1.6	5.7	1.9	2.28	<.05
Number of levels	3.2	1.2	5.6	1.9	1.72	<.05

Quantitative markers included pre-session and post-session counts of (a) the number of concepts represented, (b) the number of cross links specified and (c) the number of hierarchical levels represented. One-tailed correlated groups to tests were calculated to identify which of these markers indicated change. The analyses revealed a statistically significant increase, $p < .01$, in the number of concepts students generated. An increase in the total number of cross-links and map levels was also found $p < .05$. The qualitative analyses of the pre and post-treatment groups' maps are described in the following section.

4.1.2.3 Qualitative analysis

This section presents the qualitative analysis of the concept maps, starting with the various types of maps that were identified in the study. Table 4.8 presents the types of pre-treatment concept maps and the raw number of students that created a similar type of concept map:

Table 4.8: Types of student concept maps as classified by the coders

	Pre-concept maps	Post – concept maps
Types of concept maps	Number of students	Number of students
1. Spokes:	8 (total*)	2 (total*)
a. One-centred	3	0
b. Several centred	5	2
2. Chains / Linear	0	0
3. Networks	4	5
a. Spaghetti	1	6
Total student number	13	13

*: There were two types of spokes (i.e. one and several centred) and the indication total refers to the total number of students who created spoke type maps

As Reese (2002) mentions, whenever a connection is established between disparate branches, a cross-link is constructed. Thus, this ability to construct cross-links and to make relational connections between strands reveals a primary distinction between high and low achievers. Based on this distinction, Reese's patterns of high and low achievers were compared against the structure of the concept maps that were constructed by the students (Appendix 24). The figures (i.e. concept map structures) in the Appendix illustrate maps that were created according to the treatment high and low achiever subscore-to-node ratios. The map of a higher achiever should be demonstrating greater integration than the lower achiever map. Table 4.9 indicates the number of students and the concept map patterns in Appendix 24 that best represent their concept map performance so far.

Table 4.9: Student concept maps and the matching specific patterns of concept map structure

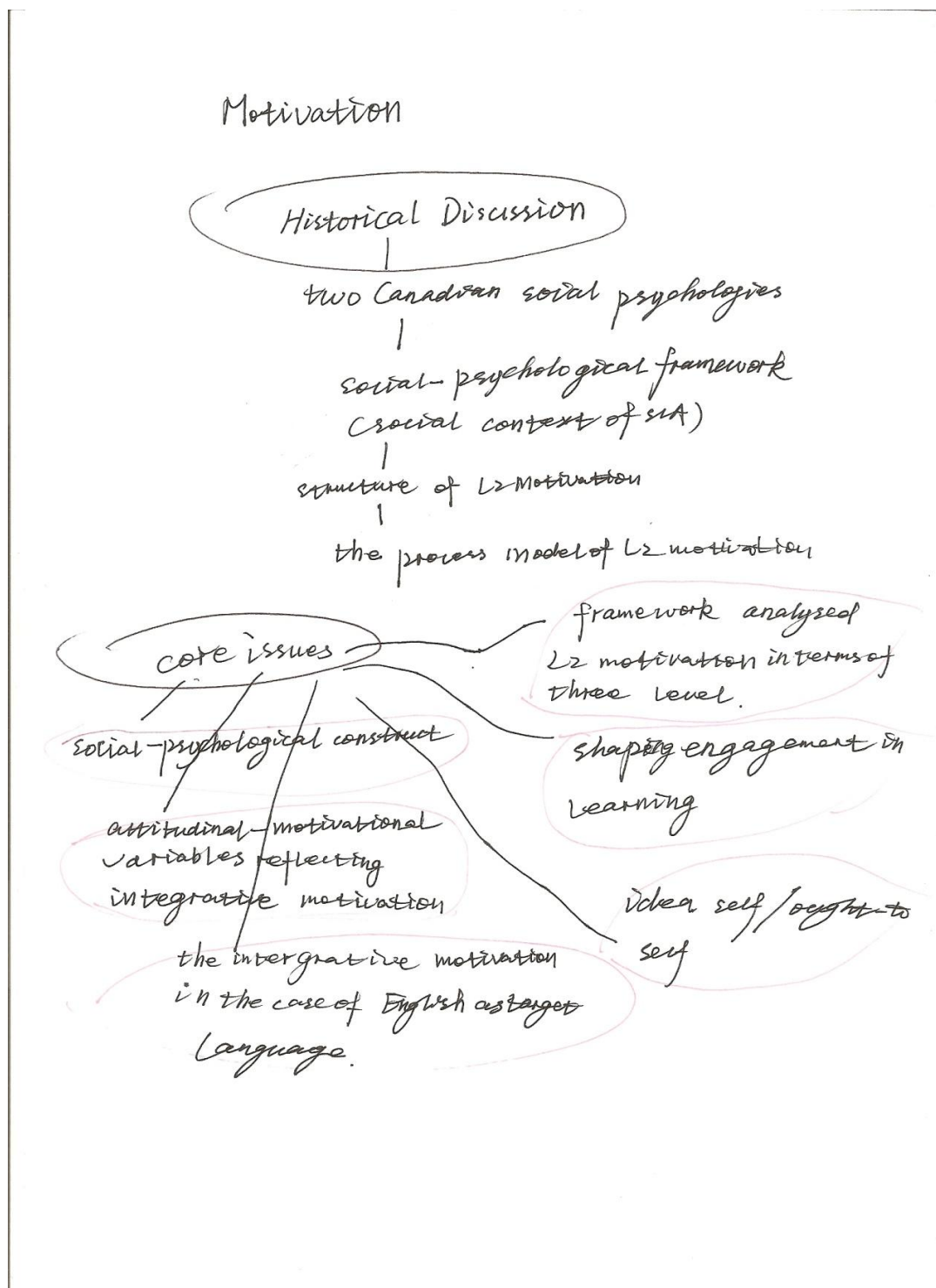
	Pre-concept maps	Post-concept maps
Pattern of concept map structure (Reese, 2002)	Total student number	Total student number
Figure 4*	2	0
Figure 5*	5	2
Figure 6*	5	5
Figure 7*	1	6

*The figures refer to concept map structures as these were numbered and introduced in Reese, 2002, Appendix 11.

The qualitative analysis of the pre-concept maps yielded further evidence that the students' level of conceptual ability was not of the highest level since the students did not demonstrate skills of evaluating or planning before the creation of their concept maps to

predict their final outcome. An example of such a map which replicates the format of Figure 4 (in Appendix 24) and the basic one-centred version of a concept map is the following (Figure 4.1):

Figure 4.1: One centred student concept map example



4.1.3 Presentations

Further to all the previous data, the oral presentations enabled the participants to verbalise the concepts that were schematically depicted on their concepts maps and demonstrate their ability to function at a mental level (3.6.1.3). By delivering a presentation on an academic article topic, the participants were required to summarize, elaborate and structure a well organised academic oral output.

The presentations were audio-recorded and were also quantitatively and qualitatively analysed. The quantitative evaluation relied on the scores that were awarded to each presentation by filling in an evaluation form (Appendix 26). The evaluation form focused on 12 aspects relating to Content and Language. The qualitative analysis focused on the examination of the transcribed data based on a coding scheme (Appendix 27). The scheme was developed around four main areas: content, delivery, format/structure and preparation.

The students' pre and post-treatment oral outputs were indicative of their level of conceptual understanding as explained in 3.9.3.1. This section will present information about the following areas in more detail: i. a table with an overview of the popularity of specific terms in the students' presentations, ii. a table with the patterns of students' presentation structure and iii. a table with the areas that the students were successful at during their presentations and those which required further improvement.

4.1.3.1 *Thematic evaluation of presentations*

Table 4.10 below gives an overview of the frequency of specific qualitative analysis aspects that emerged when analysing the recordings of 13 students. The term

frequency refers to which specific theme was addressed the most by the students in their presentations. At the pre-treatment stage, the theme of Coverage and relevance was quite frequent when students delivered their presentations, since they managed to focus on the topic, and identify the major areas which needed to be addressed. However, 2 out of 13 failed to address a wide enough range of issues and implications which indicates that further training was required for students to identify key points. Moreover, the frequency of A2 (Analysis) and A3 (Supporting evidence) which correspond to critical elements of conceptual ability were quite low.

Table 4.10: Popularity of specific themes during pre and post presentations

	Pre-treatment presentations	Post-treatment presentations
Presentation aspects	Frequency among student presentations (%)	
Coverage relevance	90.3	97.3
Analysis	81.2	90.2
Supporting evidence	68	87
Voice/delivery	75	88
Format / structure	86	92.1
Preparation	60	78.5

At post-treatment, the frequency of the aspect of Coverage and relevance was improved when the students delivered their presentations, since they managed to focus on the topic, and identify the major areas which needed to be addressed. This means that more students were able this time to create and deliver a complete presentation that covered all points. Furthermore, A2 (Analysis) and A3 (Supporting evidence), were improved at a post-treatment stage.

In general, Table 4.11 illustrates the number of students who achieved a first at the various aspects of oral presentation assessment for their pre and post- treatment performance.

Table 4.11: Number of students who achieved a first at the various oral presentation assessment aspects – Pre and post treatment

Aspects	Pre-treatment presentations	Post-treatment presentations
Coverage	1	9
Analysis	-	8
Supporting evidence	1	8
Voice	2	8
Format / Structure	1	6
Preparation	-	9

For reasons of space a table that presents the level that each student (S) managed to achieve after delivering their presentation for each specific category at a pre-treatment stage can be found in Appendix 32. There are six levels in total including First, Upper 2nd, Lower 2nd, Third, Ordinary and Fail. A table that presents the level that each student (S) managed to achieve after delivering their presentation for each specific category at a post-treatment stage can be found at the Appendix 33 and the types of competence against which the students were evaluated are the same as those used for the pre-treatment presentations.

By analysing the interview data, two general patterns of presentation structure emerged at both pre and post treatment stages and are presented below. Some of the students were already familiar with the delivery of presentations and followed a generally acceptable pattern and others experimented with their options. The Pattern of presentation structure 2 (Table 4.12) corresponded to 7 of the students' presentation structure. They adopted a basic organisation though, and the explanation of related links (d) below was not a fully developed section. This reflects the students' low conceptual ability at this stage (as they were not able to establish/describe connections between concepts).

Table 4.12: Patterns of presentation structure at a pre and post treatment stage

Pre-treatment stage		Post-treatment stage	
Pattern of presentation structure 1	Pattern of presentation structure 2	Pattern of presentation structure 1	Pattern of presentation structure 2
a. Introduction to the topic	a. Introduction to the topic	a. Introduction to the topic	a. Introduction to the topic
b. Definition of concept 1	b. Outline of the article structure	b. Definition of the main concepts	b. Presentation of the key concept
c. Example	c. Presentation of the main ideas	c. Examples	c. Overview of the concept map and ideas
d. Explanation of how it relates to other concepts in the field	d. Explanation of related links	d. Analysis of the relationships between concepts	d. Explanation of the connections between ideas
e. Definition of extra concepts	e. Provision of examples	e. Definition of extra concepts	e. Presentation of how this links to the article
f. Explanation of the article's arguments	f. Conclusion	f. Explanation of the author's purpose and stance	f. Examples
g. Conclusion		g. Conclusion	g. Conclusions

From the analysis of the interview data, it appeared that the students were guided through the various steps of presentation preparation during the three-day training, incorporated feedback and suggestions from the previous two presentations and followed a much more improved and acceptable presentation pattern. The post-treatment presentations show that the students adopted an improved presentation organisation and the analysis of related links is an issue that reflects the students' higher conceptual ability at the moment (as they are able to establish/describe connections between concepts, bring examples and critically analyse and synthesise a presentation that reveals their personal comprehension of the article's content and concepts).

Further to the previous qualitative analysis, the pre and post-presentation scores for each student based on the evaluation forms (Appendix 26) were also analysed. Table 4.13 offers information about the average score of the students out of max. 12 points.

Table 4.13: Pre and post-treatment student oral presentations (figures represent raw scores)

Students	Pre-treatment Score (/12)	Average score	Post-treatment Score (/12)	Average score
S1	6	7.69	10	10.53
S2	7		9	
S3	5		8	
S4	7		10	
S5	8		11	
S6	8		12	
S7	7		10	
S8	9		11	
S9	8		12	
S10	7		9	
S11	9		12	
S12	10		12	
S13	9		11	

Moreover, the data presented below indicate the students' areas of success and those areas requiring further improvement. The areas indicate the number of students whose presentations were successful or not for each specific area. For instance, in 1.a there were 8 students out of 13 whose presentation was on topic. The data in Table 4.14 refer to the areas that have arisen during the pre-treatment presentations:

Table 4.14: Pre-treatment oral presentations – Areas of success and areas of further improvement

Areas of success	Number of students (out of 13)	Areas requiring further improvement	Number of students (out of 13)
1*.a Focus on topic	8	1.a Focus on topic	5
1.b Clarity in presenting the main idea	6	1.b Clarity in presenting the main idea	7
1.c. Adequate details / examples	9	1.c. Adequate details / examples	4
1.d. Ideas directly related to the topic	7	1.d. Ideas directly related to the topic	6
1.e Logical structure	10	1.e Logical structure	3
1.f Smooth presentation flow	7	1.f Smooth presentation flow	6
1.g.Evoking interest	8	1.g.Evoking interest	5
1.h Effective conclusion	8	1.h Effective conclusion	5
1.i Effective summary of main ideas	5	1.i Effective summary of main ideas	8
1.j Critical comparison of ideas	2	1.j Critical comparison of ideas	11
2.aEffective use of language	9	2.aEffective use of language	4
2.b Appropriate terminology	7	2.b Appropriate terminology	6

*Numbers 1 and 2 refer to areas of evaluation in the oral presentation evaluation form (Appendix 26), 1 standing for content and 2 standing for language.

At this stage the students were capable of delivering a quite satisfactory academic presentation however for the critical comparison and contrast of ideas the oral presentations indicated that students required additional practice. This issue revealed information about the students' conceptual ability which at this stage did not show evidence of selecting the main ideas and critically presenting a summary and evaluation. Therefore, the level of the students' conceptual ability was limited to the first three levels that were outlined earlier.

At a post-treatment stage, the students delivered an oral presentation on the topic of ("Motivation") which was a new article and they had not worked on it during the training. They could deliver their presentations by consulting their concept maps only during the presentation in case they needed extra support (3.5.7). The format of the oral presentations was similar to the pre-sessions and the presentations were once more audio-recorded and were quantitatively and qualitatively analysed.

Table 4.15: Post-treatment oral presentations – Areas of success and areas of further improvement

Areas of success	Number of students (out of 13)	Areas requiring further improvement	Number of students (out of 13)
1.a Focus on topic	13	1.a Focus on topic	0
1.b Clarity in presenting the main idea	10	1.b Clarity in presenting the main idea	3
1.c. Adequate details / examples	12	1.c. Adequate details / examples	1
1.d. Ideas directly related to the topic	12	1.d. Ideas directly related to the topic	1
1.e Logical structure	12	1.e Logical structure	1
1.f Smooth presentation flow	11	1.f Smooth presentation flow	2
1.g.Evoking interest	10	1.g.Evoking interest	3
1.h Effective conclusion	10	1.h Effective conclusion	3
1.i Effective summary of main ideas	9	1.i Effective summary of main ideas	4

1.j Critical comparison of ideas	10	1.j Critical comparison of ideas	3
2.a Effective use of language	12	2.a Effective use of language	1
2.b Appropriate terminology	10	2.b Appropriate terminology	3

After the training and since the students already had the opportunity to deliver two oral presentations, they were now capable of submitting a satisfactory academic presentation. However still, for the critical comparison and contrast of ideas the oral presentations indicated that three students required additional practice and their conceptual ability was not remarkably improved (Table 4.15). This skill is one that requires further support and practice to develop and it is understandable that some of the students would require further support sessions on this. It might also be the case that students found the topic of the last article on Motivation more clear and straightforward or that the students got used to the task demands. Information about the students' conceptual ability which improved for a number of students. as it can be seen above, was also revealed and especially when compared to previous oral presentations (10 students out of 13 have achieved to incorporate an element of critical evaluation of the article's main concepts).

4.2 Research Question 2

Based on the quantitative and qualitative data obtained, this part of the chapter will address the second research question which is the following: How have the Moodle Pedagogic Unit's affordances for academic training (comprising of academic reading tasks and speaking advice) enabled participants to: (a) Understand academic texts at a conceptual level and (b) Effectively deliver an oral presentation.

When referring to the value and affordances of a Moodle Pedagogic Unit (i.e. online course) it should be mentioned that this can be understood as the value of the training course in terms of enabling students to successfully achieve their course goals. The second interpretation of this would refer to the affordances of Moodle as an online learning environment (i.e. platform) and the opportunities this offers in terms of creating an academic training course. It should therefore be mentioned that the focus of this section is on how the Moodle Pedagogic Unit has supported the conceptual development that was observed and analysed in section 4.1 and which specific training tasks of the designed Pedagogic Unit have contributed the most towards this.

A variety of data was collected to determine the value and affordances of the Moodle Pedagogic Unit to foster academic development during the students' treatment training by means of various measures: i. Online task scores from the treatment sessions (quantitative and qualitative data) and ii. Screen-captures and audio recordings of the treatment sessions (qualitative data).

The affordances of Moodle as an online environment (i.e. platform) for training were initially assessed by the researcher after i) employing a checklist of characteristics (4.2.1) and ii) by consulting screen captures in order to verify the frequency with which specific Moodle environment features were used by the students. The rest of this section

will focus on a) how the Moodle unit (i.e. online course) provided support and enabled the participants to understand texts at a conceptual level (4.2.2) and b) how the Moodle unit provided support and enabled participants to deliver an oral presentation effectively (4.2.3). The students' views on the value of various types of EAP tasks that were designed for the unit and on the value of the Moodle unit in general will be presented as part of the RQ4 results section. The students' views on the affordances of Moodle as an online environment will be presented in the RQ4 results section.

4.2.1 The affordances of Moodle as an online environment for training – a checklist evaluation

To evaluate the affordances of Moodle as an online learning environment, a checklist was employed by the researcher during the analysis of the screen-capture content (3.9.2.1.3). The main areas covered by the checklist included features of the system's structure to examine whether it provides a knowledge-centred, community and assessment based environment for learning. The following three aspects have been analysed and the results regarding the key dimensions of Moodle as an online learning environment are presented below.

a. Possible Features of a Knowledge-centered, Online Learning Environment

1. Digital content-area, curriculum or resources focused around specific issues or themes that is up-to-date, authentic, accessible and generative

Moodle can host a variety of digital content and resources to support learning. For the specific course Moodle hosted links to websites, the upload of pdf and word documents, embedded Hot-potato exercises (exercises created by using a web-authoring software) and it also supported a large variety of task types (Appendix 4).

2. Electronic networking forums to support knowledge sharing (e.g., links to additional resources; student work)

The platform offered a variety of networking forums to support the sharing of knowledge among students. This included links to further resources such as external websites to provide additional information about concept-mapping and links to models (i.e. examples) of diagrams and concept maps that the students were required to produce during the training. The purpose was to enable learners to consult a guide and orient their actions before they worked at a material level. It was found from the observations of the screen-captures and the overall students' scores that the students who had made use of the networking forums during task completion and followed the instructions (10 in total) managed to complete their tasks without mistakes (6 students) or at least with a higher score (4 students) than that of the students who had not consulted the relevant support offered by the Pedagogic Unit (3 students).

3. Interactive survey instruments encourage reflection on workplace practices

The Moodle platform affordances which encouraged students to reflect on discussion topics during the course but also on the course itself included polls, quizzes and survey-type questions for feedback and for expressing personal opinions. The purpose of the

polls was to raise student awareness about academic reading and speaking and the correct student responses (8 in total) were associated with higher scores in all the post-treatment tasks that they had to perform. Moreover, the students who tended to provide more detailed and lengthy feedback to the feedback questionnaires after each training session (6 students in total) would spend more time on completing their online tasks during the training. Their average time on tasks was found to be 2-3 minutes longer compared to the average time that the other students would spend on the same tasks. Consequently, the online task scores of these 6 students were higher as they would finish without making mistakes. These 6 students would also create more detailed concept maps and oral presentations at the post-treatment stage that received a higher score than that of the students who were observed not to engage in reflective activities for the same period of time.

b. Possible Features of a Community-centered, Online Learning Environment

1. Workshop environments that assist communication online

Moodle offers an online workshop environment which helps to establish an online community during the training. The students are initially invited to submit their work, then the tutor can choose to randomly assign student work to other students for peer-assessment or to select the students that will review a specific piece of work. In the audio-recordings, 10 out of 13 students commented on the usefulness of this feature of the environment for enabling them to communicate with others and check their work. From these 10 students, 8 performed better at the post-treatment concept maps by incorporating

the feedback they had received compared to the three students who had not commented on the usefulness of this Moodle feature.

2. Synchronous mechanisms (e.g., via “chat” rooms, multi-user virtual environments or asynchronous e-mail, bulletin boards, threaded discussion forums)

Apart from the previously mentioned workshop area which is a form of synchronous communication (since the students fill-out online feedback forms in class and check their feedback straight afterwards), Moodle also enables students to use a chat space if they deem it necessary. In the present study and as the students were working on specific tasks within a computer lab environment, the use of a chat space was not necessary and the students should focus on exploiting the available online scaffolding features instead of asking for help.

3. Asynchronous mechanisms (e.g., e-mail, bulletin boards, etc.) that allow anytime-anywhere communication and archiving of discussions to assist the development of a group understanding over time

From this perspective, the Moodle platform (not the course itself) offers the opportunity to provide students with a record of activities over the training period. The relevant features that were found to offer this type of support included: forum discussions, an email notification system which informs students of relevant action online or responses to their comments in the forum area and records of task score performance for each online completed task and the automated feedback that was received. The asynchronous mechanisms were largely successful with students because all have

reported using them and they mentioned they preferred them as they allowed them to respond back in their own time. All the students who were involved in these activities managed to improve their post-treatment concept map and oral presentation scores when compared to their pre-treatment ones (4.1).

c. Possible Features of an Assessment-centered, Online Learning Environment

1. Tools for or tools that encourage self-assessment, reflection, metacognition, feedback such as pop-ups or text boxes to write selected information (e.g., electronic feedback forms, etc.)

For establishing a Pedagogic Unit that can foster the students' self-assessment and reflection, Moodle offered students the opportunity to receive peer-feedback in the forum areas but also feedback comments on their fellow students' work and reflect on their progress. The students who would spend an average of 1-2 minutes more on consulting feedback (4 students) or on providing more detailed comments (3 students) would have slightly higher scores at the post-treatment concept maps and presentations. Another opportunity for reflection on individual work and progress occurred during the workshop tasks when the students could receive comments on an online assessment form from another student. In this case, the three students that provided feedback within just one minute and which was not detailed (i.e. less than a sentence) had an average online task score lower than that of other students and this was also reflected on their post-treatment concept-maps and oral presentations. Similarly, Moodle also offered students the opportunity to access their scores on a portfolio which allowed them to reflect on their progress daily. The portfolio also allowed students to consult their individual responses to

specific questions and relevant feedback. The students that would consult this daily (i.e. when they participated in the training sessions) were 11 in total and fell under two groups: a) 9 of them had quite high online task scores and their overall post-treatment performance was higher compared to the other 2 and b) 2 of these 11 students were among the three students whose post-treatment performance was lower compared to the performance of the 9 students. Regarding the overall course experience Moodle enables students to reflect on the whole learning experience and provide course feedback by employing online survey questions.

2. Tools for or tools that encourage peer exchange, constructive critique, networking, such as collaborative design tools (e.g., shared online spaces for posting and editing group work, etc.)

Although Moodle offers a wiki area for the collaborative creation of group projects, this feature was not used in the present case study as emphasis was on the students' individual completion of the online training tasks and their use of the various scaffolding mechanisms. For peer exchange and feedback, the Forum area of the course was used as an extra tool that enabled students to offer individual feedback to each other and reflect on their own work. However, the high achievers at the post-treatment stage would be the students that would prefer to use the workshop area for feedback (8 students in total expressed this view) and only 2 students who mentioned that they preferred the forum were among the high post-treatment achievers.

4.2.2 Moodle Unit support towards enabling participants to understand texts at a conceptual level

The tools that contributed to measuring the participants' conceptual ability throughout the three day training but also the value of the training Moodle unit comprised of a variety of online closed and open ended tasks on Moodle (3.5.3). This section will report on the Moodle tasks that enabled students to understand texts conceptually by referring to the task scores as being indicative of the students' gradual progress and of the unit's success in fostering it. The section is divided into two parts that cover a) the tasks that facilitated the development of the students' reading strategies (4.2.2.1) and b) the tasks that enabled students to create schematic representations of their reading texts (i.e. diagrams depicting text structure, etc.) and have thus led to reading comprehension (4.2.2.2). For each of the two parts evidence will be brought about the online performance of students when involved in a variety of tasks (3.5.6, Table 3.3), from the analysis of screen-captures and audio-recordings and from the students' scores and answers for each task (4.2.1.1 & 4.2.1.2). For certain tasks the analysis of open-ended questions for each item was based on the individual expert answer key that was produced for measuring conceptual ability for each task (3.9.2.1.4). All data and tasks that required qualitative analysis and coding (Day 2, Tasks 1, 2, 3, F and Day 3, Tasks 3 and 4) were rated by a second rater and the necessary inter-rater reliability tests were carried out (section 3.9.2.1.4). Finally, the tasks will be presented in the order in which they appeared to contribute to conceptual understanding the most but they are outlined in detail in 3.5.6, Table 3.3.

4.2.2.1 Tasks that encouraged the development of reading strategies

This section will focus on explaining which specific Moodle tasks were successful at enabling learners to develop their reading strategies and how the learning outcomes from these tasks were evident at a post-treatment stage. Supporting evidence will be brought from screen and audio-recordings (4.2.2.1.1.) and from the analysis of the students' online Moodle task scores (4.2.2.1.2).

4.2.2.1.1 Evidence from screen-captures and audio-recordings

A number of basic reading strategies were employed by the students which revealed their tendency to exploit features of the article they were working on during the treatment stage to achieve a better understanding of it (3.9.1.4). These strategies, starting from Day 1 included mostly planning and predicting as all students were successful in creating online outlines to depict the structure of the article they had to read (Task 1). Regarding the planning of the structure of the article, the students commented that “This is quite useful because we could later extend it and have the basis of a presentation or summary” (Student 13).

Another skill that was developed and reveals information about the level of the users' conceptual ability was predicting. This was recorded when users moved their cursor to titles or other article elements when reading a text for the first time. This was a skill that was employed by 10 out of the 13 students. Some of them commented that they were paying attention now to specific details: “I think at this point we might have to pay more attention at elements that can help us get an idea quickly about the article like here

(points to abstract, title, etc.” (Student 12). Overall, on the first day of the training, the online activity of the users was influenced by the requirements of each task.

On Day 2 of the training, the screen capture evidence allowed for detecting all visible changes on the screen, whether they were produced by the user using the keyboard or the mouse, or by the computer application or the operating system as a response to an action. In the particular case of the transcription of interaction occurring during a task that involved answering the pre-reading questions that the students created in Day 2 (Task 2: Checking predictions, Day 2), the whole set of visible online activity while completing the task were identified and transcribed. An example of this transcription is given in Appendix 34. Examples of the pre-reading questions that were answered by the students can be found in Appendix 35.

Overall, during Day 2 of the training, the online activity of the users revealed more action in areas that involved reading skills such as distinguishing key ideas, understanding key concepts, identifying the function of specific sentences within the text and summarizing. A number of basic reading strategies were employed by the students which revealed their tendency to exploit article features to achieve better understanding. For identifying key ideas and understanding concepts, all students were successful in creating concept maps and locating the necessary concepts to depict the interconnections between concepts (Task 6). Task 6 has enabled students to improve their post-treatment concept map skills since they all improved their scores as shown in 4.1.

Two more skills that were observed and reveal information about the level of the users’ conceptual ability were identifying the function of sentences within paragraphs (Task 7) and summarizing (Task 3). This was recorded when users moved their cursor to specific parts of paragraphs after reading a question or when they created online notes about the key ideas from each part of the article briefly. These online skills were

employed by 10 out of the 13 students whereas the other three students were still able to perform at this level but took handwritten notes instead of online. This explains the advanced post-treatment scores of all students for their oral presentations since 10 students included references during their presentations to specific article sentences to establish the author's position. This reflects the students' comprehension of the article.

The audio recordings during phase II of the training (since the students could address clarification questions to the tutor, to each other or even to themselves), revealed the online activity of the users in areas that involved skills mentioned in the beginning of Day 2 earlier. For identifying key ideas and understanding concepts all students were successful in creating concept maps and locating the necessary concepts to depict the interconnections between concepts (Task 6). A student was observed commenting on locating key ideas by mentioning that she is looking for a specific term. Students 8 and 10 mentioned that "the concept map at this stage helped me figure out how the concepts are related". The format and content of this specific task has also contributed to article comprehension since 11 out of 13 students could mention the key concepts in their concept maps at the post-treatment stage and their score was better compared to their pre-treatment one (4.1).

During Day 3 we can observe the particular case of the transcription of interaction occurring during a task that involves answering the pre-reading questions that the students created in Day 3 (Task 3: Identifying purpose and tone, Day 3), where the whole set of visible events can be identified. An example of this transcription is found in Appendix 34. The students who managed to complete this task successfully (9 out of 13) had received higher scores at their oral presentations compared both to their pre-treatment presentations and to the post-treatment presentations of the students that had not passed this task successfully.

Moreover, the online screen-captured activity of the users revealed more action in areas that involved skills such as article evaluation, understanding key concepts, identifying a purpose for reading and identifying the author's purpose and tone. For understanding concepts and article evaluation all students were successful in creating content outlines for presentations and evaluating concepts to deliver a presentation that could clearly reflect the main ideas of the article (Task 5, Day 3). All the post-treatment oral presentations of these students represent that Task 5 was successful at helping all 13 learners understand the article, as in all post-treatment presentations the scores were improved (compared to the pre-treatment ones) because the students had better explained key article concepts and had identified the author's tone and purpose. Only the scores of two students were not greatly increased (i.e. a score improvement that would classify the student at a higher level of conceptual development, section 4.1).

Finally, the audio-recorded online activity of the users (i.e. comments while doing the task, while working on peer activities or when consulting the tutor) revealed more action in the same areas as in the screen-captures mentioned earlier. Two skills that were observed and reveal information about the level of the users' conceptual ability were identifying a purpose for reading and the author's purpose and tone. Students 8 and 11 mentioned that knowing that their purpose was to create a presentation had guided them in their selection of the key concepts when creating the initial online outline. These skills (i.e. recognizing the purpose of the article and selecting key concepts to represent in the presentation to serve the presentation's purpose) were employed by 10 out of the 13 students. The post-treatment scores of these students at their oral presentations were improved compared to their pre-treatment ones and indicate that Tasks 3 and 5 from Day 3 were successful in helping students understand a text at a conceptual level.

Table 4.16 summarizes the most frequently observed conceptual development instances during the three day training period. The average frequency of the presented instances of conceptual development (i.e. using predicting skills) was calculated after the total number that each student was observed to use each skill was counted throughout the whole three day period training. For instance, the activities of the users online during the first day of the training revealed additional information about the level of the conceptual ability of the learners. Table 4.16 shows evidence of the most frequently observed instances of conceptual development during the two-hour training for each day of the training and it also contains the actual times that the skills were observed to have been used by the specific number of students each day:

Table 4.16: Most frequent conceptual development instances during the training

Day 1		
Skills	Average Frequency of use (%)	No. of students performing the skills (out of 13)
Conceptual development: Predicting skills	40% (25 times)	10
Conceptual development: Identifying key ideas	35.1% (37 times)	13
Day 2		
Conceptual development: Understanding key concepts	35.7% (28 times)	10
Conceptual development: Identifying key ideas	41.3% (29 times)	12
Conceptual development: Identifying the function of sentences	22% (50 times)	11
Conceptual development: Summarizing	34.2% (38 times)	13
Day 3		
Conceptual development: article evaluation	21.8% (55 times)	12
Conceptual development: Identifying a purpose for reading	27.2% (44 times)	12
Conceptual development: Identifying the author's purpose and tone	18.75% (64 times)	12

4.2.2.1.2 Evidence from online task scores

On the first training day, the third task which was a prediction warm up task, enabled students to trial a different task format (i.e. that of a multiple choice survey) to find their way within the environment but also to establish a purpose for reading the treatment text. The exercise, due to the Moodle task type affordances, provided a number of statements with potential reasons that students would consider before reading the second academic article that the students would work on during the treatment phase. 80% of the students managed to identify some of the reasons and demonstrated their ability to combine information and answer questions. This task helped raising the students' awareness of predicting strategies and the same students who had identified the correct answers also mentioned them at the post-treatment retrospection task.

Task 4, which followed immediately afterwards, is also indicative of the affordances of Moodle. It asked students to evaluate which elements of an academic article might contribute more to initial article reading orientation. The students' answers (Table 4.17) ranged from 1 to 10 with 1 being the most important element and 10 the least important.

Table 4.17: Task 4 – Day 1: Student individual evaluation of the usefulness of various text elements when predicting reading context.

Students	The title	The sub-headings	The photos	The graphs	Introduction - conclusion
S1	3	2	5	4	2
S2	3	2	7	2	3
S3	5	6	5	6	7
S4	7	9	4	6	8
S5	10	10	9	8	10
S6	1	2	5	4	1
S7	8	8	5	8	4
S8	1	3	8	7	2
S9	5	3	7	7	3
S10	2	1	10	8	1
S11	6	7	6	6	7
S12	1	2	5	4	3
S13	1	3	5	4	2

The students also mentioned other elements such as key words, the reference lists, the first and last sentence of each paragraph, the topic sentences and sub-headings. Appendix 36 presents the students' responses to the open-ended questions about the article elements that reveal the most helpful information about the topic. The most popular answers include the title (5 responses) and the subheadings (4 responses). Students also predicted the topic of the treatment article at this stage and 7 students out of 13 were successful at predicting that the article would be about implicit and explicit language learning. Their answers were also reproduced at the post-treatment retrospective task where the students mentioned the same elements.

After experimenting with article structure, Task 6 was also an exercise that asked students to think of and prepare a number of pre-reading questions that could best enable readers to read the academic article and predict its content. The students' responses (8) were well formed and demonstrated their evaluative and creative abilities which are two of the higher level conceptual understanding abilities (3.9.2.1.1). Four students though, formulated comprehension questions that did not fulfill the purpose of the exercise and which could not be employed as guiding article comprehension questions (Appendix 37). Student 11, for instance, misinterpreted the meaning of the exercise and created questions which would extract information from the students about their reading strategies rather than guiding them towards extracting the necessary article information themselves. The task was successful in helping learners understand the text at the post-treatment retrospective tasks since 11 out of 13 students were recorded using questions before approaching an academic article.

Finally, Task 7 was the last task that was assigned to students during Day 1 of the treatment. It was a lesson activity made up of a number of pages according to the affordances of the platform and on each page there was a question. Figure 4.2 presents

the overall lesson results along with information about the average students' scores and completion time. The high / low time indications in the figure refer to the maximum and minimum time that students spent for task completion as this was calculated automatically by Moodle.

Figure 4.2: Overall lesson task results

Lesson statistics

Average score	Average time	High score	Low score	High time	Low time
89.29%	5 mins 8 secs	100%	75%	8 mins 51 secs	3 mins 4 secs

Furthermore, Table 4.18 provides an analytic description of the students' scores after performing the task, the time required by each student and their areas of mistakes. Only five students experienced problems with the grammatical elements that were introduced in the lesson task. From these five students the two errors that they made were random errors as it was later observed from the screen-captures. The other three students were confused with the use of specific linking words but all answered correctly after following the extra practice page.

Table 4.18: Individual student performance on Task 7 – Day 1

Students	Scores	Task Duration	Areas of mistakes
S1	75%	5 mins 26 secs	Linking words (wrong use of as a result)
S2	75%	8 mins 51 secs	Linking words (wrong use of in spite of)
S3	100%	3 mins 44 secs	-
S4	100%	5 mins 36 secs	-
S5	100%	4 mins 21 secs	-
S6	100%	3 mins 44 secs	-
S7	75%	4 mins 51 secs	Linking words (wrong use of in spite of)
S8	90%	4 mins 30 secs	Random error
S9	100%	3 mins 50 secs	-
S10	100%	3 mins 35 secs	-
S11	100%	5 mins 20 secs	-
S12	90%	4 mins 19 secs	Random errors
S13	100%	4 mins 23 secs	-

The task was successful because at the post-treatment stage 10 out of 13 students mentioned at the retrospection tasks that the use of specific linking words in the article guided them towards identifying article structure and content.

After having explored the structure of the academic article, the students were invited to answer the comprehension questions (Day 2, Task 2) from Day 1 for Task 6. The students' answers were evaluated based on the answer key that was provided by the expert and the samples of high and low achievers (3.9.2.1.4). Based on these analyses, 10 out of 13 students were classified as high achievers. Their answers demonstrated comprehension of the question and their responses had covered most of the aspects of the question. On the contrary, three students offered repetitive key word answers which reflected a performance at a Memory level and therefore indicative of lower achievers. The task indicated that the Moodle affordance to answer these questions and upload them for peer-evaluation and feedback has helped all 13 students to think about forming predicting questions when engaging with an academic article for the purposes of the post-treatment retrospection task.

After checking article predictions, the next step for the students was to read the first three paragraphs of the article and focus on identifying the main idea and summarise the content of the first three paragraphs (Day 2, Task 3). Students were quite successful with 10 out of 13 being classified as high achievers (according to the criteria in 3.9.2.1.4). High achievers provided an answer indicating cohesion and a personal way of understanding article ideas and by mentioning the main points of each paragraph briefly. However, low achievers presented answers which could simply be based on copying information, sentences or key words from the original article. At a post-treatment stage 9 out of 13 students were successful at replicating this strategy for understanding the

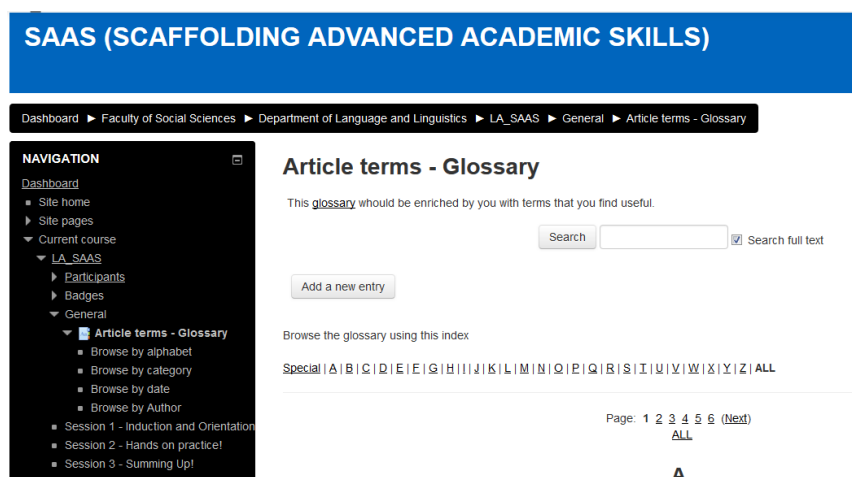
content of a text before creating their concept maps and 11 students used this approach to understand text content before creating their oral presentations.

Then, the students were asked to do Task 5 (Day 2) which was a quiz with various types of four article comprehension questions (3.9.2.2.3). Table 4.19 offers an overview of the students' performance at all four parts of this quiz and their scores along with the mistake areas. For completely wrong answers 0 marks were assigned and each part of the quiz would account for 25% of the final mark.

Table 4.19: Student performance on Task 5 Day 2

Student	Overall score	Q1: 25	Q2:25	Q3:25	Q4:25	Mistake areas
S1	93.33	25	20.83	22.50	25	Q2: definition of intake Q3: aptitude and competence
S2	75	25	25	25	0	
S3	95.83	25	20.83	25	25	Q2: definition of focus on forms
S4	88.88	25	13.88	25	25	Q2: definition of focus on form and intake
S5	95.83	25	20.83	25	25	Q2: definition of intake
S6	97.50	25	25	22.50	25	Q3: competence
S7	70.83	25	20.83	25	0	Q2: definition of focus on form
S8	72.5	0	25	22.50	25	Q3: competence
S9	97.50	25	25	22.50	25	Q3: competence and performance
S10	88.88	25	13.88	25	25	Q2: definition of focus on form and input
S11	75	25	25	25	0	
S12	93.33	25	20.83	22.50	25	Q2: definition of intake Q3: aptitude and performance
S13	95.83	25	20.83	25	25	Q2: definition of input

The overall scores indicated that 9 students were successful at receiving an 80% (or higher) score for the quiz and the other four students whose score ranged between 70 and 75 were encouraged to retake the wrong parts of the quiz and were all successful. After receiving a final score which required that all the students should receive at least an 80% of correct answers to proceed, the next task was to select four terms and enter their definitions in the classroom glossary that was available for the course and which was organized as shown in Figure 4.3:

Figure 4.3: Overview of the Moodle glossary

The students' responses would vary as they were free to select terms of their choice and practice searching for definitions of key terms from the treatment article. Appendix 38 indicates each students' preferred term definitions and whether these were correct. Nine students defined all four definitions, 2 students confused one definition and 2 students confused two definitions. The task enabled students to identify and focus on extracting the meaning of concepts in the article that was used for their post-treatment tasks with all 13 students mentioning that identifying key concepts for their map creation and oral presentations was essential.

4.2.2.2 *Tasks that facilitated reading comprehension through concept map creation*

This section will focus on explaining which specific Moodle tasks were successful at enabling learners to understand an academic text by using concept map creation and how the learning outcomes from these tasks were evident at a post-treatment stage.

Supporting evidence comes from screen and audio-recordings (4.2.2.2.2.) and from the analysis of the students' online Moodle task scores (4.2.2.2.1).

4.2.2.2.1 Evidence from online task scores

The first two tasks on Moodle for Day 1 helped the learners orient themselves in the new learning environment, experiment with an exercise format like this and think about which elements play a crucial role in academic reading comprehension. They were two prediction warm up exercises in a quick poll Moodle format. The students' detailed answers are presented in Appendix 39 and it can be seen from their comments that the majority of the students were already expecting/anticipating which elements could support their comprehension. Further to the previous quick poll, the students were invited to submit their answers to a second question about the importance of delivering an academic presentation on a journal article and the overall coverage they should provide in similar situations. Once more the students were informed about academic standards in general and expected a few quality criteria to be met which is indicative of the fact that their level of conceptual understanding covers the lower level of comprehension and identification of information and key concepts. The purpose of the tasks was not to evaluate the students' choices but to orient their actions before creating a concept map and therefore no task scores were collected for these two tasks. 11 out of 13 students mentioned these responses about article comprehension during their post-treatment retrospective tasks.

After having encouraged the students to think about academic speaking and reading, another Moodle task to familiarize learners with the treatment reading article and ask them to decide on the elements they would need to focus on to create a concept map

was Task 2. The output was to draw a diagram of the article's structure. The students experimented with a variety of formats but their outputs at this stage were mainly focusing on the structure of the article either representing it by using headings (5 students out of 8 students) or concept maps (3 out of 8 students) and not so much on depicting relations between concepts (in total 8 out of 13 students). This indicated that the students' conceptual ability was not at the stage of synthesizing information from a critical and evaluative perspective. A general outline of the students' concept maps at this stage can be found in Appendix 37.

Moreover, in Table 4.20 concept maps with several centres were the most commonly occurring maps at a treatment stage, with a one centred map coming second but also followed by linear maps. There were no spaghetti maps. This reveals that the students could create complex maps that reflected the relationship between terms and that consisted of various levels after receiving the training but still not at a stage of indicating connections between various levels at the maps.

Table 4.20: Types of concept maps

	Treatment concept maps
Types of concept maps	Number of maps
One centred	2
Several centres	9
Linear	1
Spaghetti	0
Total	12
Not a concept map	1
Total	13

The findings above at a treatment stage indicate that the students in their majority (12 students) managed to identify concepts and organise information around the concept nodes. However, no further associations were made between nodes or sub-nodes that indicated the ability of the students to synthesize information at a conceptual level after critically evaluating it. This is a skill that students would be expected to indicate if their

concept maps were of a linear or of the spaghetti type. Therefore, at this stage the conceptual ability of only 9 of the students was at the stage of critically evaluating the content of their concept maps and establishing connections between concepts and nodes by creating linear concept maps. The previously discussed maps indicate these patterns as Figure 5 (Appendix 24) represents a typical several centres map and Figure 6 which was an example of a low achiever represents a linear type of concept maps with limited levels of hierarchy between ideas arranged in a chain – diagram format (Appendix 24).

Moreover, Table 4.21 presents the types of treatment concept maps and the number of students that created a similar type of concept map:

Table 4.21: Types of student concept maps as classified by the coders

	Treatment concept maps	Post – concept maps
Types of concept maps	Number of students	Number of students
1. Spokes:	11 (total)*	2 (total*)
a. One-centred	2	0
b. Several centred	9	2
2. Chains / Linear	1	0
3. Networks	1	5
a. Spaghetti	0	6
Total student number	13	13

*: There were two types of spokes (i.e. one and several centred) and the indication total refers to the total number of students who created spoke type maps.

As Reese (2002) notes, the ability to construct links and to make relational connections between strands reveals a primary distinction between high and low achievers. Based on Reese's patterns, high and low achievers were compared against the structure of the concept maps that were constructed by the students (Appendix 24). The figures in Appendix 24 illustrate maps that were created according to the treatment high and low achiever subscore-to-node ratios. The process followed for the evaluation of the maps that were produced during the training is the same as in 4.1.2.3. The map of a higher achiever should be demonstrating greater integration than the low achiever map.

Furthermore, a number of basic reading strategies were employed by the students at the treatment stage. For identifying key ideas and understanding concepts all students were successful in creating concept maps and locating the necessary concepts to depict the interconnections between concepts (Task 6). Student 4 was caught commenting on locating key ideas by mentioning that she is looking for a specific term. Students 8 and 10 mentioned that “the concept map at this stage helped me figure out how the concepts are related”. Consequently, from the 8 students that were successful at concept map creation at a treatment stage, 11 students progressed and produced correct concept maps at a post-treatment stage.

Finally, Moodle Task 5 on Day 1 encouraged students to reflect on article structure and associate it with metaphors such as “window”, “bridge” and “door” (3.5.6). All the students were successful at identifying the role of the various article parts and associating them to the previously mentioned three metaphors by matching pictures (i.e. a bridge) to article parts. Appendix 40 (based on Moodle platform data) indicates that the 84.44% of the students (11 in total) who experimented initially with the metaphors and article structure were successful and then during the last attempt 91.11% of the students (12 students) managed to match pictures given as part of the task with the article parts. Appendix 40 provides more detailed information and indicates that the visual element provided by Moodle was quite strong as 7 out of 13 students reported this metaphor during their post-treatment retrospective tasks.

4.2.2.2.2 Evidence from screen-captures and recordings

The online activity of the users during Day 2 revealed more action in areas that involved skills such as distinguishing key ideas and understanding key concepts to lead students to concept map creation that would facilitate reading comprehension. In more

detail, Task 1 for Day 2, asked students to create a five step guide with instructions for the students that would attempt to read the academic article. The students experimented with a variety of steps and their work was evaluated against the answer that the expert provided and by considering the revised Bloom's taxonomy to evaluate conceptual development (3.9.2.1.4). The eight of thirteen high achievers demonstrated their ability to work at a high conceptual level based on the revised taxonomy and when designing their steps their work indicated that they invited the reader to evaluate the article, employ strategies for formulating assumptions by gradually planning and structuring a series of steps to achieve this.

However, the work of five students demonstrated that their level of conceptual understanding was at an intermediate level since they focused mostly on providing advice that related to article comprehension and not to the critical application of reading strategies. For instance, the first 3 steps would focus on the lower levels of the taxonomy or they would not promote critical thinking to enable the readers to evaluate article content. At a post-treatment stage it was found that this task actually helped 11 out of 13 students with their concept-map creation as they mentioned replicating these steps to create their maps.

The next task for this session was the creation of a mind map (Day 2, Task 6) to enable the students to represent their understanding of the article by visualizing the major ideas of the article and how these link to each other. Moodle offered students the chance to consult examples of concept maps before creating their own. The expert's map on the treatment article received a score of 57 (with a total of 13 identified concepts, a score of 25 for the level of hierarchies, 0 for the number of cross-links and 0 marks for the number of examples provided). The students' scores were compared across the expert's map

score to reveal their level of similarity with the expert map and are presented in Table 4.22:

Table 4.22: Treatment concept map (CM) scores (Student and Expert scores)

Student	Treatment concept maps	
	Raw CM score	Similarity with expert map (%)
S1	49	85.96%
S2	39	68.42%
S3	50	87.71%
S4	40	70.17%
S5	38	66.66%
S6	36	63.15%
S7	30	52.63%
S8	48	84.21%
S9	51	89.47%
S10	24	42.10%
S11	10	17.54%
S12	29	50.87%
S13	49	85.96%
Average	37.92	66.52%
Expert map score	57	100%

At this stage the similarity with the expert map revealed the progress the students had made and reflected their conceptual development in the areas of identifying the article's structure, planning and the organisation of information while establishing connections between concepts (which also offers them extra marks towards their overall scores). In general, the students' raw concept map scores have begun to approach the expert's map scores. The average similarity score that the students got at the treatment stage was 66.52 % and the indications about the students' conceptual ability at this stage centred around the intermediate levels of comprehension and analysis (Appendix 19). More explicitly, student 13 whose pre-treatment raw concept map score was 65 and whose map was 53.7% similar to the expert's the previous time, has during the treatment stage achieved to create a map that is 85.96% similar to the relevant expert map (Appendix 41). This can therefore translate into a gradually increasing ability to demonstrate high levels of comprehension since at the treatment stage the student can

evaluate the importance of terms, add to them and synthesize a map that depicts the main article concepts (Appendix 41). The first map is the expert map that was designed for the specific article to serve as a criterion for marking the students' maps.

This Moodle task therefore serves as a transitional stage that enables students to experiment with concept map creation and formation to depict the essence of an academic article.

4.2.3 Moodle Unit support for enabling participants to effectively deliver an oral presentation

This section will report on the Moodle tasks that enabled students to effectively deliver oral presentations by referring to the speaking Moodle task scores as being indicative of the students' gradual progress and of the unit's success in fostering it. The section is divided into two parts that cover a) the tasks that facilitated the creation of concept maps for speaking (i.e. structuring oral presentations) (4.2.3.1) and b) the tasks that enabled students to develop content for their presentations (4.2.3.2). For each of the two parts, evidence will be brought about the online performance of students during a variety of tasks (3.5.6, Table 3.3), from the analysis of screen-captures and audio-recordings and from the students' scores and answers for each task (sections 4.2.1.1 & 4.2.1.2).

4.2.3.1 *Tasks that facilitated the creation of concept maps for speaking*

This section will focus on explaining which specific Moodle tasks were successful at enabling learners to deliver a successful oral presentation and how the learning outcomes from these tasks were evident at a post-treatment stage. Supporting evidence

will be brought by analyzing the Moodle affordances for designing tasks to create concept maps for speaking (4.2.3.1.1.) and from the analysis of the students' online Moodle task scores on activities about terminology (4.2.2.1.2).

4.2.3.1.1 Tasks which generated concept maps that functioned as speaking diagrams

The second task for Day 3 asked students to reflect on the steps they take for summary writing which is an important skill towards creating a concept map for speaking with appropriate structure. The task scores from Day 3 had already indicated that so far 11 out of 13 students had managed to demonstrate significant progress with their level of conceptual ability. The remaining two students were low achievers. The high achieving students could summarise information successfully through various tasks and plan/organise information in a critical way to communicate ideas. During Task 2 the students were asked to reflect on the process that one needs to follow to write a summary and create a step-by step guide with instructions for this. Examples of high and low achievers can be found in Appendix 42.

Moreover, the qualitative analysis of the step-by-step guides that were created by the students focused on identifying two main processes that were followed (Table 4.23). The example figures of the summary process below can be found in section 3.9.2.1.4 along with examples for low achievers. The emphasis is on the high achievers and only 3 students were found to be low achievers.

Table 4.23: High achiever student summary writing processes and steps

Summary process 1	Summary process 2
1. Skimming and scanning of the article	1) Skimming and scanning
2. Identification of key terms	2) Identification of main ideas
3. Identification of main ideas	3) Reduction of paragraphs into brief phrases / sentences
4. Ranking in order of mention	4) Ordering of content
5. Summary write up	5) Summary write up

Table 4.23 presents the main steps that the high achieving students brought forward when reflecting on the processes they followed with summary writing tasks. Both of the above mentioned processes are indicative of high achieving students in terms of conceptual level. In these cases the students were successful at critically evaluating the main areas to be included in the article (evaluation) and could also propose steps for the synthesis of a summary (creation stage). In total, 8 students followed Summary process 1 and 2 students followed Summary process 2. An indicative student example of the summary process 1 can also be found in Appendix 42. This task therefore shows that Moodle offered students the opportunity through this activity to create a summary by incorporating all the necessary summary steps and it should be mentioned that the 8 students mentioned above could also build on this structure and enrich it with more advanced steps at a post-treatment stage when they created their concept maps (4.1).

Then, another task which involved the creation of a presentation outline was Task 4 (3.9.2.1.4). Regarding understanding concepts and article evaluation, Moodle offered all students the opportunity to successfully create content outlines for presentations and evaluate concepts to deliver a presentation that could clearly reflect on the main ideas of the article (Task 5). This also appears from their efforts to locate the main ideas and their attempts to create an outline online that could lead to the creation of a presentation (which functioned as the students' purpose). These skills were employed by 10 out of 13 students. Conceptual ability was also observed from the students' efforts to locate the main ideas and their attempts to create an outline that could lead to the creation of a presentation (which was the students' purpose). The task was successful at enabling the students to deliver an effective presentation as the number of those who employed these skills increased from 10 to 12 at a post-treatment presentation stage. Furthermore, the 10 students that employed these skills at the treatment stage had all received higher post-

treatment oral presentation scores compared to the three students that did not use these skills during the treatment.

During the last phase of the training, the online activity of the users revealed more action in areas that involved skills such as article evaluation, understanding key concepts, identifying a purpose for reading and identifying the author's purpose and tone. The students mentioned this was because of the workshop opportunities and the use of the forum area for uploading tasks which both supported the exchange of feedback. In understanding concepts and article evaluation all students were successful in creating content outlines for presentations and evaluating concepts to deliver a presentation that could clearly reflect the main ideas of the article (Task 5). Student 5 mentioned that "creating a content outline was very important to guide the creation of the presentation later on".

The next step after the presentation outline was for the students to expand on it when performing Task 5 and create the content of their presentation based on the treatment article. Further to all the previous data, the oral presentations enabled all the participants to verbalise the concepts that were schematically depicted on their concept maps during this three day training and demonstrate their ability to function at a mental level. During the final day of the training the students delivered an oral presentation on the topic of the article they were working on ("Noticing") by consulting their concept maps only. The format of the oral presentations was that of the pre-treatment sessions and the presentations were once more audio-recorded and were quantitatively and qualitatively analysed.

Table 4.24 summarises the number of presentations exhibiting specific aspects from the qualitative analysis that emerged when analysing the recordings of the 13 students. At the treatment stage the aspect of Coverage and Relevance when the students

delivered their presentations was very frequent. More students could this time create and deliver a complete presentation that covered all points. Moreover, for the aspects of Analysis and Supporting evidence which correspond to critical elements of conceptual ability, the themes were significantly higher compared to those of the pre-treatment presentations. The presentation of the following data is similar to the one provided for the pre- and post-treatment presentations in 4.1.3 to show the students' performance during the training, towards their post-training performance. Potential improvement can indicate that the training that the students received during these three days rendered the Moodle Pedagogic Unit successful for developing academic speaking skills.

Table 4.24: Number of presentations exhibiting specific aspects during treatment presentations

	Treatment presentations	Post-treatment presentations
Presentation aspects	Number of student presentations	Number of student presentations
Coverage relevance	(12 presentations)	(13 presentations)
Analysis	(11 presentations)	(12 presentations)
Supporting evidence	(10 presentations)	(11 presentations)
Voice/delivery	(10 presentations)	(12 presentations)
Format / structure	(11 presentations)	(12 presentations)
Preparation	(9 presentations)	(10 presentations)

Further to the previous, the treatment presentation scores for each student based on the evaluation forms (Appendix 26) were also analysed and are presented below. Table 4.25 also offers information about the average score of the students during the treatment phase. It seems that the Moodle training has enabled students to improve when comparing their scores with the pre-treatment ones.

Table 4.25: Numerical treatment raw student oral presentation scores

Students	Treatment Score (__/12)	Average score of class	Pre-treatment Score (__/12)	Average score of class
1	8	9.75	6	7.69
2	8		7	
3	6		5	
4	8		7	
5	9		8	
6	10		8	
7	9		7	
8	10		9	
9	10		8	
10	8		7	
11	10		9	
12	11		10	
13	10		9	

Moreover, the data presented in Table 4.26 indicate the students' areas of success or those areas requiring further improvement. The areas also indicate the number of students that were successful or not for each specific area.

Table 4.26: Treatment oral presentations – Areas of success and areas of further improvement

Areas of success	Number of students (out of 13)	Areas requiring further improvement	Number of students (out of 13)
1.a Focus on topic	11	1.a Focus on topic	2
1.b Clarity in presenting the main idea	9	1.b Clarity in presenting the main idea	4
1.c. Adequate details / examples	11	1.c. Adequate details / examples	2
1.d. Ideas directly related to the topic	10	1.d. Ideas directly related to the topic	3
1.e Logical structure	12	1.e Logical structure	1
1.f Smooth presentation flow	10	1.f Smooth presentation flow	3
1.g. Evoking interest	9	1.g. Evoking interest	4
1.h Effective conclusion	10	1.h Effective conclusion	3
1.i Effective summary of main ideas	9	1.i Effective summary of main ideas	4
1.j Critical comparison of ideas	8	1.j Critical comparison of ideas	5
2.a Effective use of language	11	2.a Effective use of language	2
2.b Appropriate terminology	9	2.b Appropriate terminology	4

At this stage and compared to the pre and post-treatment areas of success presented in Table 4.14 and 4.15 in 4.1.3 earlier in this chapter, it appears that the students were capable of submitting a quite satisfactory academic presentation however still, regarding the critical comparison and contrast of ideas, the oral presentations indicated that five students required additional practice. However, students have improved compared to their pre-treatment level and therefore the training appears to have been contributing towards enabling students to be more successful in the areas in Table 4.26. This has also revealed information about the students' conceptual ability which at this stage has significantly improved for a number of students and especially when compared to previous oral presentations (6 students have managed to incorporate an element of critical evaluation of the article's main concepts).

An indicative treatment presentation outline of a high achiever (6 students in total, 3 students at intermediate level) which demonstrates the complete structure of the presentation according to article sections by focusing on the main ideas of each section can be found in Appendix 43. However, a low achiever would submit work that would be incomplete and where no logical cohesion would follow between ideas (2 students in total).

4.2.3.1.2 Tasks with speaking terminology

Moodle as a platform facilitated task creation for developing speaking terminology. Task 8, for instance, during the training (Day 2) required students to do a vocabulary rating task in terms of how they perceive the importance of specific terms to understand an academic article. In total, 10 out of the 13 students were successful at reaching this stage. The task had a reflective character and therefore the students were not assigned specific marks for specific features. The high achievers' and low achievers'

examples can be found in 3.9.2.1.4 (Figures. 3.21 and 3.22). High achievers included most of the key/important terms that should be grouped in an appropriate way to demonstrate their relationship. Moreover, the students had attempted to link the concepts to the central article concept (“attention”) and they demonstrated their ability to critically select the appropriate concepts and synthesize them to create a complex relationship depiction. However, the low achievers’ ranking and term depiction did not include the terms that were important.

Finally, three general patterns of ranking and visualisation were identified. The first pattern was the concept map representation of the most important article terms in ways which also depicted their relationship (Figure 3.21 – 3.9.2.1.4).

In total, 10 students selected this pattern. This was indicative of a student working at a high conceptual level by critically selecting and evaluating terminology and by being able to create a visual representation of the relationships between terms. The second pattern was the collection of article terms which were arranged in a linear way with no interconnections between the various levels of the representations (Figure 3.22 – 3.9.2.1.4). This pattern was selected by 2 students and indicates that the students were working at an intermediate stage by being able to analyse the various article terms while using them to do the task.

Then, the final pattern that was selected by 1 student was a simple ranking of the article terms from the most important to the least important in a list format with no depiction of any connections between the terms. The student was operating at low conceptual level since his list ranked the various article concepts without recognising their inter-relations. At this stage the 10 students who performed higher at this task could also receive a higher score for selecting appropriate terminology both for concept map

creation and for their oral presentations at a post-treatment stage compared to the two students who did not perform well at this task.

Task 9, followed from the previous one and was a fill-in the gaps exercise that was a popular Moodle task type. The screen capture below indicates the requirements of the task which focused on clicking and “moving” 9 terms at the appropriate place in the text.

Question 1
Not yet answered
Marked out of 1.00
Flag question
Edit question

The '**Noticing** Hypothesis'. At about the same time, Schmidt and Frota (1986) published the results of a diary study in which Schmidt [] for a close relationship between what he had 'noticed' (operationalized as testimony to the [] of L2 forms, in written diary [] about a language he was learning (Portuguese), and the subsequent appearance of some of those forms in his own production. Further pursuing the [] of **noticing**. Schmidt (1990) pointed out that the term 'unconscious' (the defining feature of Krashen's '[]' process) is commonly used in three distinct senses: to describe learning without 'intention', learning without [] 'understanding', and learning without attention and 'awareness'. Schmidt argued that while L2 learning without intention or metalinguistic understanding is clearly possible, there can be no learning without attention, accompanied by the [] experience of '**noticing**', or being aware of aspects of the 'surface []' of **input**. All L2 learning is conscious in this sense, since **input** does not become **intake** for learning unless it is noticed. Schmidt assumed that focal attention and the contents of [] are essentially isomorphic. The '**Noticing** Hypothesis' continues to promote much research into the role of awareness in second language learning in instructed and experimental settings, using an increasingly sophisticated and sensitive range of measures of awareness, as will be described in the third section of this chapter.

[] occurrence [] subjective [] entries [] argued [] structure [] metalinguistic [] awareness [] acquisition [] notion

Next

Table 4.27 offers an overview of the students' scores and responses. Only seven students out of 13 achieved an excellent score (100).

Table 4.27: Student scores for Task 9, Day 2

Student	Grade/100.00 (max.)
S1	22,22
S2	77,78
S3	100
S4	77,78
S5	66,67
S6	100
S7	100
S8	77,78
S9	100
S10	100
S11	77,78
S12	100
S13	100

Table 4.28 presents the Quiz structure analysis along with information about random guess and the numbers of attempts. The drag and drop activity that was designed

made use of a quiz task that was offered on Moodle and only one question was designed with several gap-fills.

Table 4.28: Quiz structure analysis

#Q1	Question type	Question name	Attempts	Standard deviation	Random guess score	Intended weight	Effective weight
	Drag and drop into text	Fill in the gap exercise	13	2.16%	1.11%	100.00%	100.00%

All students attempted the task once and the random guess score was only 1.11% which is satisfactory. This score refers to the chances that students had to select the correct answer by chance and the low score means that it was not easy for students to do so. The seven students that were successful at this task could also receive better scores for concept map terminology at the post-treatment stage.

Finally, the first task of Day 3 also focused on helping learners develop an understanding of academic speaking terms and the difference between formal and informal style. The students performed a Moodle task which offered students the chance to rank 4 different types of texts from the most informal to the most formal. In more detail, the task revealed whether the students could recognize formality in academic texts (Appendix 44). On the whole, 10 out of 13 students were successful at this task since they ranked all 4 excerpts correctly and their scores are provided in Table 4.29:

Table 4.29: Student scores for Task 1, Day 3

Students	Answers
S1	All 4 correct
S2	All 4 correct
S3	Confused the ranking between text A and D
S4	All 4 correct
S5	All 4 correct
S6	All 4 correct
S7	All 4 correct
S8	All 4 correct
S9	All 4 correct
S10	Confused the ranking between text A and D
S11	All 4 correct
S12	Confused the ranking between text B and C
S13	All 4 correct

After ranking the four texts the students were invited to create their own definition of the term “formality” and enter in the glossary section of the Moodle Pedagogic Unit. The students’ definitions of the concept of formality from the Moodle glossary of definitions were compared with the definition provided by the expert. The expert’s evaluations for this task can be found in 3.9.2.1.4. Table 4.30 below presents the number of the related characteristics that were used by the students and which ones. It can be seen that the majority of the students (7 out of 13) were successful at including in their definitions more than half of the definition parts that were suggested by the expert. This reveals that through the practice exercises the students practically explored the concept of formality and managed to move from the practical (material) level of locating formality in texts to a conceptual interpretation of the term at a mental level (i.e. recognising the meaning of the term as a general discourse characteristic).

Table 4.30: Student answers for the definitions of Task 1, Day 3

Students	Characteristics from the expert’s definition	Total number out of the 9 expert characteristics
S1	1,2,3,5, 6,7,9	7
S2	1,2,3, 4, 9	5
S3	4,5,8,9	4
S4	3,5,7	3
S5	2,3,9	3
S6	4,6,7	3
S7	2,3,5,6,9	5
S8	1,2,4,5,6,9	6
S9	1,2,3,8, 9	5
S10	1, 4,5,8,9	5
S11	3,4,5	3
S12	1, 2,4,5,7,8,9	7
S13	1, 2, 3,7,9	5

Students 8 and 11 mentioned that knowing that their purpose was to create a presentation had guided them in their selection of the key concepts when creating the initial outline. These skills were employed by 10 out of the 13 students.

4.2.3.2 *Tasks that encouraged the creation of student oral presentations*

This sections focuses on presenting the specific Moodle affordances that enabled students to create successful student oral presentations. The main emphasis is on the tasks that enabled students to create appropriate presentation content and specific task types and affordances are further analysed.

4.2.3.2.1 Tasks for developing oral presentation content

The following section will offer an analysis of the screen captures of the students' online performance to calculate the frequency with which specific Moodle environment features were employed by the students when preparing for their oral presentations. These Moodle features included the following: the forum area, the glossary, embedded external links, examples of model answers, peer-assessment tasks (4.2.3.2.1.1), tasks that combined text and pictures (4.2.3.2.1.2), mazes (4.2.3.2.1.3) and Hot-Potato exercises (4.2.3.2.1.4). This analysis will reveal more information about the affordances of the Pedagogic Unit to provide academic speaking training and specifically regarding the last four online Moodle training tasks that have enabled students to deliver more successful oral presentations.

Table 4.31 offers an overview of the specific Moodle environment features, the tasks with which every feature was associated, how frequently each feature was used by the total number of students that were reported to have used it (the average percent of frequency use is presented) and the number of students who were reported to have used the specific feature. For a more detailed overview of the specific tasks that were offered each day of the training please consult Table 3.3, section 3.5.6.

Table 4.31: Overview of the use of specific Moodle environment features during the online training

Tasks	Action	Moodle Environment features	Average length of use in minutes per task per student	Frequency of use (average in total)	Number of students (out of 13)
Task 2, Day 1	Presenting the structure of an academic article (diagram creation)	Peer feedback in the forum area (40 times max.)	3 minutes	57.5%	9
Task 3, Day 2	Summary of paragraphs		6 minutes	75%	13
Task 6, Day 2	Mind map task		5 minutes	62.5%	10
Task 4, Day 3	Summary practice for presentation		4 minutes	47.5%	11
Task 5, Day 3	Creation of presentation outline		3.5 minutes	57.5%	9
Task 6, Day 3	Final presentation		4.5 minutes	72.5%	11
Task 5, Day 2	Multi-task	Creating and consulting a Glossary (20 times max)	2 minutes	25%	5
Task 8, Day 2	Rating terms		3 minutes	60%	12
Task 10, Day 2	Description of key terms		4.5 minutes	55%	11
Task 1, Day 3	Defining formality		2.5 minutes	40%	8
Task 6, Day 2	Mind map creation	Consulting Embedded external links (15 times max.)	5 minutes	86.66%	13
Task 6, Day 3	Preparation for the presentation: Locate the article sections and highlighted terms and summarize the key content from each section in 3-5 lines.		4 minutes	73.3%	11
Task 6, Day 2	Concept map creation	Consulting Example models (attachments) (31 times max)	6 minutes	90.3%	13
Task 9, Day 2	Diagram structure		4.5 minutes	48.38%	11
Task 5, Day 3	Presentation content outline		7 minutes	83.8%	13
Task 4, Day 3	Summary practice with bullet points		5 minutes	64.5%	10

Table 4.31 reveals that for making use of Moodle's forum area the majority of students (13) preferred to use it during the initial stages of the training and mostly to receive feedback on summary writing and the creation of concept maps. The frequency of use was calculated by counting the maximum number of times that each student would click on a feature to consult it and then finding the average number of times that students had clicked on the feature. An additional tool of Moodle was consulted during tasks which required the rating of terms (60%) and the description of specific terminology (55%). External links were particularly popular when the students required information about the creation of the concept maps and the links served as models that provided information about orienting the students' actions (86.6%). Finally, the model answers that were provided and clearly served as examples to guide the students' completion of the tasks were used by all students for the creation of concept maps and presentation content outlines. Moreover, 11 students in total consulted the models to create summaries or to understand diagram creation.

4.2.3.2.1.1 Peer-assessment tasks

The peer- assessment tasks that were offered during the training enabled the students to interact with each other, receive feedback on the content of their presentations and adjust their work accordingly to meet the requirements of academic standards. The peer-assessment tasks that obligatorily invited comments by fellow students by assigning specific work to be evaluated were Day 1, Task 5 and Day 2, Task 1 (Table 3.3, section 3.5.6). Task 5 invited students to create five reading academic article comprehension questions which were later peer-evaluated and Task 1 was about creating a step-by-step guide about checking predictions when extracting the main information from an article.

Both tasks enabled students to focus their attention on the main ideas during a presentation. The screen-captures revealed that 11 out of 13 students who were engaged in these activities consulted the guide and comprehension questions that were created during Days 1 and 2 when during Day 3 they were asked to create their presentation outlines and content. Their online activity revealed that 10 out of 13 used the article comprehension questions as a guide to create their presentation outlines and this allowed them to act at a creative conceptual level.

4.2.3.2.1.2 Tasks that combined text and pictures

During Day 1 of the training, students were asked to perform task 4 which was to represent the article structure of a specific part of the academic article by using a door (conclusion), a window (introduction) and a bridge (main body). During the preparation for the oral presentations 8 out of 13 students were audio-recorded to describe the structure of their presentation by recalling these metaphors while thinking about the order of specific information: “Perhaps I should use this term at the beginning and then I can mention the next one to “bridge” the gap and lead to the main body of my presentation” (Student 12).

4.2.3.2.1.3 Mazes

Task 6 from Day 1 was a typical example of a Moodle maze activity that during the specific three day training offered students the opportunity to familiarize themselves with the necessary terminology for the creation of their oral presentations. In total, 11 out of 13 students consulted the list of terms that was created as an outcome of this study

when creating their presentation content outline. This means that the students used the task as a means of guiding their choice of terminology but it also indicates that they could combine information from various sources and act at a higher conceptual level and create a presentation.

4.2.3.2.1.4 *Using Hot-potato exercises*

This exercise was offered to students during the third and final training and referred to identifying the author's tone and purpose by choosing answers in a multiple choice format. From the screen-captures and audio-recordings 10 out of 13 students recalled the author's position on aspects of the article when creating their presentation slides. For instance, Student 5 mentioned that she "should perhaps include a section where all the positive interpretations of the term appear and then perhaps a section with the negative ones". This is indicative of the fact that participants reached the stage of critically reflecting on the article content to synthesize a range of opinions and create a presentation (Creation level – revised Taxonomy). The next section will discuss the results for RQ3.

4.3 Research question 3

Based on the quantitative and qualitative data obtained, this section will address the third research question below:

What was the relative value of the various scaffolding mechanisms in each task to support:

- (c) The successful completion of the tasks

- (d) the increased participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes

When referring to the value of the scaffolding mechanisms of our Moodle Pedagogic Unit, these can be understood as the scaffolding features from the adopted framework (3.5.5) that were developed to enable student progress at a task level and those features which impacted on the students' conceptual development.

A variety of data was collected to determine the relative value of the various scaffolding mechanisms in each task to enable successful task completion during the students' training by means of two measures: i. Audio recordings and screen-captures of online activity (qualitative data) and ii. Semi-structured interviews at post-sessions (qualitative data).

With regards to determining the relative value of the various scaffolding mechanisms in each task to support the increased participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes the measures that were employed were: i. Semi-structured interviews at post-sessions (qualitative data) and ii. Evaluations of student performance at oral presentations (qualitative and quantitative data). The students' views on the overall value of various types of scaffolding that were designed for the unit will be presented in the RQ4 results section.

4.3.1 How have the various scaffolding mechanisms in each task supported: (a) The successful completion of the tasks

This section will focus on examining the value of the adjusted scaffolding mechanisms (3.5.5) that were employed online to support the students' successful

completion at a Pedagogic Unit level and at a task level as well. The data in the following three sections is derived from observing online activity and the analysis of the semi-structured interviews with the students during the post-treatment session (Appendix 16).

4.3.1.1 Audio recordings and screen-captures of online activity

This section focuses on presenting the use of scaffolding mechanisms online and the features that were consulted by the students at a pedagogic unit and at a task level. Examples of the various scaffolding mechanisms can be found in Appendix 45 which illustrates how each scaffolding mechanism was presented online.

4.3.1.1.1 Scaffolding features used at a pedagogic unit level:

At this stage, the scaffolding features were designed to enable students to develop their learning and conceptual understanding while working within the wide framework of the pedagogic unit and not on a specific task only. The analysis of the audio recordings and screen-captures at this point focused on how the students used the forum area, the glossary, the workshops and their suggestions of how these scaffolding features supported their successful learning process. Table 4.32 summarises the specific scaffolding features that the participants consulted during their online training as these were observed through screen-captures.

Table 4.32: Overview of the use of scaffolding features at a pedagogic unit level during the 3 day training

Day 1			Day 2			Day 3		
Scaffolding features	Frequency of use	Number of students	Scaffolding features	Frequency of use	Number of students	Scaffolding features	Frequency of use	Number of students
Forum	60%	13	Forum	36%	10	Forum	33.3%	11
Workshop	25%	13	Workshop	24%	9	Workshop	16.6%	8
Glossary	15%	8	Glossary	40%	10	Glossary	50%	13

During Day 1 students consulted scaffolding features for 20 minutes during the training (Sections 3.9.2.1.3 and 3.9.3.3). The Forum and the Workshop areas, which offered students the opportunity to upload their work and receive feedback, were frequently consulted during the first day of the training by all students (13 in total) however the glossary was consulted 15% of the total time during which scaffolding was used by 8 students. During Day 2, students used scaffolding for 25 minutes. The use of the workshop area fell to 9 students in total which visited it 24% of these 25 minutes but the Forum and the glossary areas were used by 10 students quite frequently (36 and 40% of the time). Finally, during Day 3 of the training, students used scaffolding for a total of 24 minutes. 13 students preferred to consult the glossary 50% of those 24 minutes online when completing activities, 11 students consulted the forum and 8 students consulted the workshop area for 16.6% of their time online.

Regarding the forum area, the audio-recordings allowed for an analysis of whether the use of this scaffolding feature supported the successful completion of the tasks. The majority of the students (11 out of 13) mentioned during their online training interactions that the Forum area contributed a lot “to creating a clear idea of the answer that should be provided” (Student 6) based on the “feedback provided from other students online” (Student 7) and the “discussion of good and bad examples” (Student 2). A controversial point was the students’ opinion about the notification system with message alerts which informed students about the Forum posts. Half of the students (6 out of 13) mentioned that the alerts reminded them about posts they would like to check whereas 7 students found the notifications irritating. Finally, 12 out of 13 students agreed that the comments received in the Forum area were positive and did not make them feel uncomfortable. However, one student mentioned that it was awkward to give and receive feedback while student names were revealed.

Regarding the glossary, all students mentioned that this scaffolding feature significantly supported their successful task completion. Among the positives, 8 students mentioned that the glossary provided clear definitions which facilitated article understanding, 10 students mentioned that it was quick to use the glossary compared to consulting another source which would make them lose time and 6 students mentioned that the glossary was helpful because it contained exactly the terms that were required in order to complete the task. On the other hand, 4 students mentioned that one of the negatives was that the glossary was not ready to use in the beginning and it would have helped them complete some of their tasks if it was created earlier during the training.

Regarding the workshop area, the audio-recordings revealed that 8 students observed the positive influence on their successful task completion when the feedback enabled them to revise a number of their questions which later informed the creation of their online presentation structure. However, 3 students stressed that among the negatives of this scaffolding feature was the fact that students would receive feedback on a 1-1 basis and this would create an awkward situation when giving negative feedback.

Finally, regarding suggestions for ways in which scaffolding could be employed in different ways to support the successful completion of the tasks the students' audio-recorded comments were also analysed. The three main suggestions included creating the glossary earlier during the training to consult it for the earlier tasks too (4 students), anonymising the offered feedback in the workshop area to avoid awkward moments (3 students) and giving students the chance to view each other's' work and comments in the workshop area too instead of assigning them work in pairs (5 students).

4.3.1.1.2 Scaffolding features at a task level

At this stage, the scaffolding features were designed to offer students the opportunity to develop their learning and conceptual understanding while completing specific tasks. The analysis of the audio recordings and screen-captures at this point focused on how the students used the following features (different scaffolding features for different tasks at each session) and whether the scaffolding contributed to successful task completion. Table 4.33 presents an overview of the scaffolding features offered at a task level during the training.

Table 4.33: Overview of scaffolding features at a task level

• Session 1 ○ Process models: ▪ Task examples ▪ Task Instructions ○ Quiz feedback ○ Maze feedback ○ Process prompts: ▪ built in hints ▪ Retries ▪ redirections ○ Process displays: task completion indicators ○ Reflective social discourse ▪ Comment boxes ▪ Peer-assessment	• Session 2 ○ Process models: ▪ Task examples ▪ Task Instructions ○ Quiz feedback ○ Maze feedback ○ Process prompts: ▪ built in hints ▪ Retries ▪ redirections ○ Process displays: task completion indicators ○ Reflective social discourse ▪ Comment boxes ▪ Peer-assessment	• Session 3 ○ Process models: ▪ Task examples ▪ Task Instructions ○ Quiz feedback ○ Process prompts: ▪ built in hints ▪ Retries ▪ redirections ○ Reflective social discourse ▪ Comment boxes ▪ Peer-assessment

Table 4.34 presents the tasks that students performed during Day 1 and the most frequent types of scaffolding that students accessed in their attempt to complete the tasks. For a full list of the tasks and their requirements please consult Table 3.5 in the Methodology section.

Table 4.34: Session 1 – Screen – captures

<i>Tasks</i>	<i>Task Purpose</i>	<i>Type of scaffolding</i>	<i>Average length of use in minutes per task per student</i>	<i>Number of students (out of 13)</i>	<i>Task completion rate (per student)</i>
<i>Task 2, Day 1</i>	<i>Presenting the structure of an academic article (diagram creation)</i>	<i>Online comments</i>	<i>2 minutes</i>	<i>9</i>	<i>13</i>
		<i>Peer feedback in the forum area</i>	<i>4 minutes</i>	<i>13</i>	<i>13</i>
<i>Task 2</i>	<i>Prediction warm up poll</i>	<i>Help button</i>	<i>0,5 minutes</i>	<i>5</i>	<i>13</i>
		<i>Peer comments outline</i>	<i>2.5 minutes</i>	<i>12</i>	<i>13</i>
<i>Task 3</i>	<i>Take an online survey</i>	<i>Feedback from looking at peer answers</i>	<i>2 minutes</i>	<i>13</i>	<i>13</i>
<i>Task 4</i>	<i>Match the article structure with pictures</i>	<i>Comments while doing the task</i>	<i>1 minute</i>	<i>13</i>	<i>13</i>
		<i>Task instructions</i>	<i>1 minute</i>	<i>11</i>	<i>13</i>
		<i>Score</i>	<i>0.5 minutes</i>	<i>13</i>	<i>13</i>
		<i>Feedback</i>	<i>0.5 minutes</i>	<i>8</i>	<i>13</i>
<i>Task 5</i>	<i>Create questions to answer after reading an academic article</i>	<i>Peer feedback in the workshop area</i>	<i>5 minutes</i>	<i>13</i>	<i>11</i>
		<i>Comments on forum</i>	<i>3 minutes</i>	<i>7</i>	<i>11</i>
<i>Task 6</i>	<i>Lesson activity</i>	<i>Task instructions</i>	<i>1 minute</i>	<i>13</i>	<i>12</i>
		<i>Feedback</i>	<i>1.5 minutes</i>	<i>8</i>	<i>12</i>
		<i>SCORE</i>	<i>0.5 minutes</i>	<i>13</i>	<i>12</i>
		<i>Re-tries</i>	<i>0.5 minutes</i>	<i>6</i>	<i>12</i>

Regarding the scaffolding features that students used, whenever extra support was required to perform the tasks, their comments on specific types of scaffolding were very enlightening. Table 4.35 reports on the number of students who used a specific type of scaffold, for which task, which type of scaffolding and their quotes.

Table 4.35: Session 1 – Audio-recordings

Tasks	Action	Type of scaffolding	Quotes	Number of students who commented on this during online activity(out of 13)
Task 1	Presenting the structure of an academic article (diagram creation)	Online comments	"I think we're going to give some feedback in these comment boxes, that would be reaaally good" Student 3	2
		Peer feedback in the forum area	"I'm quite happy with these suggestions,that was good." Student 4	3
Task 2	Prediction warm up poll	Help button	"I might have to click here to find out an example" Student 1	1
		Peer comments outline	"I don't think my marker understood what I wrote but maybe it's my fault" Student 3	2
Task 3	Take an online survey	Feedback from looking at peer answers	"Seems to be helpful, it's good to know what others think.." Student 5	1
Task 4	Match the article structure with pictures	Comments while doing the task	"Hahaha that's cool, I got a comment!" Student 6	4
		Task instructions	"Yeahh it says what to do here.."Student 9	3
		Score	"Ohh I made a mistake!" Student 12	6
		Feedback	"Hmm, now it makes sense why I got this score, it seems.." Student 11	5
Task 5	Create questions to answer after reading an academic article	Peer feedback in the workshop area	"I'm not sure if I like the peer feedback idea, we need to be objective!" Student 13	13
		Comments on forum	"Did you see this comment box here? Perhaps check there too! Student 1	7
Task 6	Lesson activity	Task instructions	"Cool, all clear" Student 7	4
		Feedback	"Hahaha it tells me how I did it here!" Student 8	6
		SCORE	"I could have done better with this.." Student 9	7
		Re-tries	"I think I'll try it once more, we've got time.." Student 9	6

Table 4.35 above reveals what the students thought about the task scaffoldings during this phase of the training however there were no data from the students verbalizing the process they were going through. Therefore, the comments above represent the users

reactions to the provided support and the selected quotes represent the majority of the comments that were uttered at a given time for a specific feature by a specific number of users who commented.

Appendix 2 presents the tasks performed during Day 2 and the types of scaffolding where students spent most of their time in their attempt to complete the tasks. Appendix 46 offers information about the audio recordings and more specifically about scaffolding for Session 2. The focus of the audio recordings was on classroom activity and the number of students that have commented on each type of scaffolding.

Regarding the tasks that students performed during Day 3 (Appendix 23), the most frequent types of scaffolding that students employed to complete the tasks were example answers and task instructions. For a full list of the tasks and their requirements please consult Table 3.5 in the methodology section.

Moreover, Appendix 47 presents the tasks that students performed during Day 3 and the most frequent types of scaffolding that students employed (based on the average time they spent consulting them) to complete the tasks. These included peer-feedback in workshops and in the forum areas. Moreover, the students' comments on the different types of scaffolding are also presented.

4.3.1.2 Semi-structured interviews at post-sessions

Along with the screen captures, the semi structured interviews were also analysed for specific comments on scaffolding features. Given the nature of this study, the analysis is primarily qualitative but some percentages and descriptive statistics are provided to give the reader a sense of the patterns, how frequently was each employed and to contextualise findings. This part of the research invited students to a semi-structured

interview after the treatment session and at the end of the post-treatment session. During the interview the students could revisit parts of the online tasks to support and help them remember what information they might be looking for.

Table 4.36 gives an overview of the popularity of specific scaffolding features when analysing the interview data of the 13 students:

Table 4.36: Overview of the popularity of scaffolding themes in interviews

Scaffolding features	Frequency among students (%)
Comment boxes	60.3
Peer-evaluations	73.2
Process prompts (i.e. built in hints)	64
Process models (i.e. exemplary answers)	77
Forum Area	82

From the analysis of the interview data one of the four main areas that were most widely commented on emerged and it included task scaffolding and relevant sub-sections that were frequently discussed. These are presented in Table 4.37 in the order in which the majority of the students (11 out of 13) reported them. There were two students who did not mention any task scaffolding features during the interview.

Table 4.37: Emerging task scaffolding features during interviews

Task scaffolding features	Raw numbers of students who referred to the features during the interviews
1) Comment boxes	11
2) Retries	11
3) Built-in hints	9
4) Example answers	8
5) Forum	7

Among the various aspects that students commented on during the interview, their views and attitudes about the scaffolding mechanisms that were employed by the researcher were of high interest. The students commented on a variety of scaffolding

features and the mostly commented ones are presented in the sections below along with students opinions.

4.3.1.2.1 Clarity of instructions

One of the scaffolding options included consulting task instructions before the completion of the tasks. Students found this feature helpful since 9 out of 13 mentioned it during the interview and most of their references to it suggested that “the instructions were clear and most of the times indicated the steps we should take in order to complete the tasks” (Student 1). Student 10 mentioned that “there were a lot of tasks for which simply reading the instructions was enough to perform them”. Finally, there were 2 students which like Student 2 mentioned that in some cases they “would have to ask the tutor to explain what should be done next” to check that they had understood the task instructions.

4.3.1.2.2 Clarity of task examples

The students were presented with the option to consult example answers to the tasks either by clicking and having a look, by downloading relevant files or by consulting external links. Students found this feature quite helpful since it was mentioned by at least 10 students and most comments were incited by the example answer which triggered the students’ “creativity and provided a guide towards the right direction” (Student 5). Student 7 mentioned that “when unsure about what I need to create I would click on the example to check how to do it (concept map)”. There was Student 1 though where the example answer was interpreted as a help on the one hand that was “somehow limiting

available options” since the student would think that this is the expected format and would not try something alternative.

4.3.1.2.3 Forum area

The forum area of the Pedagogic Unit was a space designed to provide general support to students with questions or feedback from the tutor and peers. It was also a place where tasks were uploaded and submitted as a means of showcasing work and comparing with others to improve further. Student 1 mentioned that “it was very enjoyable to be uploading work there as it was fast” and they “could see the work and feedback of others and incorporate feedback or take ideas”. Student 6 particularly liked that “answers could be entered as posts or attachments, be edited if necessary and they could be exported at home if they wanted to have a look at them”. On the downside, Student 9 mentioned that they would have preferred this “process to take place at the workshop area where the feedback was only visible by the writer and there was an embedded evaluation form as well”. In total, 11 out of 13 students showed a clear preference in using the Forum area and thought that it significantly contributed to successful task completion.

4.3.1.2.4 Glossary

One of the students’ options for understanding unknown words was the use of the glossary at which quite at an early stage students were invited to enter definitions of key terminology from the treatment article. Students found this feature quite helpful since it was mentioned as a helpful scaffolding tool by 11 students and most comments related to

the fact that the glossary enabled students “to check the meaning of specific article terms quickly” whenever they needed (Student 3). Student 4 mentioned that “when unsure about which word I would have to use during the task it helped a lot to check the glossary”. Two students though mentioned that in some cases “the definitions were written very quickly and they would contain spelling mistakes which were a bit distractive” but the definitions were not wrong.

4.3.1.2.5 Peer-assessment workshops

The use of comment boxes was a quite frequently used source of scaffolding for students. It was mentioned by nine out of the thirteen students and it was mostly related to cases where the students received (or gave) feedback from/to peers or the tutor either in the workshop or Forum areas. Student 7 mentions that in one case the “comments provided in the workshop area” allowed him to develop the stages of a task later on and that the advantage of this was that feedback was not visible to other users. However, Student 8 mentions that did not feel uncomfortable by the feedback in the forum area as the students “could see examples and feedback from others and make comparisons or incorporate more positive elements” in their work. Regarding the peer-feedback option Students 3 and 6 mentioned it was “very positive when appropriate comments (in detail) and fair marks were given”. Student 2 mentioned that “it was enlightening to experience this and see the perspectives others have on doing the same task”.

4.3.1.2.6 Suggestions

With regards to suggestions about how the scaffolding options could have helped students proceed with completing tasks successfully, 9 students did not mention any suggestions. Student 12 mentioned that an additional idea would have been to “use more external links to websites with examples of how to perform a specific task such as creating a concept map”. Student 2 mentioned that it would have been “better if during workshops our work was allocated for marking to another students anonymously”. Finally, students 7 and 9 mentioned that more feedback should be provided to the students who made mistakes if they needed more examples of a specific suggestion for instance.

4.3.1.2.7 Adequate task feedback

The students’ interviews were also analyzed in terms of whether they received adequate feedback when doing the tasks. In general, 10 out of 13 students commented that the amount of feedback they received “was the expected one” and that it helped with successful task completion” (Student 6). Students 7, 9 and 12 though mentioned that in some cases “more feedback would have been required if a student kept making mistakes at a specific task” or that “extra examples of the mistake and the correct answer would have explained what was expected” to complete the tasks successfully.

4.3.1.2.8 Adequate feedback questionnaire

After each training section, the students had the option to fill out online feedback questionnaires and offer their views about the various elements of the online course.

Students found this feature quite helpful because all of them mentioned that when a suggestion was made about pace for instance or extra task examples this issue was then addressed the next day and in general their feedback was considered by making the necessary adjustments. Consequently, Student 10 felt that this helped with successfully completing tasks since the students' needs were addressed. Moreover, Student 7 mentioned that the open-ended format of the questions "allowed for openly expressing views without directing one's opinions".

4.3.1.2.9 Favourite scaffolding mechanisms

Apart from the general overview of the scaffolding mechanism that students particularly enjoyed, they have also strongly commented on built – in hints. This was an additional type of support that students received when completing tasks and included the option to consult hints regarding the possible answer or word or idea that could trigger the students and enable them to continue. This type of scaffolding mechanism was quite popular (11 out of 13 students mentioned it) and usually appeared in the form of pop-up windows that according to Student 5 "were consulted at times just to make sure we're on track" or "when we run out of ideas about what to do" (Student 1). However, Student 4 mentioned that this was a bit distracting since at a certain time it distracted students from contributing their own ideas.

4.3.2 How have the various scaffolding mechanisms in each task supported: (b) the increased participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes

To determine how the various scaffolding mechanisms in each task have supported the increased participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes the measures that were employed were the following: i. Semi-structured interviews at post-sessions (qualitative data) and ii. Student performance at oral presentations (qualitative and quantitative data).

i. Semi-structured interviews at post-sessions and framework based on Bloom

This section will focus on presenting information on the students' views about scaffolding during the training. Their data reveals the students' views on their own conceptual development by reflecting on their progress and how the provided online scaffolding helped them towards achieving this goal.

It was therefore very important to identify examples of the students' recognition of their own work and progress. Student 4 mentioned that they understood concepts in more depth after receiving training feedback and that they could apply the same suggestions to other articles or tasks. Students 8 and 12 observed that "the creation of the mind maps [concept maps] was really helpful since it helped to decide on the relationship between terms, their definitions and how this is reflected on the article". The comments about the concept maps in the forum area helped them move gradually from a stage of

simply representing knowledge to the state of linking ideas in creative ways. Most importantly though, as Student 13 noted, “I have seen that I am now going through this process relatively faster and in my last presentation the visual presentation of my mind map helped me understand the topic.”

Furthermore, Student 12 mentioned that the feedback comments helped the students revisit past knowledge, remember information and act accordingly. This was a re-orientation of the students’ basis of action in Galperian terms as the feedback provided support up until the students did no longer require it to perform their tasks. Consequently, the students revealed that the overall training and scaffolding experience offered them the opportunity to develop conceptually by gradually developing and employing reading strategies and presentation skills that allowed them to read and deliver academic presentations effectively. Therefore, a transition from the basic levels of understanding (according to the revised Bloom’s taxonomy – 3.9.2.1.1) to the level of creation was achieved as 11 out of 13 students could combine skills, synthesize information critically and present it effectively after the training.

ii. Student performance at oral presentations

By analysing qualitative and quantitative data there is indication that students improved on certain aspects that were scaffolded during the training. The analysis was based on the online training tasks, the oral presentation aspects that each task helped with, the students who used scaffolding features during these tasks, their scores and the scores of those who did not use scaffolding. Then, the scores of the tasks were compared to the students’ oral presentation scores.

For instance, Task 8 from Session 2 enabled students to develop the aspect of coverage for their oral presentations. Only three students chose not to use task scaffolding and they were unsuccessful whereas the other 10 students who used scaffolding were all equally successful. The average oral presentation score of these 10 students was 11 and that of the other 3 students was 3.37. Table 4.38 below offers data about the performance of scaffold users at post-treatment oral presentations.

Table 4.38: Performance of scaffold and non-scaffold users at post-treatment oral presentations

Task and Session	Scaffold users (SU)	Non Scaffold users (NSU)	Total Presentation scores for SU	Total Presentation scores for NSU
Task 10, Session 2 – Coverage	9	4	99	37
Task score (average)	95.5/100	65.4/100		
Task 1, Session 3 – Voice	9	4	100	37
Task score (average)	95% correct	50% correct		
Task 3, Session 3 – Supporting evidence	9	4	101*	36
Task score (average)	All successful	3 unsuccessful		
Task 5, Session 3 – Preparation	9	4	101	36
Task score average	All successful	1 successful		

*For instance, this score was received by adding the raw oral presentation scores of the 9 students that used scaffolding features. In this case, four students scored 12 out of 12 (max oral presentation score), three students scored 11 out of 12 and two students scored 10 out of 12. The individual scores are presented in Table 4.15 in this Chapter.

The students' comments after the training indicated that indeed the students who used scaffolding found the information useful for their presentations and recognised the help they received from the features. The students who had chosen not to use the scaffolding features during these tasks were divided into two groups: the first group (2 students) recognised after the oral presentations that a specific task and scaffold linked to

the requirements of the oral presentation; the second group of students (2 students) recognised the usefulness of the scaffolding features right after receiving the task score.

4.4 Research question 4

Based on the quantitative and qualitative data obtained, this part of the Results chapter will address the fourth and final research question which is the following:

What were the participants' opinions and attitudes towards:

- (e) The Pedagogical Unit
- (f) The pedagogical environments, i.e., Moodle
- (g) The pedagogical tasks (i.e. reading tasks and oral presentation)
- (h) The scaffolding mechanisms

A variety of data was collected to deduce information about the students' views on the four areas mentioned above and these included the following: i. Online feedback student questionnaires (quantitative and qualitative data), ii. Semi-structured feedback interviews at post-sessions (qualitative data), iii. Screen-captures and audio recordings about the participants reactions towards the Moodle unit (qualitative data), and iv. Written survey questionnaire (quantitative data).

4.4.1 The pedagogical unit

4.4.1.1 *Online student feedback questionnaires*

The questionnaires enabled the learners to comment on whether the sessions of the unit helped them develop their academic reading and speaking skills. Ten students

agreed that they were able to develop these skills mainly with the tasks that required concept map creation, the quizzes and the oral presentation outline. As the questionnaires were administered during the training some students also made general comments about the unit before the completion of the training. Two students commented on the length of the academic articles that the Pedagogic Unit used as the basis for the training but that the topic was interesting. Regarding the new content that the sessions enabled them to acquire 8 students rated it with 8 and 5 students with 9 (Session 1), 5 students rated the content with 7, 4 students rated it with 8 and 4 students with 10 (Session 2) and 6 students rated content with 9 and 7 students rated it with 7 for Session 3).

4.4.1.2 Semi-structured feedback interviews at post-sessions

The students' views from the interviews focused on various issues that were brought up about the pedagogical unit. The positive comments mentioned that the unit was successful in terms of providing EAP training (11 out of 13 students), it was properly organized (all students), the content was presented in a logical order (12 out of 13 students) and it was easy for the students to follow (12 out of 13 students). The negatives included that students would at times require the tutor's explanations to proceed to the next task (2 students) and a suggestion for the unit was to expand the number of sessions so as to create shorter sessions (2 students).

4.4.1.3 Screen-captures and audio recordings

During the training the audio and visual recorded data offered some additional information about the students' views of the unit. The data included at least 4 instances

per session where two students would require the tutor's help to proceed to the next task (help with content). At times, a peer would listen to the query and step in to guide the students before the tutor would arrive (three times in total). The students' comments also included 2 instances of complaining about the length of the training in Session 2 and 3.

4.4.2 Moodle

4.4.2.1 *Online student feedback questionnaires*

Regarding the Moodle platform the students had the opportunity to comment on the general suggestions section of the questionnaire. One student mentioned that it would be useful to have a manual for Moodle use after Session 1 and two students mentioned that they would prefer to have a few navigation options for doing the tasks (however a specific order was required for research purposes).

4.4.2.2 *Screen-captures and audio recordings*

The recorded data about Moodle as a platform included positive comments about the visual stimulus of the exercises and about how quickly the various parts of the course would appear while navigating. Among the negatives, 4 students in total would require the tutor to help them navigate, mainly during Session 1. In total, support was needed for 22 times during these three days.

4.4.2.3 *Semi-structured feedback interviews*

The students' views from the interviews focused on various issues that were brought up about the Moodle platform. The positive comments mentioned that Moodle was easy to understand and use (all students), it was properly introduced to the students (all students), it presented content in a nice way and was not slow (12 out of 13 students) and some were already familiar with it (11 out of 13 students). The negatives included that students would at times need the tutor's explanations on how to get to a specific Moodle section (2 students) and a suggestion was to offer students a short handout to see at home about Moodle navigation (1 student).

4.4.3 Tasks

4.4.3.1 *Task questionnaire*

The students' opinions about the tasks were very interesting as they supported the views that the students later expressed in questionnaires and other data instruments (Appendix 13). The students were very positive about the tasks. From Session 1, the most popular tasks were Tasks 1 (11 students), Task 2 (11 students) and Task 6 (11 students). For Task 3 only 2 students disagreed with the statement that they found it helpful. From Session 2, Task 1 (12 students), Task 5 (12 students), Task 6 (10 students) and Task 7 (11 students – Appendix 48) were the most popular among students. The least helpful was Task 4 (4 students – Appendix 49). From Session 3, the most helpful tasks were Task 2 (10 students), Task 4 (11 students), Task 5 (all students) and Task 6 (all students). The least helpful was Task 2 (9 students). Regarding general task features and more specific

feedback the students found that the major concern was the time available for the completion of tasks as it can be seen below (Table 4.39 and Appendix 50).

Table 4.39: Student average agreement with the following statements (1= strongly disagree; 4= strongly agree) in the Task questionnaire (Appendix 13)

	Agreement
1. The instructions are clear	3.53
2. The questions are clear	3.69
3. The feedback is useful	3.84
4. There is a comprehensive overview of the course	3.61
5. Materials are presented in a logical order	3.76
6. The materials cover a wide range of areas and are interesting	3.53
7. The materials are relevant to my needs	3.76
8. The difficulty level of the materials is appropriate to my level	3.38
9. The course is structured in a logical order	3.53
10. The pace of delivery is appropriate	3.30

In general though, students were very satisfied with the training questions, the order of materials and their relevance to their needs.

4.4.3.2 Online Moodle questionnaire

Regarding the tasks, the students' comments between the training sessions focused on the time available for each task. In detail, three students commented on the fact that some tasks would take longer to complete and that they could be assigned for homework. Four of the students mentioned that they would prefer to do more quiz and maze format tasks as they found them very brief and informative at the same time.

4.4.3.3 *Interviews (interview questions about tasks)*

The students' views from the interviews focused on various issues that were brought up about the tasks. The positive comments mentioned that the tasks were successful in terms of providing EAP training (12 out of 13 students). The types of tasks that were most favoured included quizzes, mazes, workshop activities, concept maps and matching exercises whereas the least liked included reading comprehension and summarizing. The negatives of task evaluation included that students would at times feel that the tasks were taking longer to complete (3 students) and a suggestion for the tasks was to improve the vocabulary tasks and term ranking exercises by asking students to create the glossary before doing this task (3 students).

4.4.3.4 *Screen-captures and audio*

The recorded data revealed some information about the tasks. In total, nine students made positive comments about the task types mentioned earlier and two students were recorded commenting about the lesson activity and how interesting it was. However, two students were complaining about the duration of the concept map tasks during Session 1 but three students were commenting on how various tasks would link to one another (i.e. the sequence of tasks in Session 2 and then how this linked with tasks in Session 3).

4.4.4 Scaffolding

4.4.4.1 *Online feedback questionnaires*

Regarding scaffolding, the questionnaires collected general comments during the training. Three students commented that they would prefer feedback in the forum area and in the workshops to be anonymous after Sessions 1 and 2. Moreover, three students mentioned that they were not able to find the concept map examples during Session 1.

4.4.4.2 *Interviews*

The interviews focused on various issues that were brought up about scaffolding. The positive comments mentioned that scaffolding features were various and interesting (9 out of 13 students) and each feature was working properly when doing a relevant task (all students). The top satisfactory features that were mentioned were the forum, workshop, instructions and task examples (all students). The negatives included that students would at times feel that the workshop feedback should be anonymous (1 student) and a suggestion for the types of feedback was to introduce more example tasks (2 students).

4.4.4.3 *Screen-captures and audio recordings*

Regarding scaffolding, the students' recordings revealed that they indeed preferred the features mentioned earlier but were initially skeptical about the forum as they did not trust peer comments (3 students). Two students were also recorded to be

paying attention to the task progress indicators and four students were commenting on the effectiveness of workshop feedback to proceed with the creation of a concept map.

After presenting the findings for each of the four research questions, the following Chapter will provide a discussion of the findings by situating the results among current research. It will also interpret them in line with the Literature Review in Chapter 2.

5. Discussion

The present chapter will highlight and discuss the main results and findings obtained from the investigation on the role of scaffolding in online EAP training to achieve conceptual development within an L2 academic context. To further understand the role of STI and scaffolding in fostering online EAP training in this study, this chapter will address each research question with a brief overview of the focus for each question. The chapter begins by addressing research question 1 (5.1), by recapitulating the aims and objectives for this question and by providing a summary of the findings. Then, a discussion of the most important findings in answer of this research question follows and a brief conclusion about the effectiveness of the adopted STI model in fostering conceptual development. Sections 5.2, 5.3 and 5.4 equally address the subsequent three research questions of the present study. Depending on the number of sub-questions for each section relevant sub-sections were created to address the questions and provide findings in answer to them. Then, Chapter 6 follows which summarizes the overall study findings and presents a concluding review of the role of STI and scaffolding in an online academic L2 learning context.

5.1 RQ1: How has the Pedagogic Unit (implemented on Moodle) fostered understanding at a conceptual level by users of L2 English in an academic context

The first research question focused on examining how a Pedagogical Unit fostered understanding at a conceptual level by users of L2 English in an academic context. In the present study, development at a conceptual level is understood as the increased ability of the participants to perform higher mental functions.

A student's level of conceptual ability was determined by considering the indicators mentioned earlier and whether for instance the ability to plan or formulate assumptions was evident in the pre and post introspection tasks, the pre and post concept maps, the pre and post oral presentations, the audio and visual screen captures of online activity and in the task scores and outcomes.

More specifically, the retrospection tasks measured conceptual ability by focusing on the identification of specific themes. The retrospective tasks were used since Galperin's STI position supports self-regulation, described as the students' capacity and willingness to skillfully monitor and evaluate one's own learning. The target was to encourage the students to perform at a conceptual level and reflect on the reading strategies they employ when reading academic texts to approach a text, understand it, retrieve information and ultimately establish an association between the text's concepts and ideas mentally.

Following from this, the potential of self verbalisation manifested either as "self explanation" or through collaborative activity, allows the academic language features in the present case to become visible for learners to reflect on their structure and meaning.

Within this STI approach, the verbalisation activities involve “learners talking through the concept and not about the concept” (Swain, 2009: 6). Therefore, the learners of the present study were expected to explain ideas to themselves, the researcher and others by employing the concepts as tools for understanding rather than merely verbalising the concepts aloud (Negueruela, 2008: 212). The verbalisation activity involved in STI differs from other verbalisation activities such as think-aloud activity either concurrent or retrospective (Swain, 2006b). In STI the verbalisation activities aim at “helping the internalization of the L2 and not simply gaining access to the learners’ thinking process” (Lantolf, 2011b: 38).

The retrospection findings from the tasks of the training at the post-treatment stage indicated that the students improved in their use of strategies as compared to their pre-treatment phase. It appears that 9 students focused on identifying ideas and concepts, more than half of the students began to make assumptions about article content, 9 students focused on locating evidence in the text and 10 students resolved to summarising information from various article sections to develop understanding successfully. Strategy use improvement was demonstrated when students were successful at reporting that they used a specific strategy when doing the retrospection task. This was considered as evidence of the students’ awareness of specific strategies when processing and reading an academic article (especially if they were not aware of these strategies at a pre-treatment phase, and this was regarded as improvement). Moreover, the fact that students employed additional strategies since having received relevant training and they began to focus on different or additional parts of academic articles indicates that the unit appears to have been successful at helping them to develop conceptually. Therefore, the range of strategies that was favoured by the students during the pre-treatment stage resulted in more frequent use of specific strategies or even at enriching the previous range.

Regarding conceptual understanding at the final stage of the pedagogic unit training the students reported using strategies that indicated a higher level of conceptual understanding. More specifically, 12 students indicated that they sought to “identify the type” of an academic article, a skill that is considered to be key to ensure understanding at a conceptual level (according to the classification of strategies in 3.9.2.1.1). However, with regards to skills that require creation or evaluation of information and which are at a higher conceptual level (3.9.2.1.1), 11 students could respond to the challenge and report using specific strategies.

Concept maps, were another tool employed as they offered an insight into the conceptual associations that the students established having followed the process that was described by them during the retrospection task. Within the SCT literature, there are not many studies that have employed concept maps as the latter have been associated with cognitive theory. Examples of this are provided by Novak’s use of concept maps which are grounded in one of the most widely used general models of adult learning: Kolb’s learning cycle (Kolb and Fry, 1975). More specifically, Novak described learning as a cognitive change within a single continuum that extends between rote and meaningful learning. He defines meaningful learning as the learner’s ability to consciously and deliberately choose to relate new knowledge to knowledge the learner already knows in some nontrivial way (Novak, 1998: 19).

However, there are studies that have followed the STI pedagogic model and have employed Schemas for Orienting the learners’ basis of actions (SCOBAS) to visualize content knowledge. This is because Galperin emphasized that for the formation of action and the creation of a successful pedagogic intervention, three main functions are essential: the orienting function, the executive function and the control function (Lantolf & Thorne, 2006: 304). The orienting function serves the purpose of providing the learner

with all the necessary information for the successful operation of an action and the last two functions refer to issues of execution and evaluation (Lantolf & Thorne, 2006: 304). Thorne et al.'s (2008; 2011) studies are indicative events though the studies examined the use of "directives" (indirect requests) among twenty International Teaching Assistants (ITAs) within an ESL context. The project still followed a similar STI model and included three stages: a. Orienting Basis, b. Conceptual Materializations and c. Individual and Group verbalisation. Data was derived from a corpus which was also used to develop SCOBAS that would function as instructional materials (i.e. diagrams). The findings revealed that there were "visible shifts in the ITAs' language use that are traceable to the mediated corpus-informed materials" (Thorne, 2008: 278-79). Therefore, the visual representation and the STI approach were successful in promoting the learners' linguistic progress.

The maps in the present study were also indicative of the participants' higher mental skills such as classifying and ranking arguments. The students' conceptual ability was evident when they produced a concept map at an initial stage that was later on enriched and fully developed based on the received training to reflect their final level of conceptual ability. As Haenen has mentioned, the role of the concept of "orienting basis of action" (OBA), which in the present study is performed by the creation of concept maps, was to refer to the "orienting elements by which the learner is guided along in the execution of an action" (Haenen, 2001: 162). If the students were not able to develop their maps further or enrich them, this was equally indicative of their level of conceptual ability and their inability to use the maps to deliver effective academic oral presentations at a later stage. Moreover, as Negueruela (2008: 201), has mentioned the emphasis on the teaching of concepts should be on ensuring that the SCOBAS "construct understanding that has a direct reflection on oral communicative development". Therefore, the

comparison between the two concept maps (initial and final) from a qualitative and a quantitative perspective contributed to assessing conceptual development and the effectiveness of the use of concept maps in general.

The concept map findings from the post-treatment stage were different and revealed that the students' raw concept map scores had increased in similarity with the expert's map. This was because the maps were more enriched after the treatment phase. This means that the maps included more elements such as concept nodes, hierarchical levels and cross-links between concepts at various levels. This was useful because according to Galperin (1989a) "in a materialized form that is concrete" by means of diagrams, charts or concept maps, it is essential "to represent the properties and meanings of the concepts" (Lantolf and Thorne, 2006: 213). Examples of this that cover L2 English grammar aspects mostly can be found in the work of Negueruela (2003, 2008), to teach tense-aspect in L2 Spanish and in the work of Lapkin et al. (2008), to teach the concept of voice in L2 French. However, the present study employed concept maps to capture the semantic networks between various academic article sections and this has not been observed in other studies adopting a SCT didactic model. The maps' potential as a way of structuring thoughts before delivering an oral presentation and of supporting student performance was also explored within an STI framework.

The average similarity score that the students got at a post-treatment stage indicated an improvement (83.30%) and the indications about the students' conceptual ability at this stage centered on the higher levels of understanding and reasoning (3.9.2.1.1). This signifies that the students' map represented the same main and important concepts with the expert's map and that the students were successful at identifying the various levels of hierarchy and at establishing links between concepts (cross-links). This can, therefore, translate into an ability to demonstrate high levels of comprehension since

at that stage the student is able to evaluate the importance of terms, add them and synthesize a map that depicts the complex relationships between concepts.

Moreover, the oral presentations enabled the participants to verbalise the concepts that were schematically depicted on their concepts maps and demonstrate their ability to function at a mental level, as through delivering a presentation on the topic of an article the participants were asked to summarize, elaborate and structure a well organised oral product.

The Pedagogic Unit training offered the students at a post-treatment stage the opportunity to deliver oral presentations on the topic of the article they worked on (“Motivation”) which they did not have the chance to work on earlier. They did this by consulting their concept maps only during the presentation in case they needed extra support. The format of the oral presentations was that of the pre-sessions and the presentations. After the training and since the students already had the chance to deliver two oral presentations, it was expected that they would be more capable of submitting a satisfactory academic presentation. However still, regarding the critical comparison and contrast of ideas, the oral presentations indicated that three students required additional practice and their conceptual ability does not appear to have improved (Table 4.17, section 4.3.1). This skill is one that requires further support and practice to develop and it is understandable that some of the students would require further support sessions on this. It might also be the case that students found the topic of the last article on Motivation more clear and straightforward and this could also justify their high post-treatment oral presentation performance. Information about the students’ conceptual ability, which has improved for a number of students as it can be seen above, was also revealed when compared to previous oral presentations (10 students out of 13 have managed to incorporate an element of critical evaluation of the article’s main concepts).

Let us now turn to the discussion about conceptual development. Based on Galperin's theoretical framework the present study has explored and, eventually, demonstrated how individuals internalise external activity in order to internalise a deeper understanding of academic texts and concepts using a procedure called "stepwise formation of mental actions" (Galperin, 1989: 34, section 3.3.1.2.). Following Galperin's instructional approach to foster development and by focusing on conceptual thinking, the conceptual framework of his studies has also been used here. Moreover, Galperin's teaching strategy was built on developing the idea that any kind of knowledge is mastery of different kinds of actions (activities - tasks). Similarly to this and according to Arieievitch and Haenen (2005: 160), the present pedagogic unit was successful at involving the learners in a "spiral model" of teaching through which the learners passes from all the previous levels: first by undertaking a task materially in detail so that all the aspects become apparent, then by performing the task verbally and finally by being able to perform the task automatically.

Following this model, the pedagogic unit managed to *foster* and *document* the students' process of internalisation of their actions while they moved along a sequence of levels in mastering a given task. This instruction process according to Arieievitch (2005: 160) entails gradual improvements of the sub-actions performed by the students, "an ability that leads to better understanding, execution and acquisition of action at a particular level" and allows students to orient themselves in and out of an action. The students' process of internalization and general conceptual development was documented by adapting Bloom's taxonomy in a way that reflected the SCT main principles. This was essential for evaluating the construction of conceptual knowledge in online environments and to indicate which higher mental skills are indicative of which levels of conceptual development (as the levels were provided by Bloom's taxonomy).

To conclude, the study has attempted to evaluate the development and progress of the participants as discussed in the literature review from a SCT perspective. This was understood as the students' ability to shape and re-shape language as a meaning making tool, being able to go from object and other regulation to self-regulation (i.e., ultimately being able to use language without scaffolding mechanisms, mediation), and the comparison of the pre- and post-session performances were considered to mark the students' progress (Section 2.3). Thus, the findings for this project revealed that the ability to deliver a presentation successfully (success is operationalised as delivering key content, the six points outlined in Chapter 3, section 3.4.1) was of crucial importance for the students' ultimate conceptual development.

5.2 RQ2: How have the Moodle Pedagogic Unit's affordances for academic training (comprising of academic reading tasks and speaking advice) enabled participants to:

5.2.1 a) Understand academic texts at a conceptual level

The affordances of a Moodle pedagogic unit can be understood as the value of the training course in enabling students to successfully achieve their course goals. The second interpretation refers to the affordances of Moodle as an online learning environment and the opportunities this offers for creating an academic training course. Moreover, as it was mentioned in section 2.3.2.1, the comprehension of academic texts is

an advanced skill which requires focusing on specific terminology by underlining key concepts or keywords (Sarig, 1987; Amer, 1994) and then to plan and depict the relationships of specific article terms with the use of concept-mapping (Amer, 1994; McCagg & Dansereau, 1991) to develop conceptual understanding.

The Moodle platform facilitated the process of understanding academic structure in a number of ways. The students were already expecting which elements could assist with academic article comprehension, there was pre-existing knowledge about academic standards in general and expected a few quality criteria to be met. Moodle also offered the opportunity to support the creation and use of tasks that enabled students to draw diagrams of the article's structure. The students experimented with a variety of formats and although their outputs were initially mainly focusing on the structure of the article either representing it by using headings or concept maps and not so much on depicting relations between concepts, they finally managed to improve. Moodle also offered the opportunity to students to visualize structure by materializing it to orient their attention.

Given that most research to date on STI has focused on grammar, the current project was innovative in using an online environment and employing an STI approach to EAP training. In principle, there is no reason why STI “could not address any aspect of language, including pragmatics, vocabulary, discourse, and figurative language” (Littlemore & Low, 2006: 8). Therefore, the focus of the current study was on two features such as visualization (i.e. materialization) and verbalisation, which are quite different from most approaches to language instruction and which have very innovatively contributed to online EAP teaching.

Negueruela’s study (2003) presented extensive evidence that documents these two features of the learning process similar to the present study but for a different subject matter. Working with college students enrolled in a L2 Spanish course, in his study

Negueruela (2003) developed pedagogical units on three relevant grammatical concepts: Aspect, mood, and tense. He treated the assigned grammatical concept as the minimal unit of instruction for each one of those conceptual units; each concept was then operationalized in charts and diagrams (conceptual tools) that could be assigned psychological status; and finally verbalization activities focusing on the target concepts were assigned.

Negueruela (2003) reports that even though development was not even in all the participants, their performance in production of the formal features associated with the targeted concepts improved towards the end of the semester (especially in their written production). Negueruela proposed that this improvement in the use of the explored grammatical forms was due to development on their conceptual understanding. As a result, the present study's student conceptual ability reached the stage of synthesizing information from a critical and evaluative perspective (4.2.1.3).

In the second day of the training, the online activity of the users revealed more action in areas that involved skills such as distinguishing key ideas, understanding key academic concepts, identifying the function of specific sentences within the text and summarizing. The students' high task scores in exercises that required forming term definitions critically and in the glossary creation (4.2.1.1), were received as indicators of successfully achieving the course goal of understanding academic concepts. This was in line with Amiryousef, Dastjerd & Tavakoli's (2013) study results which revealed that in their online teaching of reading by following an STI approach, both bottom-up and top-down strategy use was observed. However, a prominence of bottom-up processes was evident.

Moreover, during the last phase of the current study's training, more action was witnessed in areas that involved skills such as article evaluation, understanding key

concepts, identifying a purpose for reading and identifying the author's purpose and tone. The training led to an increasing number of basic reading strategies that were employed by the students. Regarding the understanding of concepts and article evaluation, all students were successful in creating content outlines for presentations and evaluating concepts, to deliver a presentation that could clearly reflect on the main ideas of the article. Two more skills that were developed and reveal information about the level of the users' conceptual and critical ability was identifying a purpose for reading and the author's purpose and tone. This was evident from their efforts to locate the main ideas and create an outline that could lead to the creation of a presentation (which was the students' purpose – section 4.2.2.1).

Moreover, EAP has received criticism for 'skilling up' students rather than taking a critical approach, 'literacies' approach appropriate to the rapidly globalizing contexts of the twenty-first century (Doherty & Singh, 2005; Lea & Street, 2006). In her study, Wilson (2014) investigated how EAP reading pedagogies in Australian universities are responding to this call for a more critical approach, by conducting an ethnographic-ecological methodology (van Lier, 2004) to gain an understanding of reading pedagogy in three EAP learning environments. The data, which were also taken into consideration for the creation of the current Moodle pedagogic unit, suggested that conditions for such a pedagogy entail a negotiation of goals, texts and tasks which present high challenge as well as high support (Hammond & Gibbons, 2005). The research also recommends that practitioners act to set up learning environments which scaffold students' direct engagement and dialogue with texts, so that they are enabled to construct meaning, and develop an emerging identity as critical readers.

During the last phase of the training and with regards to understanding concepts and article evaluation, all students were successful in creating content outlines for

presentations and evaluating concepts to deliver a presentation that could clearly reflect the main ideas of the article. Two more skills that were developed and reveal information about the level of the users' conceptual ability was identifying a purpose for reading and the author's purpose and tone. These skills were employed by 10 out of the 13 students (section 4.2.2.1). Sterzik & Fraser (2012), is one of the few examples which –as in the case of this study - have employed concept maps to foster students' reading comprehension and diagram creation. The authors acknowledge that text-based comprehension (Kintsch, 1998) alone is not sufficient for academic success and that prior knowledge application to define purpose(s), to verify hypotheses, and to infer and question content is also required (Macaro & Erler, 2008). The authors contend that specific teaching tools towards this direction have not been developed. Therefore, in this innovative approach Reading Comprehension MAP for Situation-based comprehension (RC-MAPS) was employed as an instructional technique which focused on the two skills that were mentioned earlier.

Regarding the Moodle environment of the training, the students' activities made use of specific characteristics that the environment offered such as: reflection, interactivity, and peer support. More specifically, 9 of the students used the Moodle facilities to revisit parts of their work that they uploaded online and reflect on their previous activity. A total of 13 students were actively involved in peer-feedback activities and this has significantly increased the potential of the Moodle environment to offer interactivity opportunities. Moreover, the contribution of peer support was also important: 7 of the students received critical and supportive feedback on their work whereas 3 students claimed that the comments that were addressed to their work were slightly stricter in nature. Thus, it is also worth noting the potential of Moodle to enable course designers to create learning spaces that draw links to other VLEs.

Although *Moodle* is not designed particularly for language teaching purposes, it offers a number of useful learning tools that can be employed in EFL/ESL contexts or teacher training projects (2.4.3.2). For instance, Suvorov (2007), Su (2003) and Meurant (2008) suggested its use for ESOL (English to Speakers of Other Languages) writing classes since the typical *Moodle* course affordances offer a set of tools that enable the integration of a broad range of assignments, activities, and multimedia resources.

By the end of the current study's training, the students' activities made use of specific characteristics that the environment offered such as the following: reflection, interactivity, peer support, interaction and glossary use. Regarding the latter, Stanley's (2007) study is an example that focused on vocabulary acquisition in an intensive reading course while using *Moodle*. He reported the summary of a student generated glossary, similar to the one created by the learners in the present study, that provided students with necessary vocabulary items and a variety of opportunities to see the items in different contexts. He concluded that *Moodle* and its glossary module in particular have been of immense help to practitioners while offering learners opportunities to learn vocabulary well beyond the classroom. For the present study's purposes, the creation of the glossary was also a type of materialization task which allowed learners to concretise abstract concepts and create a list of the most essential ones to direct their learning process and focus.

Furthermore, the contribution of peer support in the current study was also important, since it enabled all students to receive critical and supportive feedback on their work and there were no negative comments regarding the quality of feedback (4.2.2.3). Meurant (2008) discusses that *Moodle* has a special potential in EFL education to promote students' development of L2 digital literacy because *Moodle* forces English to be used exclusively throughout a course website and the meta-language can be made the

target L2. This has significant impact on aspects such as designing verbalisation tasks which can encourage learners to reflect on target language use only and internalize knowledge.

Regarding the level of interaction among students, this was a variable that has increased 40% during the third phase of the training. The nature of the tasks that Moodle supported and the scaffolding assistance that was provided (i.e. the workshops) offered all users the opportunity to interact more, peer-review their work, look at other products of work and reflect on their own progress.

5.2.2 b) Effectively deliver an oral presentation for academic purposes

Academic oral presentations are quite demanding and pose a challenge for learners (2.3.2.2). As Flowerdew and Peacock (2001) argue, academic speaking is a very important aspect of EAP training. However, it tends to be neglected as a skill as “compared to the research article, which is the most researched academic genre, little work has been done to describe the spoken academic genres” (2001: 189). Most of the research in this field though has focused on identifying the elements of successful seminar participation to address the learners’ problem with seminar speaking (Lynch and Anderson, 2001: 188). However, a very important aspect of academic speaking is the oral presentation and the present study aims at covering this gap.

The Moodle platform has also enhanced the students’ understanding of the elements of a successful oral presentation. The online activity of the users revealed more action in areas that involved skills such as article evaluation, understanding key concepts,

identifying a purpose for reading and identifying the author's purpose and tone. A number of basic reading strategies were employed by the students which revealed their tendency to exploit features of the article to achieve better understanding (4.2.1.4).

The main training for oral presentation creation and delivery was offered during the last day of the training, which involved students in tasks such as ranking different text types from the most informal to the most formal. These tasks would reveal whether the students were in a position to recognize formality in academic texts (Appendix 44). This reveals that through the practice exercises the students practically explored the concept of formality and managed to move from the practical (material) level to a conceptual interpretation of the term at a mental level.

The main reason for focusing on this aspect of online training was the fact that most Moodle studies focused on designing online speaking courses that involved videos or interaction tasks but not on preparing students for academic oral presentations. Moreover, the studies that would research oral presentation training would tend not to be online or not to be conducted within a SCT or STI framework. Therefore, the implications for EAP teaching are that “genre-specific speaking courses and tasks may be necessary and that EAP teachers need to prepare students for comprehension of and participation in a variety of academic lecture/presentation formats” (Ferris & Tagg, 1996).

Moodle offered the opportunity to create a summary writing task for students to reflect on the steps they take for summary writing before creating an oral presentation. The task results indicated that students managed to demonstrate significant progress with their level of conceptual ability by being able to develop at an Evaluating and Creation level (4.2.1.4). More specifically, the high achieving students could summarise information successfully through various tasks and plan/organise information in a critical

way to communicate ideas. In detail, the students were asked to reflect on the process that one needs to follow to write a summary and create a step-by step guide with instructions for this. In these cases, the students were successful at critically evaluating the main areas to be included in the article (evaluation) and were also able to propose steps for the synthesis of a summary (creation stage).

The previous skills were also found to be successful in Boivin's (2013) study, which investigated the use of theme based content and language integration in an English Foundation course at a higher education institution in Malaysia. The study's results indicated an increase in motivation in speaking as well as greater comprehension of content terminology and topics. The process entailed skills such as writing an article summary, note taking, creating or designing graphic organizers (i.e. diagrams, etc.), critical analysis of arguments, and reflection. However, ultimately it was the design of the process which facilitated increase in student overall motivation within this EAP context.

Moodle also offered the opportunity for the creation of presentation outlines (3.9.2.1.4) in the present study. Regarding concept comprehension and article evaluation, all students were successful in creating content outlines for presentations and evaluating concepts to deliver a presentation that could clearly reflect the main ideas of the article. Two more skills that were developed and reveal information about the level of the users' conceptual ability was identifying a purpose for reading and the author's purpose and tone. This was evident from the students' efforts to locate the main ideas and their attempts to create an outline that could lead to the creation of a presentation (which functioned as the students' purpose).

This was in line with Dashtestani's (2013) EAP project which focused on exploring the use of EAP oral presentations with 533 Iranian students. His study assessed the English for academic purposes (EAP) students' perspectives on the use of PowerPoint

presentations in EAP instruction. Potential obstacles to the use of oral presentations in EAP courses were found such as the learners' technical competence or their ability to introduce content to the slides wisely. However, the results, confirmed that as EAP instruction is based on learner-centered and student-oriented approaches to pedagogy, it is crucial that future EAP courses will be developed based on what EAP students will be required to perform such as academic oral presentations.

The next step after the presentation outline was for the students to expand on it and create the content of their presentation based on the treatment article. Further to all the previous data, the oral presentations enabled all the participants to verbalise the concepts that were schematically depicted on their concept maps during this three day training and demonstrate their ability to function at a mental level. The verbalisation stage is considered very important for internalizing concepts and for guiding the learners' development in the use of L2 concepts for meaning making (Negueruela & Lantolf, 2006: 84). The activities at the verbalisation stage aim at encouraging learners to utilize "the conceptual knowledge that has been internalized" (Swain, 2009: 22) and to mediate their conceptual understanding. Two important processes that promoted the development of conceptual knowledge were visualization of the concept in the form of a concrete schema (i.e., materialization – concept map) and verbalisation of this knowledge in the learner's own words. Visualization provided "external auxiliary support (i.e., mediation) of the internal mental activity that preceded communication" (Leontiev, 1981:9). Learners in the present study employed concept-mapping visualizations to mediate their understanding of the concepts and content of academic readings as well as to support their subsequent oral presentation performance, wherein the necessary concepts were actualized in concrete, goal-directed activity.

Moreover, the feedback exchanges that were enabled with Moodle facilitated the revision processes. The success of the Moodle feedback and tasks was evident on the final day of the training when the students delivered an oral presentation on the topic of the article they were working on (“Noticing”) by consulting their concept maps only. The format of the oral presentations was that of the pre-treatment sessions and the theme of Coverage and Relevance when the students delivered their presentations was the most successful, since they managed to focus on the topic, and identify the major areas which needed to be addressed (Table 4.30 & 4.31, 4.2.3.1.2 & 4.2.3.2.1, respectively).

In general, the Moodle training appeared to enable students to adopt an improved presentation organization. The analysis of their concept map related links (on which their presentation was based) reflects the students’ higher conceptual ability at the moment (as they are able to establish/describe connections between concepts). According to the evaluation of conceptual development that was described in 2.3.5 (p.67), being at the highest level of conceptual ability involves using old ideas to create new ones, generalising from given facts, relating knowledge from several areas and predicting or drawing conclusions. The students in the current study adopted a slightly more advanced presentation structure as it can be seen in section 4.1.3. At the treatment stage it was obvious that the students were capable of submitting a quite satisfactory academic presentation. However still, with regards to the critical comparison and contrast of ideas, the oral presentations indicated that five students required additional practice. This has also revealed information about the students’ conceptual ability which during the treatment had significantly improved for a number of students (6 students have managed to incorporate an element of critical evaluation of the article’s main concepts).

When evaluating the affordances of Moodle as an online learning environment, it was examined as a knowledge-centred, community and assessment based environment

for learning (Moodle Docs 2008c). Moodle possesses easily configurable features, allowing the creation of student assessment processes (in the forms of quizzes, online tests and surveys) (Itmazi, 2005; Legoinha; 2006), besides offering a wide range of additional tools to enhance the teaching and learning process. For the specific course Moodle hosted links to websites, the upload of pdf and word documents, embedded Hotpotato exercises (exercises created by using a web-authoring software) and it also supported a large variety of task types (Appendix 4). The platform also offered a variety of networking forums to support the share of knowledge among students, to enable learners consult a guide and orient their actions before they work at a material level (2.1.3).

An online workshop environment was also offered, which helped towards establishing a sense of community online during the training. The students were initially invited to submit their work, then the tutor could choose to randomly assign student work to other students for peer-assessment or to select the students that would review a specific piece of work. Apart from the previously mentioned workshop area, Moodle enabled students to use a chat space if they deemed it necessary. For the purposes of the present study and as the students were working on specific tasks within a computer lab environment the use of a chat space was not considered to be necessary and the students should focus on exploiting the available scaffolding features that were offered online instead of asking for help. In addition, the Moodle platform offers the opportunity to provide students with a record of activities over the training period. The relevant features that were found to offer this type of support included forum discussions, an email notification system which informs students of relevant action online and records of task score performance for each online completed task with automated feedback.

With regards to establishing a pedagogic unit that can foster the students' self-assessment and reflection, Moodle offered students the opportunity to receive peer-feedback in the forum areas but also to view the feedback comments on their fellow students' work and reflect on their progress. Learners could access course contents in different formats (text, image, sound), and interact with instructors and classmates, via message boards, forums, chats, or other types of communication tools (Sanchez & Hueros, 2010). Moodle also offered a set of configurable features, to facilitate the creation of the online course (Paulsen, 2003). Another opportunity for reflection on individual work and progress was offered during the workshop tasks when the students could receive comments on an online assessment form from another student. Along the same lines, Moodle also offered students the opportunity to access their scores on a portfolio which allowed them to reflect on their progress on a daily basis. Simultaneously, these perspectives assume that the learners were active participants in the construction of how they learned. They related themselves to others and to the learning task based on their educational background, their individual goals, and their motivation within a socio-cultural context (Lantolf & Pavlenko, 2001; van Lier, 2008).

5.3 RQ3: How have the various scaffolding mechanisms in each task supported:

5.3.1 The successful completion of the tasks

During the online training, the students' tasks were supported by various online features whose purpose was to enable students to complete the tasks successfully. As it

was mentioned in section 4.3.1.2 (Appendix 46), scaffolding was found to be useful for successfully completing the tasks for 10 out of 13 students in total.

The scaffolding features which helped complete a task the most included comment boxes, retries, built-in hints, example answers and the forum areas. Based on the research findings, these specific scaffolding features are suggested for use in online environment training and for specific task types. Researchers who have analysed the use of computers for assisted learning scaffolding include Davis and Miyake (2004), Demetriades, Papadopoulos, Stamelos and Fischer (2008), Yelland and Matsers (2007) and Zydney (2010). Sale and Zimmerman (2004) describe the instant feedback, computation power, graphical representation and interactivity of digital environments as positive characteristics for user data collection and rule induction. They believe that users who are given sufficient scaffolding can refine their strategies resulting in greater learning effectiveness.

More specifically, the comment boxes are recommended for tasks which enable feedback interaction with peers or with the tutors after completing a specific task. The success of this scaffold type lies in enabling students to verbalise their ideas and scaffold each other's development by commenting on the elements that could be improved. According to Kim and Hannafin (2011), this is an example of dynamic scaffolding which provides interactive methods to assess learners' progress and provide feedback in response to differential learners' needs (e.g. cues and prompts).

The forum areas were found to be most effective for posting work under a specific work topic so that all answers appear in an organized way and then the relevant feedback would be posted there too. Their role was both to discuss about the task's completion (process and steps) but also to provide feedback after the task was completed (scaffold progress). The retries were most appropriate for multiple choice tasks, quizzes and maze

activities mostly to offer students the opportunity to understand task instructions better and re-attempt the task (encourage motivation). Moreover, the re-attempt could reveal if the feedback that is provided after an unsuccessful attempt is assimilated in the second try to complete the task.

Apart from retries, built-in task hints are appropriate scaffolds for fill-in the gap tasks or for tasks where students are required to enter information and they need clarifications or a clue (but not the answer) to understand how to complete the task. The hints were successful since they oriented the students and ensured they maintain a focus. As Kim and Hannafin (2011) state, the previous are examples of static scaffolding which is provided in the form of fixed directions, procedures or information that typically do not involve negotiation between the students and the scaffold source (e.g. text, tool, or technology). In these cases, learners assume responsibility for regulating the amount and pace of scaffolding or this could depend on their performance and they determine which scaffolds are deployed (i.e. in case further explanation is required during a task).

The example answers in the current study were also found to be very successful for task completion since they enabled students to consult an example before attempting the task themselves. As a scaffold this is recommended for tasks that require an amount of planning from students (i.e. diagram or concept map creation, presentation creation, etc.) to enable students to focus on the process of completing a task and on the successful elements of a task. Lin et al's (1999) study has also explored the use of process prompts which included sample answers and found that these were the second most successful scaffolding features employed in their training course.

However, there were also a few scaffolds which did not contribute a lot to successful task completion. These included task completion indicators which indicated to students the parts of an exercise and the extra work needed in order to complete it.

Although a few students mentioned that this would help them plan their task actions (4 in total), the majority of the students (9 in total) argued that it imposed additional stress about what was still left to be completed. Therefore, this scaffold feature should be used for relatively small tasks or in cases where students have the freedom to revisit a task and are not required to finish a task. The findings agree with Lin et al's study (1999) who focused on the same types of scaffolding and whose research indicates that this type of support was also conducive towards improving the learners' performance.

Regarding suggestions about how the scaffolding options could have helped students proceed with completing tasks successfully, more external links to websites with examples of how to perform a specific task such as creating a concept map could have been used. This should be attempted because procedural scaffolds guide the student in addressing operational aspects of the learning environment. It would have also been helpful if during workshops the students' work was allocated for marking and peer-feedback anonymously. Lin et al's (1999) study also reports the students' reserved predisposition when exposed to the work of a fellow student compared to their control group, where students would mark anonymous work and they would be more objective and relaxed. Finally, more feedback comments could be provided to the students who make mistakes if they wish to see more examples with regards to a specific suggestion. These would assist students in assessing their state of understanding, reflect on their thinking and monitor their problem solving processes.

5.3.2 The participants' ability to understand academic texts at a conceptual level and deliver an oral presentation for academic purposes

As it was mentioned in the Literature review chapter (2.3.2.1, p. 55), enabling students to develop their reading skills within an STI didactic model was treated as closely linked to the use of higher order cognitive processes such as planning their learning via predictions, paying voluntary attention when scanning for specific information, summarising sections of text and monitoring their reading frequently. Therefore, the students for the present study were expected to plan their approach when reading a text by identifying top-level structures (Smith & Edwards, 1997) or by formulating self-generated questions (Padron & Waxman, 1988). The students were then trained to focus their attention to specific terminology by underlining key words and concepts (Sarig, 1987; Amer, 1994); then to plan and depict the relationships of specific article terms with the use of concept-mapping (Amer, 1994; McCagg & Dansereau, 1991) to develop their understanding of concepts. Therefore, the students' reasoning processes were employed for selective note-taking and then planning the structure of notes for summary creation.

The online scaffolding features that helped learners understand academic texts the most included both micro-level and macro-level scaffolding mechanisms. At a micro-level, the scaffolds included retries, redirections, built-in hints and pop-up feedback comments. The redirecting mechanisms oriented the students and drew their attention to sites or resources that facilitated the comprehension of the reading context. In Watson and White's (2012: 316) study, "the sequences of activities were scaffolded with optional

help and feedback, while the tutor also assumed the role of “scaffolding student understanding of content through online discussion and feedback”.

Moreover, their course offered thematic forum discussions each week with live chatting sessions between the students, leading to an assessed reading task and formative vocabulary tests with automatic feedback. Given that this was a distance learning programme, the scaffolding assistance was successful without any face-to-face contact with the tutor and this was encouraging for the present study too which offered similar online feedback, scaffolding features on Moodle and forum discussions.

Moreover, the built-in hints in the current study enabled text comprehension by offering explanations for specific terminology for gapfill tasks, quizzes, mazes but also for tasks where students would enter their answers. The hints enhanced the students' voluntary attention to concepts and enabled them to scan for specific information more successfully. Pop-up feedback comments would appear after the students' entered responses to quizzes, mazes, gapfills or multiple choice tasks and their success was in line with the success of retries, since if the feedback was assimilated by the learner then the retry was successful. Therefore, the retry indicated the success of the feedback in enabling students to plan their actions after realizing that the first answer was wrong. The fact that random guesses were very low (4.2.1.1) indicates that the feedback was successful.

The scaffold that enabled learners to understand academic texts at a macro-level was the glossary since it enabled learners to enter definitions and check them later for the completion of various tasks. Moreover, the use of forums ranked second. An example is provided by Narelle Clarke's (2015) study which is probably the most recently produced research output regarding the use of Moodle to research the development of academic reading skills and its scaffolding affordances in terms of creating autonomous academic

readers. In her action research project she designed online reading tasks and scaffolding assistance was provided in the forum areas both from the tutor and the students who worked in collaborative groups. Moreover, the students entered journal entries once a week which offered them the opportunity to reflect on their activities and significantly develop their meta-cognitive skills. Although in the current study students were not collaborating for task completion, the reflective Moodle options and forum scaffolding were implemented in similar ways and were successful.

The micro-level scaffolds that helped learners understand academic texts the least were the task progress indicators. This is mainly because they targeted the students' motivation or plan of actions when performing a reading comprehension task. In detail, this scaffold would have been more effective for short quiz type tasks that do not have a lot of parts to stress the learners.

When turning to the delivery of oral presentations, the scaffolds that appeared to have helped learners the most at a micro-level were the process models (example answers) and process displays (learner portfolios). The example answers were helpful in providing a material version of the task output. The examples' role was also to guide the students in their attempts to produce their presentations and they were mostly used for tasks that required the creation of outlines, of identifying the main ideas and graphically linking between them. Tang (2013) also suggested that practitioners can upload documents of relative background information for speaking such as topic questions, chunks that are frequently used about the topic to the Moodle platform, which can successfully function as models for orienting the learners' actions online to help them frame their oral outputs. Similarly, in the present study the students gradually produced documents with article comprehension questions to guide their understanding of concepts that would later on be used in their oral presentations.

The learner portfolios in the current study were also helpful with offering students the opportunity to review their online activities and tasks and to plan for locating the information that was useful for creating an oral presentation. At a macro-level, the forum discussion area was very popular with students and enabled them to consult others with regards to planning their presentation outlines or the order in which the various presentation parts should appear.

Therefore, at a micro-level, the process models (instructions) and process displays (task progress indicators) were the least helpful for preparing students to deliver oral presentations. At a macro-level, all the related scaffolding mechanisms were supportive and enabled students to discuss their presentation outlines or to consult the glossary for additional support with terminology. The only downside of the workshop peer-assessment session was the lack of anonymity for the provided feedback. Linardopoulos (2010) has also found similar results. His study in the teaching of a public speaking course in English was delivered in a fully online setting provided by the Blackboard interface which is very similar to Moodle. Students in the online section were required to view Powerpoint lectures with audio and participate in discussion boards weekly. The evaluation for the online section also included three quizzes. Students were required to write, deliver and submit either streaming video online or via VHS/DVD an informative speech and a persuasive speech. There were no face-to-face meetings and no synchronous conversation or discussion options available through the Blackboard interface. This is one of the only studies that employed an environment very similar to the one of the current project for the training and delivery of oral presentations online and revealed the positive role of process models and prompts towards the training.

5.4 RQ4: What were the participants' opinions and attitudes towards:

5.4.1 The Pedagogic Unit

The study has also focused on exploring the students' views about four different factors of the project which include the Pedagogic Unit, Moodle as a training platform, the tasks and scaffolding mechanisms. The positives of the Pedagogic Unit include that the students recognized they could develop their academic reading and speaking skills mainly with the tasks that required concept map creation, the quizzes and the oral presentation outline. Moreover, regarding the new content that the unit was successful at promoting, students gradually developed the opinion that this attempt was successful (4.4.1). The unit was also organized and content was logically presented. The negatives included that students would at times need the tutor's explanations to proceed to the next task and the academic articles that the pedagogic unit employed were lengthy but interesting in terms of topic (4.4.1.2). Therefore, suggestions for the unit and for prospective units would be to expand the number of sessions over a period of week to create shorter sessions.

This was not unexpected because Lin et al's (1999) study mentioned that the students who worked on online training courses required at times the assistance of the tutor to solve quick queries. This was an issue that in Pereira's (2012) study was addressed by allowing learners to receive advice and tips, for their oral production, and by watching a parallel, exercise-synchronized video.

5.4.2 The pedagogic environment, i.e. Moodle

Regarding the Moodle platform, the students could comment on both the positives and negatives (4.4.2). In general, the findings indicated that student views were positive about the visual stimulus of the exercises and about the fact that Moodle offered this option while making the experience quite fast. As a platform it was easy to use and a tutorial was also conducted for the students (4.4.2.3). However, it might have been useful to offer a manual for Moodle use or navigation that students could consult at home. This was mainly because students would at times need the tutor's explanations on how to get to a specific Moodle section (4.4.2.1). Section 5.4.3 which follows will focus on discussing the findings about the students' comments on the pedagogic tasks.

5.4.3 The pedagogic tasks (i.e. reading tasks and oral presentation)

The positives about the tasks included student satisfaction with the questions, the order of materials and their relevance to their needs. More specifically, students remarked that the tasks were successful in terms of providing EAP training (12 out of 13 students, section 4.4.3). The types of tasks that were most favored included quizzes, mazes, workshop activities, concept maps and matching exercises, whereas the least liked included reading comprehension and summarizing. In Silva's (2012) study, the learners were also able to use and produce material and tasks integrating text, image and voice in their individual or group projects. Although the learners were studying different languages (some groups were learning English and others Portuguese), all students

perceived these tools as essential for their progress, as evidenced in a survey carried out at the end of each course. This study was encouraging for the current project, since in our case students also had to integrate materials such as mind maps and diagrams and develop actual presentations from them. Regarding the two least liked exercises that are mentioned earlier, this might be due to the length of the academic article that students were working with as some felt that it was too long.

Regarding the negatives of the general task features, the students found that the major concern was the time available for the completion of tasks (Appendix 50). A number of tasks would take longer to complete and an alternative could be to assign them for homework. There was student preference for more quiz and maze format tasks due to their brief and informative character. This was also mentioned by Linardopoulos (2010), who conducted both short term and long term studies. His study is the only study that employed an environment very similar to the one of the current project for the training and delivery of oral presentations online and revealed the positive student performance at quizzes and maze format tasks and their attitudes towards the training.

The most time consuming were the term ranking exercises and the concept map creation tasks during Session 1. However, despite these notes, students were commenting on how various tasks would link to one another (i.e. the sequence of tasks in Session 2 and then how this linked with tasks in Session 3). Section 5.4.4 which follows will focus on discussing the findings about the students' comments on the scaffolding mechanisms.

5.4.4 The scaffolding mechanisms

The positives of scaffolding were that students found the features to invoke interest, to offer variety and to function and work properly during tasks (4.4.4). The most

successful scaffolding features to be recommended from this study were the forum, workshop, instructions and task examples. Workshop feedback was found to be useful in enabling students to identify problematic cases with their concept map creation tasks (4.4.4.3). This was also in line with the reported effectiveness of online peer-feedback in Lin et al's (1999) study, who had also concluded that peer feedback can improve the students' task performance. However, regarding the forum area, the students expressed a few concerns as they did not trust their peers' comments for anonymity reasons. This was not mentioned as a possible drawback of the specific feature in Fu's (2009) study, however, it was expected that students could be reserved for politeness reasons.

The negatives in the discussion about scaffolding mechanisms included that students would occasionally face navigation problems and would consequently not be able to locate concept map examples (scaffolds) within the training unit. This might have been because students needed additional time to adjust to this learning environment. Moreover, a possible suggestion for the types of feedback would be to introduce more example tasks to offer more scaffolding options to students.

In general, the study has contributed to a variety of areas. STI as an approach called for more exploration of potential applications which so far addressed grammatical aspects. The present study enhanced the fact that STI can address any aspect of language including the teaching of concepts to support EAP reading and speaking and that as an approach it can also have online applications. Moreover, as STI investigations have been employing tangible materials thus far, in the current study these representations were transferred in an online environment, with the form of concept maps. Therefore, the potential applications of concept maps for training purposes and especially online were also explored. Moreover, the online factor allowed for researching the affordances of Moodle as a space for EAP training and L2 teaching in general. This STI study has also

combined screen and audio recordings of online activity with 13 participants which yielded a large amount of qualitative data (given that in most STI studies a smaller number of participants in employed).

With regards to Moodle, the study has contributed into exploring whether it could help students develop their speaking and reading skills, if Moodle could foster work within the learners' ZPD and if its features could scaffold the learners' conceptual level. The potential of scaffolding to support online teaching and internalization of EAP concepts was also examined. The study has also contributed to research in the academic speaking field and particularly in oral presentations as most of the studies so far were focusing on seminar participation. More specifically, the role of verbalisations during oral presentations for speaking development was explored and whether verbalisations could be used to assess conceptual development by using retrospective self-regulation and verbalization tasks. To this end, Bloom's taxonomy was also revised to adhere to SCT principles and explore critical thinking and conceptual development. This could have future applications in other fields apart from Applied Linguistics such as in broader educational research studies.

The following section will offer a conclusion for this study by focusing on the most important findings and messages. It draws conclusions based on the discussion of the research results of the main study presented in Chapters 4 and 5. Limitations about the main study will also be discussed along with the implications of these findings for online EAP teaching within a SCT framework.

6. Conclusion

This chapter draws conclusions based on the discussion of the research results of the main study that were discussed in Chapter 5. Limitations regarding the main study are also acknowledged and addressed. Moreover, the implications of these findings for the teaching of L2 English within an academic context are also discussed. Finally, recommendations for further research on the topic are suggested.

6.1 Pedagogical Implications - STI

The present study has a number of implications for the employment of Systemic-Theoretical Instruction in the English language teaching field and for EAP training in general. The findings of the study are not particular to Applied Linguistics but could also be applicable to other disciplines. The following two sections will summarise how EAP concepts were perceived as mediational tools in this study and how their materialization drove the learners' conceptual development forwards.

6.1.1 EAP concepts as mediational tools

The implementation of STI in this study as a mediational tool for enhancing EAP training, demonstrated that learners were able to develop a deeper conceptual understanding of the academic articles they were working on. In the findings of the study, learners demonstrated the ability to provide detailed oral presentations on the topics of

the academic articles they were working with that included instances of functioning at a higher mental level in their post-tests following their STI sessions. Moreover, all learners benefited from the STI approach as they could make connections between the pieces of information presented during their EAP training which they did not appear to be aware of in the initial stage of the study.

6.1.2 Materialisation of concepts as tools for driving conceptual development

Another fundamental aspect of STI is the role of concept maps and other organisers in fostering learners' understanding of the EAP concepts in question and to achieve a higher level of conceptual development in a field. Within the STI approach in this study, learners were exposed to Schemata for orienting their basis of action (SCOBAS) in the form of concept maps to help them gain a deeper understanding of the presented concepts, of the main academic article and oral presentation structure and of the concept meaning relations. The maps could be used to influence the processes students use to understand an academic text: asking students to create maps that depict academic article structure (Fig. 3.14), maps that reveal the relationships and connections between the main concepts of the article (Appendix 11), or even constructing maps that show the processes and the steps one needs to take to write a summary or to create a presentation (Fig. 3.13). Another important function of the maps was to organize the students' ideas when delivering an oral presentation during the pre and post-treatment tasks.

To capture conceptual development within an EAP context Bloom's taxonomy of cognitive abilities was revised in order to reflect the principles of the STI approach. This modified version of the taxonomy is in line with a process of development seen through a

SCT prism and as being closely linked to higher order cognitive processes. It can be employed to support understanding of critical thinking and conceptual development by analyzing the learner's interactions within their ZPD, with other tools such as the computer or within their social interactions.

As the ultimate goal of STI is to help L2 learners realize that they can use language to convey their meanings and communicative needs (within an academic environment in the present study), materials and approaches to EAP teaching should be aimed at creating awareness about the meanings implied by certain linguistic choices. Moreover, a further goal of STI is to ensure that learners will progress at a conceptual level and perform specific tasks, for instance without relying on the initially provided material support of the concept maps. Accordingly, consideration on the construction of a didactic model or teaching cycle must also emphasize the promotion of semantic understanding of abstract concepts to allow learners to generalize their use of the acquired knowledge to fulfill their various communicative needs within their context.

6.2 Implications for Moodle online training and SCT pedagogies:

There is a number of implications for the application of SCT pedagogies on Moodle online training. The following sections will outline the main considerations one should take into account to provide successful EAP training in online environments, to create a successful online course, and the guidelines for providing effective online scaffolding.

6.2.1 for creating an EAP online pedagogic unit and for task design

Upon conducting and completing the present study, I would like to make some suggestions on specific guidelines that an online Pedagogic Unit should follow on Moodle to potentially support a successful online course but also for ensuring that the designed tasks can be successful. The guidelines that will be provided would potentially guide the creation of online courses that fall under the SCT framework pedagogies.

With regards to creating an effective STI online Pedagogic Unit, course designers should ensure at first that specific principles are followed. More specifically, in the present study Galperin's spiral model was followed (see 3.3) and it was translated into the 2 main phases for the online Pedagogic Unit:

1. Orienting in the purpose of the Pedagogic Unit; that is, explaining to students the importance of distinguishing between academic genres, involving the students in the process of creating an accessible collection of step-by-step guidelines for academic reading comprehension and speaking production.
2. Main training (i.e. the tasks and the simulated presentation). These phases encompassed general problem situation questions for the training. These included for instance how we can best understand academic articles and the delivery of an academic presentation.

With regards to successful task design, the findings of the present study have indicated that the sub-goals for the tasks should be classified as follows:

1) Acting at the material level - Solving a problem materially and through a modeling process (i.e. producing visual, graphic or schematic representations like diagrams of concepts after in-depth discussion of concepts).

2) Acting at a verbal level - Performing the task verbally (i.e. negotiation for the modification of models, explaining ideas to self).

3) Acting at the mental level by generating possibilities and hypotheses and by cognitive planning (i.e. planning the delivery of a presentation, etc.).

4) Application of the models (delivering the actual presentation based on comprehension of the reading materials – academic article).

6.2.2 for designing online scaffolding

When creating a Moodle pedagogic course to provide online training it is essential that different forms of online support and assistance should be provided to the users of the course. This should enable students to solve problems while performing tasks that would otherwise hinder or delay their progress and learning.

In the present study, scaffolding the students' performance was provided through Moodle tasks on two levels: the "vertical" and the "horizontal" ones. Scaffolding on the vertical level refers to the "total project scope" scaffolding whereas horizontal scaffolding provides blueprints of what to do at each stage in the sequence described by the vertical scaffolding (Whitehouse: 2007: 2). Moreover, Lin et al.'s (1999) and Fu's (2009) scaffolding frameworks were incorporated and the scaffolding techniques and associated designs included the following:

- Reflective social discourse (i.e. comment boxes, peer-evaluation, notification system with message alerts)

- Process prompts (i.e. built-in hints for the completion of the tasks)
- Process displays (i.e. task completion and progress indicators, learner portfolios)
- Process models (i.e. accessing exemplary answers, concept maps, external links, etc.)
- Customizable options: sets of criteria for peer – assessment, sets of exemplary answers

The findings indicated that process models and reflective social discourse scaffolding features were very popular and successful online. Moreover, it was found that the provision of scaffolding at a teaching unit level or at a task level was also successful. For the purposes of the Pedagogic Unit and the training programme (section 3.5.7) scaffolding procedures and tools were designed at two levels, according to Whitehouse (2007):

(1) At a pedagogic and teaching unit level (macro-level); the scaffolding which was provided by means of a variety of resources was quite successful and included (in rank of success): the forum discussion area, the glossary that the students were asked to create, and the workshop area that was used for peer-assessment of the students' submitted work.

(2) At a task level (micro-level); the design for each task included a series of scaffolding mechanisms to provide graded and contingent assistance (Wood, 2001: 280) to the participants; there were clear instructions for task completion, examples of how the task should/could be completed and feedback comments were programmed to be provided by Moodle in certain cases right after students completed the whole task (i.e. for a quiz where the students had to select the correct answer) or after each task stage (i.e.

when the students completed a maze task and each question and answer would count). In some cases, it was also successful for scaffolding to be offered by re-directing students at an external link where they were able to view an example of a mind – map for instance.

6.3 Limitations of the study and recommendations for future research

The study has investigated STI, a pedagogical model based on Vygotsky's principles, as a mediational tool for enhancing the teaching of L2 English within an academic context. It has also examined the role of scaffolding as a part of STI in relation to online teaching environments for L2 conceptual development.

This study employed a comparatively larger group of participants to those studies reported within the STI and SCT field. It was an initial exploratory effort to apply STI in online environments and explore its potential to foster development. However, to ascertain the degree of effectiveness of STI as a pedagogical model for L2 English and EAP training in relation to other pedagogical approaches it is essential that further research, based on experimental research designs is conducted. Further studies, might also make use of a control group to measure development.

Unlike traditional, cognitive and skills-based approaches to EAP teaching-learning lessons that consist of many sessions, in the present study the main STI treatment session was short (i.e. three main treatment sessions). However, given that most of the current published studies to date that follow an STI approach are also short-term and that in the EAP field interventions tend to be of a smaller scale (i.e. pre-sessional courses), the implementation of the present study's intervention is useful and necessary.

This is in order to speculate about the effectiveness of similar programs in situations where students are required to develop skills within a short period of time.

Moreover, the materialization activity in this study (i.e. concept map creation) was restricted to the learners' overt interpretation of their conceptual understanding of the academic article. As it was the main aim of the study to ascertain the role and value of materialization to promote L2 development, the only opportunity for the learners to make use of their conceptual knowledge in context relevant situations was the oral presentations that they delivered (at a pre- and post-treatment stage). This functioned as a way of further promoting internalization of the target higher mental functions and ultimately transferability of this type of knowledge. However, as learners in this study demonstrated conceptual development that was reflected in their post-treatment retrospective tasks and oral presentations, it can be concluded that they have been able to effectively progress conceptually but a delayed perhaps intervention would have also been useful in terms of exploring the wider use of this conceptual knowledge. The tasks that asked students to retrospect about their understanding of their readings might have also been affected by the students' willingness to adopt mental processes and please the researcher or by the retrospection technique limitations (3.6.1.1).

Findings from the study also indicate that further research is required to establish whether other online learning environments offer more appropriate spaces for online training or perhaps more advanced types of scaffolding during the learners' online training. Moreover, as most of the current EAP research has focused on researching the development of specific skills online (i.e. mostly listening, reading and writing), more studies researching the development of academic oral presentation and speaking skills courses online should be conducted.

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Appendix 1: Academic article scans

2

The role of feedback

Shawn Loewen

Historical discussion

Negative feedback in second language (L2) learning has been of considerable interest to SLA researchers, generating a substantial amount of research (Ammar and Spada, 2006; Ellis *et al.*, 2001; Ellis *et al.*, 2006; Ishida, 2004; Iwashita, 2003; Leeman, 2007; Loewen, 2005; Loewen and Philp, 2006; Lyster and Izquierdo, 2009; Lyster and Ranta, 1997; Mackey, 1999; Mackey and Philp, 1998; Nassaji, 2009; Philp, 2003; Sheen, 2008; *inter alia*). Negative feedback, also known as corrective feedback and error correction, has typically been defined as information provided to learners about the ill-formedness of their L2 production. Feedback may occur in response to learners' oral or written production, with oral feedback usually occurring immediately during interaction while written feedback is often provided some time after a text has been produced. Because of the differences in modality and timing of feedback, only oral feedback will be considered in this chapter. For a comprehensive overview of written feedback, see Polio (Chapter 19, this volume).

Before considering the role of feedback in L2 acquisition, it is important to note that negative feedback, particularly recasts, has been investigated in first language (L1) acquisition. Studies of child-adult interaction have found corrective feedback to occur; nevertheless, considerable debate surrounds the efficacy of corrective feedback for L1 learning (e.g., Bohannon *et al.*, 1996; Farrar, 1992; Morgan *et al.*, 1995; Saxton, 2005). Similarly, negative feedback has assumed an important, although controversial, role within communicative approaches to L2 instruction as a means of drawing learners' attention to accurate language use without disrupting communicative classroom interaction. Historically, communicative language teaching generally rejected negative feedback because it was viewed as hindering learners' attempts to communicate freely as well as being ineffective for developing implicit L2 knowledge (e.g., Krashen, 1985). However, research in content-based and immersion instruction contexts revealed that while learners often reached high levels of L2 fluency, they did not achieve correspondingly high levels of grammatical accuracy, even on frequently occurring linguistic structures. Consequently, researchers began to reconsider the role of explicit attention to language in the classroom.

Negative feedback fits broadly within the research interests of instructed SLA (Williams, Chapter 33, this volume), with theoretical support coming from an information processing view of SLA, concerned with L2 input, intake, mental representations, and output. In particular, interactionist approaches to SLA value the role of negative feedback (Gass, 1997; Gass and Mackey, 2007). Additionally, several theoretical perspectives such as socio-cultural theory (Lantolf and Thorne, 2007; Ohta, 2000) and skill acquisition theory (DeKeyser, 2007) posit roles for feedback. However, because of the extensive investigation of feedback from an interactionist paradigm, this review will concentrate on that approach.

Early interactionist studies identified negotiation of meaning as an important component of the learning process, as L2 learners and their interlocutors interactionally modified their utterances in an attempt to achieve mutual understanding (e.g., Varonis and Gass, 1985). Negative feedback began to assume increased importance in this paradigm with the advent of focus on form (Long, 1991, 1996; Long and Robinson, 1998), which advocated spontaneous and brief attention to linguistic items in response to learners' problematic utterances within meaning-focused interaction. In this way, the use of negative feedback allowed L2 learners to integrate attention to meaning and form in ways that did not occur in focus on meaning instruction, which neglected linguistic accuracy, or in focus on forms instruction, which taught discrete linguistic forms apart from a communicative context. Following this early conceptualization of the importance of L2 interaction and focus on form, there has been a plethora of research investigating the occurrence and effectiveness of negative feedback. The next section discusses the core issues addressed by this research.

Core issues

Does feedback occur naturally in the L2 classroom?

An important initial question about L2 feedback regards its existence in L2 interaction. Descriptive studies of naturally-occurring feedback in L2 classrooms have examined a variety of contexts, including immersion, ESL, EFL, and university language classes. In both communicative and more traditional L2 instructional contexts, negative feedback has been found to occur (Ellis *et al.*, 2001; Lyster and Ranta, 1997; Yoshida, 2008); however, studies have also shown that negative feedback does not occur with equal frequency in all contexts. For example, Zyzik and Polio (2008) found that feedback was virtually absent from content-based university Spanish classes. Furthermore, Loewen (2003) discovered differences in the amount of feedback within 12 different classes at the same language school. He also found that some students did not receive any feedback during his observations, whereas others received feedback on numerous occasions. Nevertheless, these descriptive studies demonstrate that negative feedback occurs, to varying degrees, in a variety of L2 classroom contexts.

What are the characteristics of naturally-occurring feedback?

Considerable research has investigated the features of negative feedback. In an early study, Chaudron (1977) developed an extensive negative feedback taxonomy, including categories such as repetition of the error with or without changes, prompts, and explanations. Lyster and Ranta (1997) refined these categories to six: recast, elicitation, repetition, metalinguistic feedback, explicit correction, and clarification requests. Subsequently, in an attempt to move from descriptive categorization of discourse features to a more psycholinguistically-motivated taxonomy, Ellis *et al.* (2001) identified three main types of negative feedback: recasts, elicitations, and metalinguistic feedback. Most recently, Ellis (2008) has reduced the categories to either input-providing feedback or output-promoting feedback. Definitions of several key feedback types will now be discussed.

Probably no type of feedback has received more attention than recasts, a type of input-providing feedback that correctly reformulates a learner's erroneous utterance but maintains the learner's intended meaning (Nicolas *et al.*, 2001; Lyster and Ranta, 1997). Recasts are the most common feedback method in the classroom (Davies, 2006; Ellis *et al.*, 2001; Havranek, 2002; Loewen and Philp, 2006; Lyster, 1998a; Lyster and Mori, 2006; Lyster and Ranta, 1997; Yoshida, 2008). Proponents of recasts argue that they are beneficial for L2 learning because they are unobtrusive, occur immediately after the error and provide the opportunity for learners to compare their erroneous utterances with target-like forms (Long, 2007). A recast is found in Example 1.

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Example 1: Recast

- S: to her is good thing (.) to her is good thing
 T: yeah for her it's a good thing
 S: because she got a lot of money there

(Loewen and Philp, 2006: p. 538)

Recent work (Ellis and Sheen, 2006; Loewen and Philp, 2006; Sheen, 2006) has suggested that recasts are non-monolithic in nature, and that they can differ in features such as length, prosody, and number of errors corrected. In general, recasts tend to isolate the error and to contain declarative intonation (Kim and Han, 2007; Loewen and Philp, 2006; Lyster, 1998b), although other patterns have also been observed.

Apart from recasts, elicitations are another relatively frequent type of negative feedback (Ellis *et al.*, 2001; Lyster and Mori, 2006; Lyster and Ranta, 1997). Also referred to as prompts (Ammar and Spada, 2006; Lyster, 2004) or negotiation of form (Lyster, 1998a; Lyster and Ranta, 1997), elicitations are output-prompting and consist of various feedback moves, such as repetitions or clarification requests, that encourage learners to self-correct without providing them with correct linguistic forms. Proponents of elicitations argue that elicitations are less ambiguous in their corrective intent and that they also involve the learner in deeper cognitive processing because they require learners to self-correct. Of course, learners must have some knowledge of the structure to be able to self-correct. A typical elicitation is shown in Example 2.

Example 2: Elicitation

Teacher: *Il vit où un animal domestique? Où est-ce que ça vit?*

"Where does a pet live? Where does it live?"

Student: *Dans un maison.* "In a (masc.) house."

Teacher: *Dans? Attention.* "In ...? Careful."

Student: *Dans une maison.* "In a (fem.) house."

(Lyster, 2004: p. 405)

A third category of negative feedback is explicit correction, which can involve a direct indication that an utterance is incorrect and/or the use of metalinguistic terminology to indicate the nature of the error. Both types of explicit correction have been observed in the L2 classroom (Ellis *et al.*, 2001; Lyster and Ranta, 1997). An explicit correction is shown in Example 3.

Example 3: Metalinguistic feedback

Learner: He kiss her.

Researcher: Kiss—you need past tense.

Learner: He kissed her.

(Ellis *et al.*, 2006 p. 353)

An additional discursual feature related to feedback is the learners' responses to feedback, referred to as uptake (Ellis *et al.*, 2001; Lyster, 1998a; Lyster and Ranta, 1997). Uptake is of interest because learners' successful production of the correct form may be a possible indication of the effectiveness of feedback (Chaudron, 1977; Lightbown, 1998) particularly in light of Swain's output hypothesis (1995). Uptake has been found to occur in response to negative feedback, although its occurrence and success have been found to vary (Ellis *et al.*, 2001; Loewen, 2005; Lyster and Ranta, 1997; Mackey and Philp, 1998; Sheen, 2004).

Is feedback effective for L2 learning?

The effectiveness of negative feedback for L2 learning is contentious, despite its frequent occurrence in the L2 classroom. In spite of contrary arguments (e.g., Krashen, 1985; Truscott,

1999), there is mounting evidence that negative feedback can be beneficial for learners. For example, several meta-analyses (Li, 2010; Mackey and Goo, 2007; Russell and Spada, 2006) have found overall positive effects for corrective feedback. Nevertheless, the necessity of feedback for learning remains disputed (Ellis, 2006; Long, 2007), although there is some evidence that it might be necessary for learning some linguistic structures that are otherwise non-salient in the input and do not hinder communication (White, 1991).

What characteristics of feedback influence its effectiveness?

If negative feedback can be beneficial for L2 learning, the next question to consider is which features influence its effectiveness. Given Schmidt's (1995) noticing hypothesis, it is argued that learners must notice negative feedback in order for it to be effective. As a result, numerous studies have investigated the salience of different types of feedback. In particular, controversy exists regarding the salience of recasts. On one hand, their implicit and unobtrusive nature does not interrupt the flow of communication, thereby allowing learners to pay attention to form and meaning at the same time (Long, 1991, 1996, 2007). On the other hand, recasts may go unnoticed because they are not salient enough (Lyster, 2004; Truscott, 1999). Furthermore, the corrective intent of recasts may be ambiguous because of their multiple discursual functions (e.g., correction, confirmation check, or clarification request) and because teachers often repeat learners' correct utterances as well as recasting their incorrect ones. As a result, Nicholas *et al.* (2001) suggest that recasts are most effective when their ambiguity is diminished and their corrective intent is clear. Features that may influence recast salience include prosodic emphasis, intonation, segmentation, number of changes, recast length, and number of recasts (Loewen and Philp, 2006; Sheen, 2006).

In contrast to recasts, elicitations are generally viewed as a more explicit type of feedback, although it may be better to view explicitness as a continuum rather than a dichotomy. Elicitations are generally less ambiguous in their intent, and thus may be more salient as negative evidence. The most explicit type of feedback is explicit correction, and while detractors of explicit correction argue that it can be disruptive to communicative interaction, there is some evidence that more explicit feedback may be more effective for L2 learning (Ellis *et al.*, 2006; Norris and Ortega, 2000).

In an attempt to provide an explanatory statement regarding the salience of feedback, Lyster and Mori (2006) have proposed the counterbalance hypothesis which suggests that feedback will be more effective when it contrasts with a class's predominant communicative orientation. Accordingly, the more communicatively-focused the class, the more explicit the feedback needs to be. This hypothesis is awaiting further investigation.

Another issue in considering the effectiveness of feedback is whether it is effective because it provides positive evidence, negative evidence, or both. On the one hand, negative evidence, indicating that a linguistic construction is not possible, is argued to be a central component of corrective feedback (Long, 2007; White, 1991). On the other hand, positive evidence, consisting of exemplars of what is possible in a language, has also been shown to be an important component of corrective feedback (Leeman, 2003).

The effectiveness of feedback may also be contingent on the linguistic items targeted by that feedback. Any aspect of language can receive feedback, although grammar, vocabulary, and pronunciation are the most common targets in classroom contexts (Ellis *et al.*, 2001; Lyster and Ranta, 1997). In quasi-experimental studies, grammatical structures have been the primary focus, as can be seen in Table 2.1. Popular targets of inquiry have included English question formation and past tense, while fewer studies have been conducted in other languages or on other features. Furthermore, almost no research has investigated feedback on pragmatics or discourse features.

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Table 2.1 Linguistic features targeted in quasi-experimental feedback studies

<i>Linguistic Structure</i>	<i>Study</i>
ENGLISH	
Regular past tense	Adams (2007); Dabaghi and Basturkmen (2009); Doughty and Varela (1998); Ellis (2007); Ellis <i>et al.</i> (2006); Loewen and Erlam (2006); Mackey (2006); McDonough (2007); Nobuyoshi and Ellis (1993); Yang and Lyster (2010)
Past progressive	Révész and Han (2006)
Past-tense conditionals	Doughty and Varela (1998)
Irregular past tense	Dabaghi and Basturkmen (2009); Yang and Lyster (2010)
Tense consistency	Han (2002)
Questions	Adams (2007); Loewen and Nabei (2007); Mackey and Philp (1998); Mackey and Silver (2005); Mackey (1999, 2006); McDonough and Mackey (2006); Philp (2003); Spada and Lightbown (1993)
Locatives	Adams (2007)
Vocabulary	Adams (2007); Alcón and García Mayo (2008); Trofimovitch <i>et al.</i> (2007)
Backshifted verbs	Sachs and Suh (2007)
Articles	Muranoi (2000); Sheen (2007)
Definite article	Dabaghi and Basturkmen (2009)
Indefinite article	Dabaghi and Basturkmen (2009)
Zero article with abstract count nouns	Sauro (2009)
Comparatives	Ellis (2007)
Plurals	Dabaghi and Basturkmen (2009); Mackey (2006)
Relative clause	Dabaghi and Basturkmen (2009)
Voice	Dabaghi and Basturkmen (2009)
Third-person-s	Dabaghi and Basturkmen (2009)
Possessive determiners	Ammar and Spada (2006); Ammar (2008); Lyster (2004); Trofimovitch <i>et al.</i> (2007)
Multiple, incidental forms	Havranek (2002); Loewen (2005); Nabei and Swain (2002)
FRENCH	
Gender marking on articles	Lyster and Izquierdo (2009)
Gender marking on nouns	Lyster (2004)
SPANISH	
Noun adjective agreement	Leeman (2003); Sagarra (2007)
Direct object placement	Long <i>et al.</i> (1998)
Adverb placement	Long <i>et al.</i> (1998)
KOREAN	
Object relative clauses	Jeon (2007)
Honorifics	Jeon (2007)
Verbs	Jeon (2007)
Nouns	Jeon (2007)
JAPANESE	
Locatives	Iwashita (2003); Long <i>et al.</i> (1998)
Aspectual <i>-te i-(ru)</i>	Ishida (2004); Iwashita (2003)

Learners' proficiency levels are also a consideration, with studies suggesting that learners need to be developmentally ready to benefit from feedback (Mackey, 1999; Mackey and Philp, 1998; Trofimovitch *et al.*, 2007). Additionally, there may be an interaction between proficiency and type of feedback. For example, Ammar and Spada (2006) found that higher proficiency students benefited equally from recasts and prompts, while lower proficiency learners benefited more from prompts than recasts.

The timing of feedback is also important. Generally, feedback occurs immediately after an error, and this juxtaposition of incorrect and correct forms is argued to benefit learners (Doughty, 2001; Long, 2007; Saxton, 1997, 2005). However, delayed feedback is also possible, particularly in computer-mediated communication (CMC) where the nature of synchronous written chat often means that feedback is not contingent to the error (Smith, 2003).

A final potentially influential characteristic of feedback is the amount of feedback provided to the targeted feature. Long's (1991, 1996) original definition of focus on form does not specify the ideal amount of feedback. Indeed, the construct of incidental focus on form (Ellis, 2001; Loewen, 2005) assumes that a linguistic structure may receive only one feedback episode. By contrast, feedback treatments in quasi-experimental studies have ranged from 30 minutes to 120 minutes. In his meta-analysis, Li (2010) found that treatments of 50 minutes or less were significantly more effective than were longer treatments. Additionally, Havranek (2002) found no advantage for correcting the same linguistic error multiple times as opposed to correcting it only once. Further investigations into the effects of the intensity of feedback are needed.

What contextual characteristics of feedback influence its effectiveness?

In addition to features of the feedback itself, there are also contextual features that may influence the effectiveness of feedback. These factors will be considered in turn.

Instructional variables. Negative feedback studies have been conducted in contexts, such as immersion classes, language school classes, and laboratories. One possible explanation for differences in results has been these varying contexts. For example, studies of immersion classes (Lyster 1998a,b; Lyster and Ranta, 1997) have found lower rates of feedback and uptake than studies conducted in communicative classes in language schools (Ellis *et al.*, 2001; Loewen, 2003; Sheen, 2004), and these differences have been suggested to be due to the learning goals of each environment. Additionally, concerns exist about the generalizability of laboratory studies to the classroom context; however, Gass *et al.*'s (2005) comparison of tasks in both a laboratory and classroom context found no differences in the interactional patterns between the two. Finally, studies have also begun to investigate, both descriptively and quasi-experimentally, negative feedback in CMC contexts (Loewen and Erlam, 2006; Sachs and Suh, 2007; Sagarra, 2007; Sauro, 2009).

Interlocutor variables. The role of the interlocutor in providing feedback can be another mediating variable. In most classroom studies, teachers have provided the majority of feedback (Oliver, 2000; Zhao and Bitchener, 2007). However, learners can and do provide feedback to each other, and while most of this feedback is accurate, there are instances of learners providing incorrect feedback (Adams, 2007). The accuracy of teacher feedback has not been investigated.

Other interlocutor variables, such as gender, L1 status, and age, have been investigated both separately and jointly. Studies of gender have found both differences between males and females (Ross-Feldman, 2007) and no differences (Oliver, 2002). Regarding the L1 or L2 speaker status of the interlocutor, several studies found differences, such as more negotiation in non-native speaker (NNS) dyads (Oliver, 2002) and more elicitations from L2 speakers and more reformulations from L1 speakers (Sato and Lyster, 2007). Additionally, age has been considered as a variable

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since it is possible that the differing cognitive aspects of children, adolescents, and adults may influence the effectiveness of feedback. Several feedback studies have investigated pre-adolescent learners and found that children can and do both provide and receive feedback (Mackey and Silver, 2005; Oliver, 2000, 2002) although it is not always in the same amount or type as adults (Oliver, 2000). Additionally, Mackey *et al.* (2003) found an interaction between L1 status and age, with adults native speakers providing significantly more feedback than NNS; however, for children there was no difference in the provision of feedback, although there was significantly more modified output in response to NNS.

One final interlocutor variable is whether learners are the direct recipients of feedback or merely observers of it. Some studies suggest that observers do not notice feedback as well as those who are the direct recipients of it (Mackey, 1999) while other studies suggest that observing feedback is as beneficial as receiving it (Havranek, 2002; Kim and Han, 2007; Ohta, 2000).

Data and common elicitation measures

In order to investigate these core issues, researchers have employed a number of different methodologies, which will be described in this section.

Oral production

One of the most important types of data for feedback research is oral production, with the utterances of both feedback provider and feedback recipient receiving attention. Considerable research has investigated the amount and types of feedback in naturally-occurring classrooms (Chaudron, 1977; Ellis *et al.*, 2001; Loewen, 2003; Lyster, 1998a,b; Lyster and Ranta, 1997; Sheen 2004; Yoshida, 2008). Such studies have high ecological validity because they describe actual classroom discourse. However, these studies are limited in the conclusions that they can draw about the effectiveness of feedback since they do not employ measures of L2 learning.

In addition to classroom observations, researchers have also investigated the occurrence of feedback in more controlled, laboratory contexts. In this way researchers have been able to investigate feedback variables in a more systematic and intentional manner. Laboratory-based studies can be either descriptive or quasi-experimental, with the former generally involving dyads of speakers that have been chosen according to specific characteristics, such as L1, age, sex, proficiency level, etc. Researchers then can describe the amount and types of feedback that occur given these different variables.

The utterances produced in both classroom and laboratory contexts have been analyzed using several similar taxonomies that take into account all or some of the following categories: the erroneous utterance that triggers the feedback, the feedback move itself, and the optional response to the feedback. The triggers are often coded for the general types of linguistic errors they contain, whether morphological, syntactic, phonological, or lexical. The feedback moves have been coded using taxonomies that attempt to categorize every type of feedback move or that attempt to differentiate only characteristics that may influence the learning potential of the feedback. Finally, some studies have investigated learners' responses to the feedback, which has alternatively been called repair, successful uptake, or modified output.

Measurements of learning

While descriptive studies of learner interaction have contributed to our understanding of how feedback occurs, these studies do not provide information about the effectiveness of the feedback, apart from learners' production of uptake. Therefore, quasi-experimental studies have used pre-

test, treatment, post-test designs to investigate the issue of learning, which can be operationalized in terms of increased accuracy or progress along an acquisitional sequence (Ellis, 2006).

Measures of accuracy. The majority of the studies of negative feedback have operationalized learning as increased accurate use of the targeted linguistic items, with several different types of instruments used to measure accuracy (Doughty, 2003).

Production tests. A common method of measuring accuracy is by eliciting learner production of the targeted linguistic items. Oral production tests, some with the same design as the treatment tasks, are often used (Ammar and Spada, 2006; Loewen and Nabei, 2007; Long *et al.*, 1998; Lyster, 2004; Lyster and Izquierdo, 2009; Mackey and Silver, 2005; Mackey, 2006; Sachs and Suh, 2007; Spada and Lightbown, 1993; Trofimovitch *et al.*, 2007). Such tasks include information gap, picture description, and spot-the-differences tasks. After the learner production is recorded, it is generally coded using a target-like use analysis to arrive at a percentage of accurate use (Ellis and Barkhuizen, 2005). In addition to oral production tasks, some studies have also employed written production tasks (Han, 2002; Lyster, 2004; Révész and Han, 2006; Sagarra, 2007). Other types of production tests include sentence creation (Sagarra, 2007), fill-in-the-blank (Révész and Han, 2006), and meta-linguistic knowledge tests (Ellis, 2007). Finally, some studies have examined learners' subsequent production of targeted forms in classroom interaction (Havranek, 2002; Loewen, 2007).

A drawback of many production tests is that it is not always possible to ensure production of the desired linguistic items, as learners can be very adept at avoiding using them. Consequently another option is to use an elicited imitation test in which learners are provided with oral stimuli that include either grammatical or ungrammatical exemplars of the target structure; learners are then asked to repeat the items correctly (Ellis, 2007). Imitation tests arguably force learners to draw on their implicit L2 knowledge in order to reconstruct the sentence.

Grammaticality judgment tests. Numerous studies have used grammaticality judgment tests (GJTs) to measure gains in learners' ability to identify grammatical and ungrammatical sentences. An advantage of GJTs is that they can test the specific structures targeted in the feedback treatment; however, there has been concern that GJTs may be better measures of learners' explicit, rather than implicit, L2 knowledge. In addition, GJTs are receptive, decision-making tasks and do not elicit learner production of the target form. These limitations have been countered in numerous studies by the use of both GJTs and other types of tests (Ellis, 2007; Ellis *et al.*, 2006; Loewen and Nabei, 2007; Long *et al.*, 1998; Sachs and Suh, 2007).

Individualized, tailor-made tests. The previous tests are generally administered to measure the effects of feedback on a particular linguistic item. However, spontaneous feedback can target various and multiple linguistic items within one activity. In these instances the standard pre-test/post-test design is not feasible because the targeted linguistic items are not known ahead of time, and thus cannot be pre-tested. In these cases, post-hoc tailor-made tests have been used to specifically test individual students on the linguistic items that they themselves received feedback on (Adams, 2007; Dabaghi and Basturkmen, 2009; Egi, 2007b; Havranek, 2002; Loewen, 2005; Nabei and Swain, 2002; Williams, 1999). Test features may include production of the correct form, multiple choice, GJT, etc. Recently, Nassaji (2009) has attempted to pre-test linguistic items that subsequently receive spontaneous negative feedback by having learners perform the same task as a written pre-test and then an oral treatment session. This innovative design shows some promise, although not all linguistic errors in the pre-test received feedback during the oral interaction.

Measures of development

Developmental stages. Another way of investigating the effectiveness of feedback is by examining learners' progress through developmental stages (Pienemann and Kefler, Chapter 14, this

volume). Often studies use similar language production instruments as those in studies that measure accuracy. In fact, both accuracy and development are sometimes investigated in the same study. Thus, it is the analysis of the data that differs. Rather than employing a target-like use analysis, researchers code the different linguistic stages found in the data. Increased use of higher stages, rather than increased accuracy, is viewed as a sign of learning. Studies have looked at learners' progression through stages of English question formation (Loewen and Nabei, 2007; Mackey, 1999; Mackey and Silver, 2005; Spada and Lightbown, 1993) and possessive determiners (Ammar, 2008).

Some studies distinguish between measuring learners' accurate production of linguistic stimuli that were used in the treatment (sometimes called "old" items) as well as novel stimuli that did not occur in the treatment session, in order to investigate learners' ability to generalize the feedback to new linguistic items (Ellis *et al.*, 2006; McDonough, 2007; Sagarra, 2007; Sauro, 2009).

Timing of tests. Another issue, in addition to the types of instruments used to measure L2 learning, is the timing of their administration. Most quasi-experimental studies include, at minimum, a pre-test and a post-test. Immediate post-tests may occur up to one or two days after the treatment, while delayed post-tests may occur anywhere from one week to several months after the treatment. Given that several studies have found effects on delayed post-tests but not on immediate post-tests (Ellis *et al.*, 2006; Mackey, 1999) and that some researchers argue that the effects of feedback may not be evident immediately, delayed post-testing is considered important.

Introspective measures

Because noticing is such an important construct in the theoretical support for negative feedback, recent research has begun to investigate the cognitive processes that learners engage in during negative feedback. Mackey (2006) operationalized noticing as "a learner's report indicating a mismatch between the target language form and the learner's non-target-like production or comprehension" (p. 413). Again, several different types of instruments have been used, sometimes within the same study, to elicit this information.

Sometimes learners are simply asked to report what they have noticed during interaction sessions by using learning journals or interview questions (Alcón and García Mayo, 2008; Mackey, 2006). Similar to self-report, stimulated recall has also been used to measure noticing (Gass and Mackey, 2000). While self-report relies entirely on learners' memories of the interaction, stimulated recall provides stimuli in the form of video or audio clips of negative feedback episodes that occurred in class. After viewing the clips, learners are asked to verbalize their thoughts at the time of feedback. If learners mention the targeted linguistic structure or the corrective nature of the interaction, this is taken to be evidence of noticing. There have been several studies employing stimulated recall of student's thoughts (Egi, 2004, 2007a, 2007b; Mackey *et al.*, 2000; Mackey *et al.*, 2002; Mackey *et al.*, 2007).

In an effort to avoid the memory decay that can occur in stimulated recall, several studies (Bigelow *et al.*, 2006; Philp, 2003) have used immediate repetition as a measure of learners' noticing of recasts. After a recast is given, the researcher knocks on the desk as a signal for the learner to repeat the last few words that they remembered hearing. If the repetition includes the correct form, this is taken as evidence of noticing.

Similar to immediate repetition, immediate report attempts to investigate learners' cognition as close to the time of feedback as possible. Learners also hear a knock after feedback, but instead of repeating what they just heard, they are asked to verbalize any thoughts they remember from the immediately preceding interaction. After the report, the communicative interaction continues.

Egi (2004, 2007a) has compared immediate report (occurring during the interaction) and stimulated recall (occurring after the interaction) and found that the two groups did not differ in subsequent production of the targeted form; however, stimulated recall protocols were longer than the immediate reports, and memory decay was an issue for stimulated recall participants.

Other measures

While noticing and learning have been the two main constructs investigated directly in negative feedback research, several additional constructs related to individual differences have been investigated as potential moderator variables in the effectiveness of negative feedback. These variables include analytical ability, phonological memory, working memory, and attention control (Mackey *et al.*, 2002; Trofimovitch *et al.*, 2007). It is beyond the scope of this chapter to discuss in detail the measurement of these constructs.

Empirical verification

Is feedback beneficial? There are three main indicators of the effectiveness of feedback which will be considered in this section: uptake, noticing, and learning.

Uptake. It has been argued that uptake/modified output is a possible indication that feedback has been noticed and a possible facilitator of learning (Chaudron, 1977; Ellis *et al.*, 2001; Lightbown, 1998; Swain, 1995). Studies have found that feedback can result in successfully modified output (Sagarra, 2007), although factors such as age (Oliver *et al.*, 2008) and instructional context (Lyster and Mori, 2006) can influence the amount of modified output. In addition, recasts generally have lower uptake rates than do elicitations or more explicit feedback moves (Davies, 2006; Lyster and Ranta, 1997). Some studies suggest a relationship between modified output in response to feedback and learning (Loewen, 2005; McDonough, 2005); however, other studies have not found such a relationship (Mackey and Philp, 1998) or have found it to be tenuous (Alcón and García Mayo, 2008).

Noticing. Given that noticing is argued to be an essential cognitive process for L2 learning, and since interaction and negative feedback are claimed to draw attention to linguistic items, a number of studies have investigated the noticeability of negative feedback. Several studies have shown that learners can notice recasts, with noticing operationalized as discussed earlier. Multiple studies have found that shorter recasts with fewer changes are more noticeable (Egi, 2007a; Kim and Han, 2007; Philp, 2003). Also, learners who were developmentally ready were more likely to notice recasts (Philp, 2003). Kim and Han (2007) found that students were largely able to identify the intent of the recasts, as indicated by the teachers. However, Mackey *et al.* (2007) found that learners noticed the correct intent more for explicit feedback and interrogative recasts, while declarative recasts and combinations of feedback had lower rates of noticing. Egi (2007a, b) found that feedback was more beneficial when learners noticed the linguistic nature of the feedback, as either positive or negative evidence, rather than viewing the feedback as a response to content alone. However, several studies have argued that recasts are less noticeable. For example, Lyster's (1998b) study found that teacher repetitions and teacher recasts occurred in roughly equal proportions, suggesting that the corrective nature of the recast is ambiguous. Nevertheless, Mackey (2006) found a significant association between reports of noticing and linguistic development, leading her to conclude that "these data seem to point to a relationship between noticing and learning of question formation" (p. 422).

Several studies have found that feedback on certain aspects of language are noticed more frequently than others, with most reporting that feedback targeting morphological and syntactic errors is more difficult to notice than lexical and phonological errors (Carpenter *et al.*, 2006; Gass and Lewis, 2007; Kim and Han, 2007; Mackey *et al.*, 2000; Trofimovitch *et al.*, 2007). However, Egi (2007a) found similar levels of perception for morphosyntax and lexis, with a possible explanation being that morphosyntactic recasts in her study were more frequent and more consistently targeting the same structures than were recasts in other studies. In Mackey *et al.* (2007) students recognized the corrective intent of feedback most for morphology/lexis, next for syntax, and least for phonology.

In addition, studies have investigated the role that the student plays in the discourse, whether they are the direct recipient of the feedback or only an observer. Mackey *et al.* (2007) found a higher percentage of recognition of feedback for primary recipients, although observers also indicated noticing feedback. In contrast, Ohta (2000) was more positive about the benefits of recasts for observers, finding that observers of negative feedback often produced the target form in private speech, suggesting that recasts can be salient, and that learners were sensitive to the corrective nature of the recasts. Kim and Han (2007) found no difference in receivers' or observers' ability to notice recasts.

Finally, as for the impact of individual differences on noticing, Trofimovitch *et al.* (2007) did not find that individual factors such as attention control, phonological/working memory, or analytical ability influenced the level of noticing. In contrast, Bigelow *et al.* (2006) and Tarone and Bigelow (2007) found that participants with higher alphabetic print literacy skills recalled recasts better. Mackey *et al.* (2002) found a positive correlation between noticing and working memory capacity.

L2 learning. Multiple studies have investigated the effects of negative feedback for L2 learning. In general, studies have found an effect for feedback, although there are exceptions (e.g., Loewen and Erlam, 2006). Some studies have investigated the effects of feedback without comparing them with other feedback groups or interaction-only groups and found that feedback improves learners' subsequent ability to use the structures. These studies include some of mixed types of feedback on various incidentally targeted linguistic items (Loewen, 2005), mixed types of feedback on specific linguistic structures (Adams, 2007), and specific types of feedback, such as recasts on specific linguistic structures (Révész and Han, 2006; Sachs and Suh, 2007; Trofimovitch *et al.*, 2007).

Other studies have found that feedback was more effective than interaction alone, but they did not compare different types of feedback (Mackey, 1999; Mackey and Silver, 2005). Several studies found that interaction with recasts or a combination of feedback types were better than interaction without feedback (Doughty and Varela, 1998; Han, 2002; Sagarra, 2007), and at least one small-scale study found that clarification requests were more effective than no feedback (Nobuyoshi and Ellis, 1993).

Additional research has compared different types of feedback along with a control group, and found that while feedback was effective, there was no difference for the type of feedback (Ammar and Spada, 2006; Loewen and Nabei, 2007; McDonough, 2007). However, not all studies have found feedback to be equally effective. Several studies have found metalinguistic feedback or explicit feedback to have a significantly larger effect on post-test performance than other types of feedback such as recasts (Dabaghi and Basturkmen, 2009; Ellis *et al.*, 2006; Sauro, 2009; Sheen, 2007). However, Sauro (2009) found that the effect for metalinguistic feedback was only present on test items that were included in the treatment sessions; learners were not able to generalize to novel items in the test stimuli.

Some studies have found an overall effect in favor of prompts, which elicit self-corrections from learners rather than providing them with the correct form (Ammar, 2008; Havranek, 2002; Yang

and Lyster, 2010). However, at least one study (Nassaji, 2009) has found that recasts resulted in higher accuracy scores than did elicitation, particularly on immediate post-tests. He also found that more explicit types of feedback, whether recasts or elicitation, resulted in higher accuracy scores.

In addition to studies that have investigated the effects of feedback by itself, several studies have investigated the effects of feedback plus other instructional interventions. For example, Lyster (2004) included form-focused instruction (FFI), as well as prompts and recasts, as variables in his investigation of their effects on the learning of French gender. He found that while FFI was beneficial, FFI with prompts was the most effective. In contrast, Lyster and Izquierdo (2009) in a study that included FFI plus feedback (either recast or prompt) found no difference in their effectiveness.

Other factors influencing the effectiveness of feedback. In addition to types of feedback, some studies have investigated the moderating effects of other variables on L2 learning. For example, the proficiency level of learners appears to be an important factor, with higher proficiency learners more able to benefit from feedback (Ammar and Spada, 2006; Mackey and Philp, 1998; Trofimovitch *et al.*, 2007).

Other individual difference variables have been investigated. For example, Mackey *et al.* (2002) suggest that low working memory scores were associated with initial interlanguage development, but learners with higher working memory scores showed more development on delayed tests. Sagarra (2007) found that higher working memory was associated with development of linguistic accuracy for the recast group but not the control group. Trofimovitch *et al.* (2007) found that, while phonological memory and analytical ability contributed to learners' improvement, attention control was the highest significant predictor of accuracy. Sheen (2007) found that language analytic ability correlated with accuracy scores for learners who received metalinguistic feedback but not for those who received recasts. Finally, Sheen (2008) found that, in general, feedback was more effective for learners with lower levels of anxiety. While these studies of individual differences are insightful, they are not sufficient in number to permit the types of generalizations made possible by synthetic analysis. As a result, meta-analyses such as Russell and Spada (2006), Mackey and Goo (2007) and Li (2010) have investigated the general effectiveness of corrective feedback; however, they have not been able to systematically explore such individual differences.

Applications

The role of negative feedback is highly relevant for instructional contexts, with existing research suggesting that teachers can effectively incorporate it into their more communicative activities. However, the question of what type of negative feedback is most effective is less clear, as the previous review of studies has shown. Given that there is no consensus on the superiority of one type of feedback over another, it could be best to include a variety of feedback options. In addition, there is some evidence that suggests that if teachers go to the effort of providing negative feedback, they should also ensure that students produce the correct forms.

One problem with using research as a guide for teaching is that much of the research focuses on planned focus on form in which one or two linguistic items are targeted intensively. However, descriptive research shows that negative feedback inside classrooms is generally more extensive and targets multiple forms on only one or two occasions.

Several studies also suggest that teachers' beliefs about negative feedback are important factors. For example, teachers may express their beliefs in the superiority of specific types of feedback; however, the types of feedback they provide in the classroom may not correspond with their expressed beliefs (Basturkmen *et al.*, 2004; Yoshida, 2008). Mackey *et al.* (2004) suggest that providing workshops on negative feedback can help raise teachers' awareness of this issue and that teachers with more experience are likely to provide more feedback.

Learners' views on negative feedback are also worth considering. Different types of learners may have different opinions about feedback (Loewen *et al.*, 2009) and different views of feedback may affect its effectiveness. For example, Sheen (2007) found a correlation between learners' positive attitudes toward feedback and improved accuracy scores for learners who received metalinguistic feedback.

Future directions

While considerable research has investigated the role of negative feedback, there are still questions to which we do not have clear answers. For instance, although meta-analyses of negative feedback have found a significant main effect, these studies have commented on the lack of studies available to conduct secondary analyses. Therefore, more studies which compare the effects of different types of feedback will enhance future meta-analyses. Other issues to address include the intensity of feedback necessary for noticing and learning. Some studies of negative feedback have examined spontaneous, one-off episodes, while other studies have provided treatments of one hour or longer. Li's (2010) meta-analysis suggests that a medium duration of feedback was more beneficial than longer or shorter amounts; however, few studies have directly investigated this issue. Finally, it is also probable that different linguistic items may require more or less feedback. Given that many negative feedback studies have targeted one or two English structures, there is a need for additional studies of other languages and linguistic structures.

In sum, although considerable research has investigated the role of negative feedback, there are still numerous variables which are not well understood. Further research into the effects of negative feedback will continue to provide insight into both SLA theory and pedagogy.

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Attention and awareness in second language acquisition

Peter Robinson, Alison Mackey, Susan M. Gass, and Richard Schmidt

Historical discussion

Attention and awareness in cognitive science and SLA

Issues of attention “bear on every area of cognitive science” (Allport, 1989, p. 631). Attention, however, is not a unitary construct; many mechanisms have been proposed to explain how it affects different aspects of behavior and learning. Attentional mechanisms have been invoked to explain such diverse phenomena in second language acquisition (SLA) as variation in the accuracy, fluency and complexity of second language (L2) use in different social environments, and the effects of pedagogic task demands on learners’ spoken and written performance in experimental and classroom language learning settings. Availability of attentional resources has also been argued to predict the extent to which instructional conditions manipulating the focus of learners’ attention affect the quality of perception, and, as a consequence, memory for targeted aspects of input. Explaining variational phenomena implicates mechanisms of attention which are used to *control* action while using the L2. Explaining perceptual, learning, and memory phenomena implicates mechanisms of attention which are used to select (or inhibit) and mentally rehearse information in the L2 input. These two broad classes of attentional mechanisms interact to affect SLA in ways that researchers have explored in both experimental and classroom settings.

Attentional mechanisms regulating the use and learning of L2s can be studied at a number of different levels. For example, at the neurobiological level (Schumann, 2004), research using functional magnetic resonance imaging (fMRI) shows changes in areas of neural activation during stages of behaviorally induced visual orienting (overt head and eye movement toward visual stimuli), as well as in subsequent stages of accurate discrimination between and in response to visual targets (Posner and Peterson, 1990). One aim of research at this level is to show how attentional networks in the brain give rise to *awareness*—the subjective, contentful “feel” of experience that can be reported to others, to varying extents. For example, Beck *et al.* (2001) found that the ability to successfully detect and report awareness of changes in a visual scene was associated not only with visual cortex activity related to the changing object, but also with additional activity in regions of the fronto parietal cortex commonly associated with directed attention. Neurobiological research has identified a number of these types of attentional networks (Raz and Buhle, 2006), and has begun to influence accounts of the neural components of attention to language (Arabski and Woltaszek, 2010; Chee, 2009; Green, 2003; Green *et al.*,

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2006; Indefrey *et al.*, 2001) and how they interact with phonological working memory to affect such processes as rule-learning and fossilization (de Diego-Balaguer and Lopez-Barroso, 2010; Schuchert, 2004), language selection and control in bilinguals (Fabbro, 1999; Rodriguez-Fornells *et al.*, 2006), and the influence of selection and control on the attainment of varying levels of bilingual proficiency (Chee, 2005).

Attention can also be studied at the information processing level, in which performance on cognitively demanding tasks, rather than less demanding tasks, is thought to implicate mechanisms for attention allocation (e.g., automatic versus controlled responding) that differentiate performance on each of them. At this level, attention is conceptualized as having functions that regulate our actions in and facilitate our learning about the environment. These functions include selecting information for processing, focusing on it and inhibiting distractions, activating concepts in long-term memory, and coordinating participation in multiple simultaneous activities. Many of the models of attention that have guided SLA research have their origins in areas of cognitive science addressing one of these information-processing functions. These include models proposed for the study of selective attention in visual processing (Posner and Peterson, 1990); the study of mental workload and divided attention (Kahneman, 1973; Wickens, 1984, 2007); the relationship of focal attention to rehearsal in working memory (Cowan, 1995); conditioned attention and associative learning (Rescorla and Wagner, 1972); and the withdrawal of attention during the development of automaticity and skilled responding (Anderson, 1993; Logan, 1988; Shiffrin and Schneider, 1977). In order to address specific issues in SLA theory, some models of attention have been adapted from the form in which they were originally proposed (see Chaudron, 1985; Gass, 1997; McLaughlin *et al.*, 1988; Robinson, 1995). Debate continues about which models are most effective in their explanations of aspects of information processing during SLA, such as the allocation of attention to competing task demands and the resulting effects on second language (L2) production. In addition, there is disagreement regarding how detailed or "fine-grained" attentional models should be for explaining the effects of L2 instruction (Leow, 2002; Robinson, 2003; Simard and Wong, 2001).

Attention and awareness in SLA research

Input and intake. The distinction between what is available to be learned (input), and what is cognitively registered through learners' perceptions and further processing (intake), is one of the earliest psycholinguistic distinctions made in SLA theory, although Corder's terminology differs from what is used today:

The simple fact of presenting a certain linguistic form to a learner in the classroom does not necessarily qualify it for the status of input, for the reason that input is "what goes in" not what is *available* for going in, and we may reasonably suppose that it is the learner who controls this input, or more properly his intake. This may well be determined by the characteristics of his language acquisition mechanism.

(Corder, 1967, p. 165)

Discussing the "psychological variables that make up the learner's mechanisms for perception and learning," Chaudron (1985) further distinguished between an initial stage involving perception of input, or "preliminary intake," from a later stage involved in the "recoding and encoding of the semantic (communicated) information into long term memory" (1985, p. 2), leading to "final intake." Two issues much SLA research and theory has subsequently addressed are the attentional mechanisms responsible for learners' selective perception at the early stage of preliminary intake, and whether and to what extent, it is accompanied by awareness.

Implicit and explicit learning and knowledge. Throughout the 1970s and 1980s, research and theory in cognitive psychology increasingly addressed the role of awareness in learning. These early efforts aimed to reveal the extent that “consciousness” and the “cognitive unconscious” contribute to learning, and were highly influential on SLA research. This seminal work included research and theorizing about implicit, unaware learning of complex artificial grammars (Reber, 1967, 1993) and the relationship of conscious, “explicit” memory to “implicit” memory, which (in contrast to explicit memory) involves no deliberate conscious attempt at recall (Schacter, 1987). Reber and Schacter argued that there were two functionally independent learning and memory systems, since both implicit and explicit learning as well as implicit and explicit memory, could be dissociated from each other. Furthermore, Reber claimed that where a stimulus domain was complex, as in the case of natural language, it could only be learned implicitly, that is, without participants knowing what they learned or how they learned it. Implicit learning was operationalized by asking learners to memorize strings of letters, such as XVVXXZ, generated from the rules regulating a complex finite-state grammar. Learners’ above chance accurate performance on post exposure grammaticality judgments, accompanied by the learners’ inability to describe the knowledge guiding their judgments, led Reber to conclude that participants had unconsciously abstracted the underlying structural rules (for reviews of this research see Perruchet, 2008; Pothos, 2007; Shanks and St. John, 1994; Williams, 2009).

At the same time as these early publications on implicit learning and memory in cognitive psychology were appearing, Krashen (1982) put forward a similar proposal for a distinction between two dissociated language learning systems responsible for unconscious knowledge, or “acquisition,” and conscious knowledge or “learning.” Successful SLA, he claimed, was largely the result of unconscious “acquisition,” since only simple aspects of an L2 can be consciously learned, and since access to what has been consciously learned is only possible under stringent conditions, that is, when learners have time to reflect, know the rule, and are focused on accuracy, or form. Krashen’s “Monitor Model,” and claims about the superiority of acquisition processes over conscious learning processes, prompted well over a decade of empirical research into the role of awareness in SLA. Bialystok (1978) proposed a model similar to Krashen’s, distinguishing between an Explicit Linguistic Knowledge source, containing all the “conscious” facts the learner has about the L2, and an Implicit Linguistic Knowledge source, containing “intuitive information” that cannot be verbally described. The Explicit Knowledge source stores simple rules while the Implicit Knowledge source stores the complex ones. The implicit knowledge is drawn on in spontaneous language production, in the same way that acquired knowledge is used in spontaneous production in Krashen’s model.

Consciousness raising and input enhancement. Sharwood Smith (1981) argued that “consciousness raising” activities could be potentially helpful for instructed L2 learners, distinguishing four types of intervention that could be used to direct learners’ attention to language form. These activities ranged from the provision of pedagogic rules to “brief indirect clues” to the L2 target structure such as visually enhancing a particular structure in the input during language learning activities. A great deal of SLA research has investigated the effectiveness of what Sharwood Smith (1991) later called “input enhancement” techniques and the extent to which they influence learners’ selective attention to forms. In addition, research has examined the effects of these interventions on learners’ subsequent knowledge and performance. Two particularly interesting issues in this research are how explicit or attention-demanding the input enhancement techniques should be, as in Doughty and Williams’ (1998) investigations of “focus on form” (Long, 1991), and whether input enhancement should be presented reactively (immediately following evidence that a learner has problems producing or comprehending the forms) or proactively, in anticipation of the problems learners are likely to have in selectively attending to form (R. Ellis, 2001).

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Apperception. The late 1980s and early 1990s saw a great deal of theoretical debate about the role of attention and awareness in SLA, much of it reacting to Krashen's claim that unconscious acquisition processes are most influential on the levels of success learners reach. Gass (1988) proposed a framework for research which identified five levels, or processing stages, in the conversion of ambient speech (input) to output. The first of these stages, apperception, concerns attention to and selection of input: "the apperceived input is that bit of language which is noticed by the learner because of some particular features" (p. 202)—and apperception is "the process of understanding by which newly observed qualities of an object are related to past experiences ... the selection of what we might call noticed (apperceived) material" (p. 201). It is clear that by apperception Gass means attention to and awareness of input. However, it is "not equivalent to perception" (p. 201), defined as a stimulus-driven process. Apperception involves "noticing" a form and consciously relating it to "some prior knowledge which has been stored in our experience" (p. 201).

For Krashen all that was necessary for acquisition processes to operate was comprehensible input, but Gass (1988) makes the distinction between this and *comprehended* input, which is controlled by the learner and is the processing stage preceded by apperception. Gass therefore suggests that consciousness is necessary for acquisition to take place. The extent of prior knowledge is one of the factors that determines whether apperception will select input for further processing, and which aspects of the input will be selected. Three other factors are frequency (both highly frequent, and highly infrequent input may result in apperception), affect, and attention, which is "what allows a learner to notice a mismatch between what he or she produces/knows and what is produced by speakers of the second language" (p. 203).

The "Noticing Hypothesis." At about the same time, Schmidt and Frota (1986) published the results of a diary study in which Schmidt argued for a close relationship between what he had "noticed" (operationalized as testimony to the occurrence of L2 forms, in written diary entries) about a language he was learning [Portuguese], and the subsequent appearance of some of those forms in his own production. Further pursuing the notion of noticing, Schmidt (1990) pointed out that the term "unconscious" (the defining feature of Krashen's "acquisition" process) is commonly used in three distinct senses: to describe learning without "intention," learning without metalinguistic "understanding," and learning without attention and "awareness." Schmidt argued that while L2 learning without intention or metalinguistic understanding is clearly possible, there can be no learning without attention, accompanied by the subjective experience of "noticing," or being *aware* of aspects of the "surface structure" of input. All L2 learning is conscious in this sense, since input does not become intake for learning unless it is noticed. Schmidt (1995) assumed that focal attention and the contents of awareness are essentially isomorphic. The "Noticing Hypothesis" continues to promote much research into the role of awareness in second language learning in instructed and experimental settings, using an increasingly sophisticated and sensitive range of measures of awareness, as will be described in the third section of this chapter.

Detection, noticing and working memory. In another widely cited paper, however, Tomlin and Villa (1994) argued that while attention was necessary for L2 learning, awareness was not. They argued that a more fine-grained analysis of the role of attention in SLA was necessary, and drew on Posner and Peterson's (1990) neurocognitive model of three interrelated networks, which function not only to detect stimuli (cognitive registration of them), but also to alert (prepare to attend) and orient (commit attentional resources) to stimuli. "None of the central components of attention—alertness, orientation or detection—require awareness" (p. 193), they claimed, and further, that detection was the initial, prerequisite level of processing needed for input selection and second language acquisition. Robinson (1995) described a model of attention and memory

complementary to Schmidt's Noticing Hypothesis, which accommodated some details of Tomlin and Villa's proposal. In that model, noticing was defined as "detection plus rehearsal in short-term memory, prior to encoding in long-term memory" (1995, p. 296). Drawing on Cowan's (1988, 1995) embedded process model of attention and memory he argued that only a subset of input that is detected is focally attended and noticed. Detected input, which is in peripheral attention, enters into short-term memory. Focally attended input enters working memory, which is that part of long-term memory in a currently heightened state of activation. Further, the nature of the rehearsal processes operating on the contents of working memory help to differentiate the contents of what is noticed and, following rehearsal, permanently encoded in long-term memory—thus accommodating Gass's (1988) claim that prior knowledge and attention together help determine what is noticed and available for learning. Since there are differences between learners in the abilities drawn on in focusing (and inhibiting) attention, and maintaining and rehearsing information in short-term and working memory, Robinson argued that these differences should correspond to differences in learning under implicit, incidental and explicit conditions of exposure. Those higher in these abilities should be more successful at noticing, and learning than those lower in these abilities, whatever the condition of instructional exposure. To this extent, he argued (1997a), learning under any condition of exposure is fundamentally similar.

Selective attention and frequency effects. In a series of influential papers, first appearing in the mid-1990s, N. Ellis addressed the issue of selective attention in the context of "emergentism" (N. Ellis, 1998, and Chapter 12, this volume), and the role of frequency effects in second language learning and processing (N. Ellis, 1996, 2002, 2006a, 2006b). As has been previously shown (Rescorla and Wagner, 1972), human memory is sensitive to *recency*, the time since past occurrence of a stimulus, and *frequency*, the number of times it has previously occurred, with both of these positively affecting the "associative learning of representations that reflect the probabilities of occurrence of form-function mappings" (2006a, p. 8). Ellis interprets Goldschneider and DeKeyser's (2001) findings that perceptual salience, frequency, and morphophonological regularity of morphemes were the strongest predictors of their rank in morpheme acquisition orders as evidence that these are the factors contributing the most to the intensity with which learners attended to, and associatively learned, these forms. This work on associative, statistical learning, has been influential in research into child language acquisition (Conway and Christiansen, 2006; Gomez and Gerken, 1999; Saffran *et al.*, 1999), and is currently being drawn on in studies of implicit and explicit learning during adult SLA (Rebuschat, 2008; Williams, 2010).

Core issues

In this section, we deal with three issues related to attention and awareness in L2 research: (1) interface between implicit and explicit knowledge, (2) objects of attention (i.e., which aspects of language can or cannot be attended to), and (3) the role of attention to and awareness of output.

Interface between implicit and explicit knowledge

Within SLA research, the study of implicit and explicit learning, as well as the distinctions between implicit and explicit knowledge, is firmly rooted in cognitive psychology as discussed earlier. Disagreement regarding a number of factors, including the role of awareness, and the nature of knowledge acquired through different types of learning, became a source of debate in both SLA and cognitive psychology. Central to the implicit/explicit discussion is the question of whether or not implicit and explicit learning, and implicit and explicit knowledge, are two dissociated and

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distinct systems. If in fact two independent systems exist, what is the relationship, or interface, between these two learning and knowledge systems? Krashen (1982) has claimed that grammatical competence is acquired only through exposure and cannot be explicitly taught, that is, it is essentially implicit. Because learners rely on implicit knowledge for both comprehension and production, and explicit knowledge is used only for monitoring the accuracy of output, explicit instruction and the explicit knowledge gained through it are useful when responding to discrete items on tests, but play no real role when language is being used for real communication. Krashen also argued that these two types of language knowledge are stored and used differently by learners, and that explicit knowledge cannot become implicit knowledge. This position, that implicit knowledge is informationally encapsulated and unaffected by conscious knowledge, is referred to as the non-interface position.

Recent research in neuroscience and neurolinguistics has demonstrated the existence of two distinct and separate processes for developing and storing implicit and explicit knowledge (as described in Chapter 17 of this volume by Ullman and Morgan-Short), but the influence of explicit knowledge on the development of implicit knowledge remains a source of debate in the field of second language acquisition. DeKeyser (1997, 2003, 2009) argued that explicit declarative knowledge can provide a basis for repeated practice, which, if sufficient, leads to proceduralized and eventually automatized knowledge. Over time, proceduralized knowledge allows the learner to become faster and more consistent in their production and comprehension, thus devoting fewer attentional resources to form. This strong interface position claims that declarative knowledge resulting from explicit learning can directly result in the development of procedural knowledge that learners can subconsciously access in the same way as implicit competence. However, this position depends on excluding awareness as a crucial part of the definition of acquired knowledge, because learners do not become unaware of the rules through practice. Rather, DeKeyser argues that they can develop knowledge that is "functionally equivalent" (2003) to knowledge that is learned implicitly and suggests, moreover, that after automatization of the rules, learners may in fact forget previously known metalinguistic rules, since they are no longer needed.

Another perspective is the weak interface position, which holds that explicit knowledge can become implicit knowledge under the right conditions. R. Ellis (1993) has argued that the transformation of explicit to implicit knowledge through practice can only occur if the learner is developmentally ready to advance (see, for example, the developmental constraints on readiness proposed by Pienemann in his Processability Theory described in Chapter 14). Another possibility is that explicit knowledge can facilitate the growth of implicit knowledge by alerting learners to what they need to attend to when processing input. Indeed, explicit knowledge (whether gained through instruction or through conscious induction) should have mostly positive influences on learning through exposure and interaction, since "learning with advance organizers and clues is always better than learning without cues" (MacWhinney, 1997, p. 278). N. Ellis (2005, 2008) has argued for still another version of the weak interface position, stating that although explicit and implicit knowledge are distinct and dissociated systems, representing different types of knowledge supported in different areas of the brain, there is interaction between them. According to N. Ellis, explicit knowledge is developed through learners' conscious efforts to construct meaning, while implicit knowledge is developed during fluent language production and comprehension. Relying on implicit and automatized knowledge in predictable situations, we only draw on additional conscious resources, such as explicit knowledge, when these automatic abilities fail. Ellis provides the example of walking to illustrate his point. We do not think about walking until we take a misstep, at which point we use explicit knowledge to subsidize the failure of our implicit knowledge. These implicit and explicit processes connect in what Ellis (2005) refers to as a dynamic interface (p. 325), which is established

during conscious processing in working memory. Thus consciousness plays a crucial role in enabling this interface, which then allows conscious and unconscious processes to operate in parallel in language learning as in any other cognitive performance task.

Paradis (2009) has argued that these various scenarios do not constitute an interface between two systems, but rather the replacement of one system with another. Paradis suggests that when instructed learners first begin to acquire a language, metalinguistic knowledge may be used almost exclusively. However, as learners progress, they begin to rely more on the implicit knowledge that has been developed and internalized through continued and extensive practice, with this knowledge eventually becoming automatized as implicit competence. Paradis provides the metaphor of someone recovering from blindness. As this person learns to read visually, he will gradually replace reading with Braille to reading with his eyes. The two systems, tactile and visual, are independent of each other, and although the knowledge of Braille still exists, it does not become visual reading. Within SLA, this can be interpreted to mean that metalinguistic knowledge remains available to language learners, even as they gradually develop automatic implicit competence as a separate and independent system. For instance, learners can use their explicit knowledge to produce monitored output, which then serves as the input for the development of the implicit knowledge system (as also argued by Gass and Mackey, 2006, Schmidt and Frota, 1986). As learners progress, they devote more attention to creating meaning while the structural processes become more automatic (Schmidt, 1995), gradually replacing reliance on the explicit system with implicit knowledge acquired through repetition and exposure to the form in context.

Objects of attention

So far, we have been referring to attention as if it were uniformly involved in all language learning and processing, but research suggests that learners pay more attention to some aspects of language than to others. It is well-established, for example, that learners are less sensitive to syntactic cues to grammatical gender than they are to morphophonological cues (noun endings) during processing. In particular, Bordag and Pechmann (2007); Bordag *et al.* (2006); Carroll (1999); Franceschina (2005); Holmes and de la Batie (1999) provided evidence to demonstrate that learners are sensitive to noun endings and make use of them in their determination of gender. On the other end of the spectrum, Lew-Williams (2009) and Guillemon and Grosjean (2001) have shown that learners are insensitive to syntactic indicators of gender, such as agreement on determiners and adjectives. Most of this research has been examined through processing measures such as speed or accuracy of noun production or production using priming experiments, preferential looking tasks, and word recognition tasks. Diversity in cue sensitivity may be considered an indication of where attention is focused when processing a second language.

Mackey, *et al.*, (2000) indirectly investigated attention to different parts of language by looking at learners' perceptions of oral feedback. In this study, learners were given feedback on their production of target forms, and then were asked through retrospective interviews to comment on the feedback that they received. These learner-produced comments provide a way of examining learners' attentional focus on a particular area of production, in this case, a form that deviated from target language norms. Results indicated that feedback intended to correct lexical, semantic, and phonological errors was perceived more accurately than feedback intended for morphosyntactic errors. Related to these results is Jiang's (2004) study of Chinese ESL learners, and his finding that learners are not sensitive to morphology when processing L2 sentences. Possible explanations for this observed differential sensitivity to certain aspects of language are the phenomena of attentional blocking and learned attention (N. Ellis, 2006a, b). According to N. Ellis, when linguistic cues are redundant (e.g., in the sentence *He goes to the store*, both *He* and *-s* indicate the third-person

singular) the learning of later experienced cues is blocked by earlier learned cues. For example, N. Ellis (2006b) found that for redundant cues, when learners were exposed to adverbial cues, the acquisition of verbal tense morphology was blocked, whereas earlier exposure to verbal tense morphology blocked the later acquisition of adverbs. In the case of L2 acquisition, speakers who do not have a certain linguistic cue in their L1 may fail to pay attention to, and subsequently learn, that cue in their L2. Indeed, N. Ellis (2006b) also found that L1 speakers of Chinese languages, which do not have verb tense morphology, were unable to acquire inflectional morphology in the presence of redundant adverbial and verbal cues. Other theoretical approaches to L2 learning (e.g., Lardiere, 1998; Prévost and White, 2000; Sprouse, 1998) also support the view of differential learning. However, in these studies, the explanations take a more formal direction with rare discussion devoted to the role or influence of attention.

Gass *et al.* (2003) investigated the role of focused attention on the learning of three areas of language: syntax, lexicon, and morphosyntax. The focus of attention was manipulated by underlining words, phrases and sentences in stories that participants read on a computer screen and telling participants to pay attention to the underlined material. Findings indicated that although learners' attention was focused on all three parts of language, the greatest amount of learning took place in syntax. However, without focused attention, the greatest amount of learning took place in the lexicon, followed by morphosyntax, and then by syntax. In addition, the authors discussed the role of proficiency in relation to attention, finding a diminished impact of directed attention as a function of proficiency and in all language areas. However, "focused attention" in that study refers only to externally-manipulated attention, and does not necessarily correspond to internal attentional processes, which the authors cite as a limitation.

The role of attention to and awareness of output

Many of the issues we have described concern the role of attention and awareness in processing input, and the extent to which levels of attention and awareness are necessary for retention of input and further learning. Recently, however, there has been an increasing number of studies examining attention to and awareness of form in L2 production, or output, and the extent to which attention to and awareness of output can facilitate SLA. Swain (1995) argued that attention to output has a facilitating role, since "in producing the target language ... learners may notice a gap between what they want to say and what they can say, leading them to recognize what they do not know, or know only partially" (pp. 125–126). Producing language also offers opportunities for testing hypotheses about well-formedness, and for metalinguistic reflection on L2 form. Izumi (2003) and Komros (2006) have described the stages of L2 speech production at which attention can operate to promote the three kinds of awareness that Swain described, and current research is concerned with the extent to which the attentional demands of pedagogic tasks promote these kinds of awareness, and so affect performance and learning.

The theoretical question of interest here is the notion of attention as "capacity." Clearly, the human information processing system is limited in its ability to process and respond to information in the environment; but are breakdowns in performance caused by limits on attentional capacity? Skehan (1998, 2009) argues for this position, claiming that capacity limits on a single pool of attentional resources will, in general, lead to decrements in the fluency, accuracy and complexity of L2 speech when tasks are high in their attentional, memory, and other cognitive demands. Skehan argues that certain task characteristics may "predispose learners to channel their attention in predictable ways, such as clear macrostructure toward accuracy, the need to impose order on ideas toward complexity, and so on" (Skehan, 1998, p. 112). However, tasks can lead either to increased complexity, or accuracy of production, but not to both. In Skehan's account, due to

scarcity of attentional resources, attention to accuracy of speech takes place at the expense of attention to complexity of speech. A contrasting position has been proposed by Robinson (2003, 2007), who argues that attentional capacity limits are an unsatisfactory, post-hoc explanation for breakdowns in attention to speech. Following Neuman (1987) and Sanders (1998), Robinson suggests that breakdowns in "action-control," not capacity limits, lead to decrements in speech production, and learners' failure to benefit from the learning opportunities that attention directing provides. Consequently, increasing complexity along various dimensions of tasks, such as increasing the amount of reasoning the task requires or increasing the memory load of the task, promotes greater effort at controlling production and more vigilant monitoring of output. This increased task complexity leads to greater accuracy and complexity of L2 production when compared to performance on simpler task versions that require little or no reasoning. Furthermore, greater task complexity leads to increased noticing and improved uptake of task relevant input. Research into Skehan's and Robinson's contrasting predictions, and their theoretical underpinnings in models of attention and speech production, can be expected to continue in current SLA research.

Data and common elicitation measures

First-person verbal reports

First-person reports of experience, collected in the form of speech or writing, have been the major source of information on the contribution of attention and awareness to SLA, and have been elicited via a range of methodologies. These include diary entries, in which learners reflect on their experience over weeks or months (Schmidt and Frota, 1986; Warden *et al.*, 1995); on-line "think-aloud" protocols, in which learners verbalize the contents of their experience while directly engaged in learning activities (Bowles, 2010; Leow, 1997, 2000; Leow and Morgan-Short, 2004); immediate off-line response prompts to recall experience (Philp, 2003); or somewhat more delayed responses to written questionnaires (Bell and Collins, 2009; Robinson, 1996, 2010a); stimulated recall, in which learners are prompted to report the thoughts they had while performing a task (Gass and Mackey, 2000; Mackey *et al.*, 2000) or oral interview questions (Leow, 2000; Williams, 2004, 2005).

As Baars (2003) notes, the standard behavioral index for consciousness is the ability people have to report their experience (see also Weiskrantz, 1997). Conscious processes "can be operationally defined as events that: (1) can be reported and acted upon, (2) with verifiable accuracy, (3) under optimal reporting conditions, and (4) which are reported as conscious" (2003, p. 4). Optimal reporting conditions involve, for example, factors such as a minimum delay between the event and the report, and freedom from distraction. Because of the need for optimal conditions, immediate off-line measures, such as those collected by Philp (2003) and Mackey *et al.* (2000), have advantages over first-person reports collected after some period of delay, as in diary studies or during oral interviews, where learners may have simply forgotten what they were aware of during learning. Think-aloud protocols have been argued to be concurrent measures of awareness and, possibly, learning, and have the advantage of immediacy over all other methods for first-person reporting, but it has been argued that learning activities may distract attention from attempts to verbalize experience while thinking aloud, thereby reducing their faithfulness as records of what learners were aware of. On the other hand, the effort to verbalize thoughts may distract learners' attention from the learning activity, negatively affecting performance. This potential effect that the effort of verbalization may have on the cognitive processes of interest is referred to as the risk of "negative reactivity." Sachs and Polio (2007) found just such an effect, since a group instructed to think aloud while processing feedback in the form of reformulations provided on the drafts of

essays they had written made a lower percentage of corrections to their revised essays than a group not instructed to think aloud while processing the feedback. On the other hand, Sanz *et al.* (2009) found that a group of English speaking students instructed to think aloud while participating in a computerized lesson on the Latin case system, in which they received explicit feedback about responses to the semantic functions of case markers, performed significantly better on post-test measures of grammaticality judgment and sentence production than a group not instructed to think aloud, but had no effect on the latency of response to grammaticality judgment items. Thus the observed reactivity was “positive” in this case (see Bowles, 2010 for extensive discussion of this issue of “reactivity”).

Overall, although they differ in the optimality of the conditions they require for eliciting awareness, the first-person reports of experience described above are valuable sources of information about the facilitating effect (or not) of more versus less reported awareness on learning morpho-syntactic, lexical or phonological form (Mackey *et al.*, 2000) or pragmatic form (Felix-Brasdefer, 2008). In the classroom and laboratory studies referred to above, first-person reports are used to assess the relative “extent” of awareness of forms made salient through some instructional intervention intended to guide attention to them, such as input enhancement (Alanen, 1995; Jourdenais *et al.*, 1995; Robinson, 1997b), or recasting (Mackey, 2006; Philp, 2003), and the extent to which these “greater” levels of awareness did (more explicit learning) or did not (more implicit learning) accompany pre-to post-test gains in knowledge.

Subjective and objective behavioral tests of learning

First-person verbal reports, however, clearly may fail to include all of the information learners were aware of during learning (cf., Allport, 1988; Godfroid *et al.*, 2010; Jourdenais, 2001; Rosa and O'Neill, 1999). This lack of information may be due to some of the reasons provided above, such as the possibility of forgetting after a delay between experience and reporting, as well as for other reasons described below. In studies of implicit learning in cognitive psychology, first-person verbal reports have been criticized for failing to meet what Shanks and St. John (1994) have called the *information criterion*, and also the *sensitivity criterion*.

In the early studies of implicit learning conducted by Reber (see Reber, 1989), during training he asked participants to attend to, and copy down a series of letter strings they were presented with (e.g., XXVVZ). He then told them the strings they had seen followed certain rules, regulating permissible sequences, and asked them to judge which of a further series followed, or did not follow the same rules. Participants performed with above chance accuracy, but without being able to respond to requests to verbalize the rules they were following in making judgments. However, as Perruchet and Pacteau (1990) and Shanks and St. John (1994) argued, these results were not evidence that unconscious learning had taken place. Participants were asked to provide information in the verbal reports about their *knowledge of rules*, but even those who were completely unaware of and unable to verbalize *rules* could have been aware of and used other information (e.g., co-occurring bigrams and trigrams) to guide their performance. These verbal reports therefore violated the information criterion necessary in measures of implicit learning because they did not necessarily measure the knowledge responsible for guiding behavior.

The sensitivity criterion states that a measure of awareness should be *sensitive to all* of the conscious knowledge that could have guided learning. First-person verbal reports may fail to meet this criterion since participants may be insufficiently motivated to report knowledge which they have, but which they feel unsure of or lack confidence in. In short, when learners are asked to report first-person experiences, they may not be asked about the information they were

aware of and which led to learning, or they may intentionally withhold knowledge they were aware of and which led to learning. For these reasons, researchers argue (e.g., Dienes and Scott, 2005; Merikle and Reingold, 1991; Tunney and Shanks, 1993) that both subjective and objective "behavioral tests" need to be employed as markers of awareness. These tests are necessary supplements to first-person reports of experience, such as protocols, in order to probe whether awareness is actually implicated in learning, even in the absence of learner failures to voluntarily self-report it.

An objective test of learning encourages learners to respond by consciously accessing the knowledge they need to perform the test or task. For example, after being trained on an artificial grammar in implicit or explicit learning conditions, learners are often asked to complete a grammaticality judgment task (i.e., indicate whether the new string follows the grammar of the strings encountered during training). When learners are required to underline or otherwise identify the information that guided their decisions, they are guided to consciously indicate the knowledge on which their judgments are based. Where the above chance accuracy of grammaticality judgments matches learners' underlining or other identification of the information that did occur during training, it is taken to be evidence that learning was the result of awareness. However, asking participants to engage in such a task may increase awareness of the target forms during testing, and does not necessarily reflect the level of awareness during the learning phase. Objective measures may also require learners to generate a sequence of letter strings or words based on learners' explicitly accessible knowledge and memory of their occurrence during trained exposure. Again, where the explicitly accessed knowledge used to generate strings or sentences in these tests matches the occurrence of those strings and sentences in training, then learning is judged to be the result of awareness. All of the direct measures for assessing reflective memory for prior exposure to grammatical strings during training described by Merikle and Reingold (1991) (and summarized in Robinson, 1995) are therefore objective tests. These measures include forced choice recognition tests of information presented during training, or responses to instructions to recall whether information in the test occurred during training.

In contrast, a subjective test of learning does not encourage learners to consciously reflect on their prior experience with—and so their explicit memory for—the stimulus during training, but rather requires them to respond on the basis of the degree of "feel," or certainty about intuitions guiding their responses during actual test performance. These subjective tests include those eliciting estimates of the confidence which learners have in making responses to a post-training exposure test of knowledge gained (Rebuschat and Williams, 2010; Shanks and Johnstone, 1998; cf., Krashen, 1982). Where learners themselves report to have no confidence in their responses, and so to be "guessing" versus "not guessing" (a dichotomous scale), and where there is also above chance accuracy in responding to the test of what was learned (another dichotomous scale), the knowledge guiding responding is then judged to be outside of awareness. According to Dienes *et al.* (1995), tests of implicit, unaware learning should meet this guessing criterion, which can be calculated using the chi-square statistic. This guessing criterion demonstrates the absence of awareness by showing a greater than expected proportion of guessing/above chance accurate responses compared to other responses in a 2 x 2 guessing/not guessing, above/below chance matrix. Similarly, when there is no significant positive correlation between learners' confidence ratings on the accuracy of their decisions, measured along some interval scale from "no confidence" to "absolute confidence," and their percentage of accurate decision-making on test items, the knowledge that guides performance on the tests is also judged to be outside of awareness. This is what Dienes *et al.* (1995) call the "zero correlation criterion" for demonstrating implicit learning.

Applications

Input enhancement

Many subfields of second language research are relevant to the instructional context (see Chapter 33). Significant amounts of research have investigated what Sharwood Smith (1991) referred to as input enhancement, or induced input salience (p. 121) and the extent to which it in fact induces selective attention. Polio (2007) provides a clear review of the input enhancement literature, including definitions, similarities, and correspondences with the term “focus on form” (see Chapter 33) as well as empirical evidence. She points to narrow definitions of input enhancement, in which instructors or materials developers visually enhance materials (e.g., colors, bold letters), as having been shown to have little effect. On the other hand, if a broader definition is taken, such as one that includes any effort to draw learners’ attention to certain language features, then the impact on acquisition is broader (see also Han *et al.*, 2008; Huang, 2008; Leow, 2007).

As was noted earlier, the significance of attention-drawing activities varies according to the structure involved. For example, Jeon (2007) designed communicative activities that were focused on lexical items (nouns and verbs) and morphosyntactic features (relative clauses and Korean honorifics). In the short-term, relative clauses, verbs, and nouns were impacted more than honorifics; in the long-term, attention-drawing activities had a greater impact on relative clauses than on honorifics within the category of morphosyntax. Comparing morphosyntax and the lexicon, verbs were more impacted than nouns and honorifics. Jeon’s explanation for the differential effects of attention-focusing activities centers on the salience of form.

Individual differences and attention

Aptitude. Considered a strong indicator of academic success, aptitude has generally been regarded as a key factor in predicting learners’ rate of development in second language learning contexts (DeKeyser, 2000; Dörnyei, 2005) and is discussed in Chapter 23 by Skehan in this volume. Early aptitude research (Carroll, 1973, 1981) identified four cognitive components related to predicting language learning potential: phonemic coding ability, grammatical sensitivity, associative memory ability, and inductive language learning ability. Recent research has also suggested that these aptitude components play an important role in learners’ individual processing abilities (Dörnyei and Skehan, 2003; Robinson, 1996, 1997a). For instance, earlier sections of this chapter have addressed the importance of focusing learners’ attention on form in order to facilitate acquisition. However, the success of focusing learners’ attention is likely affected by learners’ individual abilities to focus on form, abilities which are grounded in the aptitude components of grammatical sensitivity and inductive language learning ability.

Empirical research (de Graaff, 1997; Robinson, 1997a; Williams, 1999) has also demonstrated that individual differences in aptitude influence learning in both implicit and explicit conditions. For instance, in Robinson’s studies examining the effects of varying learner / learning conditions (rule-search, instructed, incidental, and implicit) on acquisition (1996, 1997a), learners in the implicit group who demonstrated greater grammatical sensitivity were more likely to deduce and be able to verbalize explicit knowledge from language stimuli than those lower in grammatical sensitivity. Robinson (2002) also suggests that learning conditions that promote attention to and noticing of target forms (such as explicit conditions in which a pedagogic rule is presented to guide input processing, or in which learners are encouraged to search the input for grammatical rules) draw on different aptitude resources, or aptitude complexes, than learning that takes place during

incidental (i.e., a comprehension activity) or implicit conditions (i.e., memorizing sentences and answering questions about the location of words in the sentences).

These differential relationships between aptitude complexes and psycholinguistic processing conditions, such as pedagogical tasks or instructional treatments, have significant implications for the language learning classroom (Robinson, 2002). For example, by profiling the strengths and weaknesses learners have in the abilities that contribute to language learning aptitude it should then be possible to match these profiles to tasks and input processing conditions that draw on the abilities learners are strong in, thereby optimizing their chances of success in L2 instructional programs.

Working memory. Another individual difference closely linked to attention, working memory is usually described as the processes used to temporarily store and manipulate information needed for both known and novel cognitive tasks and is discussed in Chapter 26 by John Williams in this volume. Working memory is often considered to be a central component of language aptitude (Miyake and Friedman, 1998; Robinson, 2001, 2002, 2005a; Skehan, 2002), and the relationship between working memory and attention has been a key area of research in SLA, with working memory capacity closely related to comprehension and processing skills. Although there are a number of working memory models (Baddeley and Hitch, 1974; Conway *et al.*, 2005; Engle, 2001; Miyake and Shah, 1999) defining the construct in variable ways, each model identifies a form of executive attention or coordination. This executive component supervises the distribution of attentional resources when more than one cognitive task or task dimension requires attention, maintaining access to relevant information and blocking access to irrelevant information (Kane *et al.*, 2007).

Considering the complexity and cognitive demands involved in second language learning, the link between working memory capacity and attention is an important one, and a number of empirical studies have demonstrated a connection between them. In an exploratory small-scale study, Mackey *et al.* (2002) examined the relationship between both phonological and verbal working memory and noticing, finding that learners who reported lower levels of noticing of questions during task performance also had low working memory capacities. Learners with high working memory capacities were more likely to have noticed more questions. Mackey *et al.* (2010) investigated the relationship between working memory and modified output during interaction. Because modified output can occur following corrective feedback on an utterance in interaction, the idea is that the learner must have, at some point, attended to the corrective feedback and in this study, working memory scores significantly predicted the production of modified output by learners (see also Mackey and Sachs, 2011, for similar working memory-learning patterns with older adults). Within instructional contexts, learners' individual capabilities to store and manipulate information, as well as manage and devote attentional resources to competing cognitive demands and suppress irrelevant information, are likely to be significant factors affecting learner success.

Tasks in language learning

Tasks are central to language learning in communicative classrooms. Arguments for their validity as a pedagogical tool come partially from the interactionist literature (see Mackey and Gass, 2006; Gass and Mackey, 2007; for reviews) which, in turn, relies heavily on the construct of attention and attention-drawing activities. As Schmidt noted, in summarizing conclusions drawn by Ericsson and Simon (1984), and others, "Task demands are a powerful determinant of what is noticed" in experimental settings, "and provide one of the basic arguments that what is learned is what is noticed ... the information committed to memory is essentially the information that must be heeded

in order to carry out a task" (1990, p. 143). The extent to which this is true of second language learning tasks in classrooms is an important issue for materials and instructional design. Space limitations prevent us from a thorough discussion of tasks, and findings from research into their effects on learning, but, suffice it to say, proposals concerning task characteristics, task complexity and task sequencing (see e.g., Candlin, 1987; Robinson, 2001, 2007; Skehan, 1996, 1998) have proven to be central in discussions of classroom instruction. For example, are there certain task types or even feedback types that might result in implicit or explicit knowledge? In what way is it useful to manipulate the conceptual demands of tasks so as to direct attention to one part of language as opposed to another? What task characteristics promote output and noticing of forms in the input, and to what extent do attestations of noticing lead to greater retention and learning of those forms?

Feedback in interactive settings is an important factor that may guide attention since, in principle, feedback may focus attention on problematic parts of an utterance. Thirty years ago, Schachter (1981) engaged in a discussion of the role of feedback types and proposed hand signals that focused on specific error types. The underlying principle is similar to today's activities which focus on the extent to which learners can be trained to understand the intent of feedback and understand the function of feedback. Connecting task demands and attention to feedback, Robinson (2005b) has argued that complex tasks (compared to simpler counterpart tasks) lead learners to attend more closely to information provided in task input (such as corrective feedback), with the consequence that complex tasks will result in more uptake and retention of attended input than simple task versions. A final issue of instructional relevance is the extent to which preparatory attention, provided during planning time, facilitates task-based learning, and whether it is better to provide this before (pre-task) or during (within-task) task performance. Ellis (2009), provides a comprehensive summary of findings for this research to date.

Future directions

The area of attention and awareness in second language acquisition is growing in importance in second language research. Many of the areas discussed in this section are continuations and outgrowths of current research. Below we provide some suggestions for new research directions to continue to move the field forward.

- (1) *Do different techniques for focusing attention on form draw on different sets of cognitive abilities?* The contribution of individual differences in cognitive abilities to attend to, be aware of, and successfully learn forms and meaning is an ongoing and important area of research, particularly regarding instructional attempts to make forms and meanings salient to learners. A research area of particular interest is whether different techniques for focusing attention on form (Doughty and Williams, 1998; Long and Robinson, 1998) draw on different sets of cognitive abilities. For example, do different sets of abilities promote successful attention to and noticing of recasts of problematic learner utterances, compared to the abilities that are involved in understanding metalinguistic explanations of the error? Research has shown that working memory capacity is related to the ability to notice and use the negative feedback provided in interaction (Mackey *et al.*, 2002; Mackey and Sachs, 2011). Learners with greater working memory capacity profit more from this feedback technique, and are also better able to attend to, notice and learn aspects of grammar while processing input for meaning. Findings such as these (see e.g., Sagarra, 2007; Trofimovich *et al.*, 2007) are prompting new proposals for comprehensive aptitude batteries (Robinson, 2002, 2005a, 2007) that sample the cognitive abilities learners draw on under a range of input processing conditions, and in response to a range of focus on form techniques, which aim to promote attention to

and noticing of instructionally targeted forms. For example, some learners may be more “primeable” than others, such that previous recasts more successfully prompt later recollection, use and so longer-term retention of the recast forms in subsequent episodes inviting their use (McDonough and Trofimovitch, 2008; Robinson, 2005a). The prospect that this research offers, is that—if identified—the cognitive abilities that promote attention to, noticing and retention of form-meaning connections under differing task and processing conditions can be profiled in populations of learners, and instructional options can subsequently be matched to these profiles in order to optimize the probability of more successful allocation of attention to, noticing and elaborative processing of forms and their meanings (cf., Robinson, 2010b; Snow, 1994).

How do we increase the sensitivity of behavioral tests of the role of attention and awareness in learning? Future research will likely adopt increasingly sensitive measures of the contents of awareness, and explore new methodologies for operationalizing this complex and multi-faceted construct. For example, Rebuschat (2008) has used, for the first time, subjective behavioral tests, such as confidence estimates and source attributions, described earlier, to examine the extent of implicit versus explicit L2 learning. Neurophysiological measures of physical changes in brain states will also be used increasingly to complement the behavioral and introspective methods for studying the relationship of attention and awareness to learning. Studies such as that of Godfroid *et al.* (2010) reported below, provide an example of how such converging behavioral and neurophysiological evidence for the influence of attention and awareness on L2 learning may be gathered in future studies.

How do we research situated and distributed cognition perspectives on the roles of attention and awareness? Cognition, learning, and attention are always situated processes, occurring in sociocultural contexts which can be analyzed at different levels of granularity in instructional settings (Snow, 1994). This raises the question of the extent to which these contexts can be consistently reproduced (for purposes of instructional accountability, planning, and management) and matched to the abilities learners bring to them. One option is to reproduce instructional contexts by delivering tasks having the same or similar characteristics, and research the ways these task characteristics make demands on the abilities learners bring to them, and the consequences of these task characteristic—ability determinant coordinates for success or failure in learning (Ackeman and Ciancolo, 2002). Another option is to research how attention and noticing are deployed across sequences of such tasks, such that the distribution of attention and learning opportunities across task affordances is maximized. Sequences of tasks, appropriately distributed across timescales, have the capacity to afford opportunities to prime and prompt recollection of previously experienced language related episodes, thus strengthening memory for them. The theoretical constructs adopted in research into the role of “reminders” in other areas of instructional design (see Ross and Bradshaw, 1994) will be important to consider in SLA research into these issues.

Combining first-person verbal reports and physiological measures to study attention and awareness during second language acquisition. A final issue for research that we raise here is important for operationally evaluating the results of future research into all the other issues raised above into the roles of attention and awareness in instructed SLA. We described the limitations of verbal reports as measures of attention to and awareness of learning targets above. Verbal reports are unlikely to faithfully reflect everything that learners are attending to and aware of. Consequently, supplementing these reports with physiological indices of on-line attention to learning targets such as eye movements (Scheiter and Van Gog, 2009), is a valuable way of attempting to establish more reliable, converging evidence for the roles of attention and

awareness in learning. Eye-tracking lines of research provide one such example of a converging physiological index of learning processes in what follows.

One might assume that longer length of eye gaze fixation indicates greater effort, and awareness of the fixated content (the eye-mind assumption; e.g., Reichle *et al.*, 2006). Godfroid *et al.* (2010) report the first SLA research to explore this procedure in the context of noticing. In their study of incidental learning of vocabulary, participants read short 9–11 line paragraphs on a computer screen for comprehension purposes (participants were told the aim of the exercise was to compare how people read on a computer screen and read on paper). Eight pseudo word target forms were embedded in the paragraphs. Following a post-exposure recognition test of knowledge of the pseudo words, Godfroid *et al.* used a stimulated recall procedure (Gass and Mackey, 2000) to elicit comments from learners about the words in the post-tests, and memories of their occurrence while reading. Accurate scores on the multiple choice post-test showed some learners recognized words they had been exposed to, and understood their meaning. The stimulated recall data also indicated that some learners remembered reading the target words, and provided information about how they dealt with them during the reading task. Godfroid *et al.* also collected information about four different measures of eye fixation time for the pseudo words and the immediately following words (the *spillover* region). Statistical analyses (reported in Godfroid, 2010) revealed that the total amount of time learners spent reading a pseudo word predicted the recognition of that pseudo word on the post-test, thereby lending support to the view that attention plays a crucial role in encoding stimuli in memory. However, some participants recognized words they had been exposed to (performing accurately on the post-test), even though fixation times were quite low (indicating lack of increased awareness). These findings led to the conclusion that the “mere perception of the target words sufficed to create a memory trace that enabled participants to discriminate them” (p. 185). This suggests that detection, not noticing, led to learning, as measured by post-test recognition of the words. The problem here, however, is in establishing a boundary of eye fixation time above which one can conclude attention was accompanied by awareness, and below which it was not. Although it might be possible to establish such a boundary for an individual by using a combination of the verbal reports, test performance, and eye tracking data, such an eye fixation threshold would likely differ across individuals. Furthermore, this type of threshold could possibly vary within individuals, given the levels of variation in the complexity of processing they are engaged in on any two tasks. As Godfroid *et al.* (2010) suggest, these remain important issues for future research.

Note

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24

Motivation

Ema Ushioda and Zoltán Dörnyei

Historical discussion

Motivation has been a major research topic within second language acquisition (SLA) for over five decades, ever since it became recognized as an important internal cause of variability in language learning success. Of course, the study of motivation in general has a much longer history across the broader disciplines of mainstream and educational psychology. Second language (L2) motivation research has evolved somewhat independently, however, originating in a concern to address the unique social, psychological, behavioral, and cultural complexities that acquiring a new communication code entails. Over the years, the field has evolved through successive phases reflecting increasing degrees of integration with developments in mainstream motivational psychology, while retaining a sharp focus on aspects of motivation unique to language learning. Dörnyei and Ushioda (2011) have identified these phases as follows:

- The *social-psychological period* (1959–1990), characterized by the work of Robert Gardner and his associates in Canada
- The *cognitive-situated period* (during the 1990s), characterized by work drawing on cognitive theories in educational psychology
- The *process-oriented period* (turn of the century), characterized by a focus on motivational change
- The *socio-dynamic period* (current), characterized by a concern with dynamic systems and contextual interactions.

L2 motivation research owes its origins to two Canadian social psychologists, Robert Gardner and Wallace Lambert, who conducted a series of studies investigating language learning attitudes and motivation dating back to 1959, and published a collective report in 1972 that was to prove seminal in shaping this research area for the next two decades. Gardner and Lambert (1972) theorized that motivation was a significant cause of variability in SLA, and that its effect was independent of ability or aptitude. They speculated moreover that SLA had important social and psychological dimensions which distinguished the motivation to learn a second language from other types of learning motivation, since learners are expected not simply to acquire knowledge of the language but to identify with the target language community and adopt their distinctive speech behaviors and styles. Individuals' attitudes toward the target language community, as well as their ethnocentric orientation in general, were hypothesized to exert a directive influence on their L2 learning behavior, which led Gardner and Lambert (1972) to propose two kinds of motivational orientation in language learning: an *integrative* orientation "reflecting a sincere and

personal interest in the people and culture represented by the other group"; and an *instrumental* orientation "reflecting the practical value and advantages of learning a new language" (p. 132).

Founded in the bilingual social context of Canada, L2 motivation research thus originated in a *social-psychological* framework implicating the social context of SLA and attitudes and relations between different communities. This social perspective sharply differentiated L2 motivation research from the individual-cognitive perspectives then dominating mainstream motivational psychology, and as Dörnyei (2005) comments, was radically ahead of its time since socio-contextual perspectives did not really begin to inform motivation research in mainstream psychology until the 1990s (p. 67). Through the 1970s and 1980s, Gardner and Lambert's theory and later models developed by Gardner and his associates generated a wealth of empirical investigation in Canada and beyond (see e.g., Gardner, 1985; Gardner and MacIntyre, 1993).

By the late 1980s and early 1990s, however, there was a sense that the social-psychological line of inquiry had run its course and that alternative research perspectives were needed to complement the existing findings and thus widen the horizon of L2 motivation research. This view was voiced independently by a number of scholars at the turn of the decade (e.g., Brown, 1990; Crookes and Schmidt, 1991; Julkunen, 1989; Skehan, 1989), and prompted a series of discussion papers published in *The Modern Language Journal* in 1994 on broadening the research agenda (e.g., Dörnyei, 1994a, b; Gardner and Tremblay, 1994; Oxford and Shearin, 1994). These discussions marked a shift toward what Dörnyei (2005) has called the *cognitive-situated period* of L2 research. This period was characterized by two interrelated trends: (a) the need to bring L2 motivation research in line with *cognitive* theories in mainstream motivational psychology, and (b) the desire to move from the broad macro perspective of ethnolinguistic communities and learners' general dispositions to L2 learning to a more *situated* analysis of motivation in specific learning settings (e.g., classrooms). Essentially, the cognitive-situated period entailed focusing more on motivation in L2 instructional contexts, integrating cognitive motivation concepts from the education field (e.g., intrinsic motivation, self-efficacy, attributions) and developing more extensive theoretical frameworks (e.g., Dörnyei, 1994a; Williams and Burden, 1997), yet without discarding social-psychological perspectives altogether.

With this more situated analysis of motivation in the classroom setting, attention was also drawn to the unstable nature of motivation during the learning process, whether during engagement in a task, through successive lessons, or across the broader time span of a course of study. Analyzing the temporal structure of motivation has always been a challenge in mainstream motivational psychology, since motivation research has typically relied on theoretical models and corresponding research designs that attempt to measure motivation at a particular point in time and investigate relationships with other variables such as achievement or performance. These approaches do not lend themselves to investigating the complex ebb and flow of motivation. Such snapshot approaches have also dominated L2 motivation research, and it is only relatively recently that we have begun to address temporal perspectives and adopt more *process-oriented* approaches to the analysis of L2 motivation (e.g., Dörnyei, 2002; Dörnyei and Ottó, 1998; Shoaib and Dörnyei, 2005; Ushioda, 1996a, 2001; Williams and Burden, 1997). In this connection, a basic first step in analyzing motivation from a temporal perspective is to clarify the conceptual distinction between motivation to engage in L2 learning (choices, reasons, goals, decisions), and motivation during engagement (how one feels, behaves, and responds during the process of learning). Dörnyei and Ottó's (1998; see also Dörnyei, 2000, 2001b) process model represents the most elaborate attempt to date to delineate the temporal structure of L2 motivation, which it divides into pre-actional (choice motivation), actional (executive motivation), and post-actional (evaluation) phases, each shaped by various internal and contextual motivational influences and regulatory mechanisms. These influences and mechanisms can be enhancing (e.g., sense of self-efficacy, positive teacher

feedback), or inhibiting (e.g., competitive pressures, distracting influences), depending on whether they contribute to successful implementation of the goal or dampen the actor's endeavor.

The process model of L2 motivation has two key shortcomings: (a) it assumes that we can define clearly when a learning process begins and ends; (b) it assumes that the actional process occurs in relative isolation, without interference from other actional processes in which the learner may be simultaneously engaged. These shortcomings in fact reflect limitations of most approaches to motivation in SLA to date, which, in the effort to identify explanatory linear models, have not taken adequate account of the dynamic and situated complexity of the learning process or the multiple goals and agendas shaping learner behavior. Within the past decade or so in the broader field of mainstream motivational psychology, there has been a move toward more dynamic contextual paradigms for the analysis of motivation (e.g., Järvelä, 2001), where the relationship between individuals and context is conceived of in terms of complex and dynamic organic systems emerging and evolving over time. Such perspectives have also begun to influence thinking in the L2 motivation field, heralding a shift to the current new *socio-dynamic* phase. This phase is characterized by a focus on the situated complexity of the L2 motivation process and its organic development in interaction with a multiplicity of internal, social, and contextual factors—that is, a move toward relational or dynamic systems perspectives on motivation (e.g., Dörnyei, 2009a; Ushioda, 2009); and characterized by a concern to theorize L2 motivation in ways that take account of the broader complexities of language learning and language use in the modern globalized world—that is, by reframing L2 motivation in the context of contemporary theories of self and identity (Dörnyei, 2005; Dörnyei and Ushioda, 2009a).

It should be noted that complexity theory and dynamic systems perspectives have also begun to pervade discussions across the wider field of SLA (e.g., Ellis and Larsen-Freeman, 2009; Larsen-Freeman and Cameron, 2008a; see also Larsen-Freeman, Chapter 5, this volume). In this regard, the current socio-dynamic phase may represent a period when motivation research contributes to the development of major lines of thinking within SLA. Surprisingly perhaps, this kind of integration of motivation research with the more dominant linguistic traditions that prevail in SLA has been slow in coming. As Dörnyei (2003) comments, motivation research has endured a somewhat isolated and marginalized position within SLA, largely because it has had rather little to say about how the psychology of motivation relates to the actual processes and intricacies of linguistic development, which are the major emphasis in SLA, regardless of the theoretical motivation. The analysis of motivation and its role in SLA has largely been at the level of global learning outcomes or measures of proficiency. Thus while motivation is recognized as a prerequisite for SLA to take place, the relevance of motivation research to understanding the finer detail of how SLA happens has been rather unclear. Despite the moves toward more cognitive-situated and then process-oriented approaches, L2 motivation research has not really succeeded in bridging the gap between psychological and linguistic perspectives in SLA. It will be interesting to see if the current socio-dynamic phase brings about a real change in this respect.

Core issues

Throughout the history of L2 motivation research to date, a central preoccupation has been to develop a theoretical analysis of motivation and its role in SLA. Until the 1990s, the theoretical concept that prevailed was a social-psychological construct, composed of three motivation components (motivational intensity, desire to learn the language, attitudes toward learning the language); and motivational antecedents comprising orientations (i.e., integrative or instrumental reasons for learning) and attitudinal factors (interest in foreign languages, attitudes toward the target language community, attitudes toward the L2 learning situation) (for detailed discussion,

see Gardner, 1985, pp. 146–150). In short, the social-psychological tradition established a rigorously articulated analysis of L2 motivation, which distinguished between motivation *per se* (encapsulating effort, desire, and positive affect toward learning the language) and its social-psychological determinants (orientations and attitudes). While Gardner and Lambert's (1972) original model predicted direct causal links between orientations, attitudes, and L2 proficiency, Gardner's later conceptualization hypothesized that this association was mediated by motivation (Gardner, 1985, p. 150). Empirical investigations largely confirmed this analysis, as well as the independence of motivation and aptitude as causal variables influencing L2 achievement (Gardner, 1985; Masgoret and Gardner, 2003).

Research findings also pointed to the prevalence and significance of a particular constellation of attitudinal-motivational variables reflecting integrative motivation—that is, a combination of integrative orientation, positive attitudes, and motivation, providing empirical support for Gardner's (1985) key claim that L2 motivation “always has an integrativeness component,” since even when motivation is instrumental “this has associated with it some level of willingness to interact with other communities” (p. 168). Undoubtedly this claim represents the core issue to emerge from the social-psychological analysis of L2 motivation, provoking critical questions about the nature of integrative motivation, its strong or weak forms (i.e., whether it expresses a desire to identify and integrate with the target language community, or simply positive attitudes and interest), its generalizability and relevance to foreign language (FL) versus L2 learning settings, and its conceptual distinctiveness from instrumental motivation or other possible kinds of motivational orientation (e.g., Clément and Kruidenier, 1983; Dörnyei, 1990; McDonough, 1981).

As the analysis of L2 motivation moved beyond social-psychological perspectives through the 1990s, the integrative and instrumental dimensions of L2 motivation continued to be recognized as important in determining basic learning goals and language choice, but insufficient to explain the processes of motivation shaping engagement in learning, particularly in formal classroom contexts. Intrinsic and extrinsic orientations gained theoretical prominence as motivation concepts more relevant to the analysis of classroom language learning, and more directly amenable to pedagogical influence and to internal as well as external regulation (e.g., Dörnyei, 1994a; Noels, 2001; Ushioda, 1996b; Williams and Burden, 1997). Dörnyei's (1994a) expanded framework analysed L2 motivation in terms of three levels: the *language level* (integrative and instrumental motivational subsystems), the *learner level* (individual motivational characteristics), and the *learning situation level* (situation-specific motives relating to the course and social learning environment). Core issues during the cognitive-situated and process-oriented periods increasingly turned to practical questions of how motivation might be initiated, influenced, supported, or sustained. Attention thus focused on the interaction between the learning situation (e.g., instructional techniques, classroom environment, interpersonal relations), and individual motivational cognitions and behaviors (e.g., goals, attitudes, beliefs, processing of experience, self-regulatory strategies) (Dörnyei, 2002; Dörnyei and Tseng, 2009).

From a conceptual point of view, this interactional focus considerably complicates the analysis of motivation, since its theoretical boundaries are seen to extend beyond the individual to embrace the dynamic interaction between the individual and the social learning environment. A key issue now emerging is how to integrate the individual and context in the analysis of motivation (for a recent overview of the challenging nature of this task, see Dörnyei, 2009d). This issue mirrors similar theoretical concerns in contemporary mainstream motivational psychology, and also reflects broader debates within the SLA field concerning cognitive-psycholinguistic versus social-contextual perspectives on language learning (e.g., Lafford, 2007; Zuengler and Miller, 2006). Where the analysis of motivation is concerned, a further issue is the difficulty of isolating “motivation” (traditionally classified as an affective variable and individual difference

characteristic—e.g., Skehan, 1989) from the range of cognitive and emotional processes that interact with one another (and the social environment) to shape engagement in learning. Addressing these issues, Dörnyei (2009a) has recently argued against an individual difference approach to motivation in favor of a dynamic systems framework. Dynamic systems approaches concern the behavior of complex systems that contain multiple interconnected components, where development is characterized by non-linear growth as systems adapt and evolve organically in response to contextual processes and in ways that contribute to shaping context. As Dörnyei (2009a, d) argues, this dynamic systems perspective on SLA processes renders the notion of discrete individual difference variables (such as motivation) rather meaningless, since processes of motivation, cognition, and emotion and their constituent components continuously interact with one another and the developing context, thereby changing and causing change, as the system as a whole restructures, adapts, and evolves. As noted above, complex systems perspectives have also begun to influence thinking across the wider field of SLA (see Larsen-Freeman, Chapter 5, this volume), and it seems likely that a dynamic systems approach to the analysis of motivation will entail much closer integration with other dimensions of SLA than hitherto, given that the focus is across evolving systems of interacting internal and contextual factors shaping engagement in SLA, and given the need to consider the processes of human agency and intentionality that are fundamental to the interactions between individual and context (Sealey and Carter, 2004). However, a key challenge will be to develop workable research designs and analytical tools to investigate such systems in a coherent way (see Larsen-Freeman and Cameron, 2008b).

Returning to the social-psychological dimensions of L2 motivation, the integrative/instrumental motivation concepts have maintained their enduring influence on theorizing about why people learn languages or choose particular languages to learn. Since the turn of the century, however, growing discussions about the global spread of English have provoked a new critical issue in the analysis of integrative motivation. A basic question we have begun to ask is whether it is meaningful to talk about integrative motivation in the case of English as target language, given the status of English as a global language, an international lingua franca, and a basic educational skill in more and more educational curricula. One response has been to broaden the target reference group from a specific geographical community of speakers to a global community, transmuting the notion of integrative motivation to a generalized international outlook or what Yashima (2002) has called “international posture.” However, as Ushioda (2006) asks: Precisely because it is a global community, is it meaningful to conceptualize it as an external reference group, or as part of one’s internal representation of oneself as a *de facto* member of that global community? (p. 150). This shift in focus from an external reference group to the internal domain of self and identity represents a significant development in current L2 motivation theory, and was prompted in large part by the findings of a major longitudinal survey of Hungarian students’ language learning motivation (Dörnyei and Csizér, 2002; Dörnyei *et al.*, 2006). Commenting on the salience and multifaceted composition of an integrative motivation factor in their data, Dörnyei and Csizér (2002) speculated that the process of identification theorized to underpin integrativeness might be better explained as an internal process of identification within the person’s self-concept (p. 453).

Based on these findings, Dörnyei (2005, 2009b) has drawn on the psychological theory of “possible selves” (Markus and Nurius, 1986) and developed a new conceptualization of the “L2 Motivational Self System” centered on people’s vision of themselves in the future. Its central concept is the *ideal self*, signifying the attributes that one would ideally like to possess (i.e., a representation of personal hopes, aspirations, or wishes). A complementary concept is the *ought-to self*, signifying the attributes that one believes one ought to possess (i.e., a representation of someone else’s sense of duty, obligations, or responsibilities). A basic tenet is that if proficiency in the target language is integral to one’s *ideal* or *ought-to self*, this will serve as a powerful motivator

to learn the language because of our psychological desire to reduce the discrepancy between current and future self states. Key issues for analysis and empirical investigation concern how such self images develop and evolve in interaction with the complex constellations of internal and contextual processes shaping engagement in learning, represented as a third component (L2 learning experience) in the L2 Motivational Self System, and thus relating back to the dynamic systems perspectives discussed above.

Data and common elicitation measures

As an abstract, multifaceted construct subject to various internal, contextual and temporal processes, motivation is notoriously difficult to measure in an objective way. It is not directly observable, since observable behaviors (e.g., how many times students bid for turns in class) may well reflect a variety of underlying motivational factors (e.g., interest in learning, or a desire to display knowledge, outperform others, please the teacher, seek attention or praise). Consequently, motivation research has generally relied on gathering self-report data to access L2 learners' own perspectives, such as, for example, how much they agree or disagree with, rate the importance of, or perceive as true for themselves, certain statements reflecting particular attitudes, intentions or behaviors (e.g., "I don't think that foreign languages are important school subjects," Dörnyei *et al.*, 2006, p. 160).

To minimize the inherent subjectivity of such data, considerable attention has been paid to constructing rigorous measurement instruments with good psychometric properties, as exemplified in particular by the standardized Attitude/Motivation Test Battery (AMTB) developed by Gardner and his associates (see Gardner, 1985, Appendix). In its original form, the AMTB operationalizes the main attitudinal-motivational constituents of Gardner's theory, and also includes measures of language anxiety and parental encouragement. It comprises a number of multi-item Likert, multiple choice, and semantic differential scales, yielding composite indices of attitudinal-motivational variables such as *interest in foreign languages* and *integrative or instrumental orientation*. These indices are then entered into statistical analyses of relationships with other independent or dependent variables (e.g., measures of language aptitude or L2 proficiency), typically using factor analytical, correlational, regression analysis, or path analysis methods.

The AMTB has been adapted for use in a variety of L2 contexts (e.g., Clément *et al.*, 1994; Kraemer, 1993). Its psychometric design principles have been applied to the development of measures of other motivational constructs such as intrinsic and extrinsic orientations (e.g., Noels *et al.*, 2000), and have influenced approaches to constructing self-report scales to measure new L2 motivation constructs such as *ideal* and *ought-to* selves (e.g., MacIntyre *et al.*, 2009; Ryan, 2009; Taguchi *et al.*, 2009). In short, there has been a robust tradition of quantitative psychometric measurement in L2 motivation research, reflecting the methodological traditions that have prevailed in mainstream cognitive and social psychology. Strengths of this quantitative approach include rigor and systematicity in data-gathering and analysis, as well as comparability and replicability of data, and generalizability to wider populations.

As noted in our historical review earlier, however, the evolution of L2 motivation research has been characterized by a growing concern with temporal and contextual variability, and with the limitations of linear models in representing the dynamic complexity of motivational processes. Current quantitative methods of SLA inquiry are ill-equipped to investigate these more complex, process-oriented, and contextual perspectives, since such methods typically rely on superficial snapshot measures at an arbitrary point in time, seek to generalize on the basis of statistically representative patterns in the data, and are not sensitive to the particularities of evolving motivational experiences or individual-contextual interactions. Within the last decade or so, more qualitative

methods of inquiry have gradually begun to complement the dominant quantitative paradigm, in an effort to address the dynamic and situated complexity of L2 motivation, and also mirroring a general trend in SLA research. In particular, unstructured or semi-structured interview techniques have been used to elicit in-depth self-report data on motivation and motivational experience, with the transcribed data then subjected to thematic analysis based on predetermined codes and categories, grounded or emergent categories (Gibbs, 2007), or a mixture of the two (e.g., Shoaib and Dörnyei, 2005; Ushioda, 2001; Williams *et al.*, 2001).

While interview studies are inevitably limited in scale and scope, the data elicited can offer very rich insights into the process and experience of motivation, particularly when a longitudinal research design is adopted with multiple interviews with participants (e.g., Kim, 2009). Moreover, limitations in the scope of the dataset can be offset by complementing it with more large-scale quantitative data in a mixed methods research design (e.g., a questionnaire survey of attitudes and motivation, combined with follow-up interview data from a sub-sample; or an exploratory interview study followed by a questionnaire survey to generalize the findings to a wider sample). In L2 motivation research as in much SLA research in general, there is increasing recognition that mixed methods approaches can help to capture more of the complexity of the issues under investigation (Dörnyei, 2007a; Larsen-Freeman and Cameron, 2008b). In particular, with current moves toward more socio-dynamic perspectives on motivation, the investigation of contextual factors and individual-contextual interactions is likely to entail triangulation of multiple forms of data from diverse points of view (e.g., interviews with teachers and students, classroom observations, classroom interaction data, focus group discussions, learner journals, written narratives), in order to obtain a rich holistic analysis of motivation-in-context, rather than relying (as traditionally) on a single set of self-report measures (on researching the classroom as a dynamic system, see also Jessica Williams, Chapter 33, this volume). Needless to say, however, such research designs pose some interesting challenges for the analysis and representation of these complex datasets.

We now consider empirical verification. As noted above, the study of L2 motivation has been characterized by a solid tradition of empirical research, beginning with the pioneering investigations conducted by Gardner and Lambert (1972). Attitudinal-motivational, aptitude, and achievement data elicited from various groups of L2 learners in Montreal, Louisiana, Connecticut, and the Philippines were factor analysed to see if independent attitudinal-motivational and aptitude factors would emerge, each with loadings on the criterion variable achievement. The clearly bilingual setting of Montreal produced the strongest evidence of an independent relationship between integrative motivation and achievement, with findings less conclusive for the other settings. Thus, causal relationships (between motivation and achievement) and applicability to different ethno-linguistic settings became key issues during the social-psychological period, leading to critical and empirical analyses of the direction of causality (e.g., Hermann, 1980), of the chains of causation linking attitudes, orientations, motivation, and achievement (Gardner, 1985), and of their generalizability to a range of cultural and linguistic settings (e.g., Clément *et al.*, 1994; Kraemer, 1993).

To investigate causality and test the validity and generalizability of Gardner's theoretical model, sophisticated structural equation modeling techniques became adopted to verify hypothesized causal links between constructs (e.g., *attitudes toward the learning situation* and *motivation*) and between constructs and their constituent components (e.g., *attitudes toward the learning situation*, and its constituent components of Evaluation of the L2 Teacher and Evaluation of the L2 Course) (e.g., Gardner, 1985; Gardner *et al.*, 1983; Gardner *et al.*, 1997; Tremblay and Gardner, 1995). As Masgoret and Gardner (2003) summarize in their meta-analysis of empirical studies involving 75 independent samples and 10,489 L2 learners, the overall evidence underlines positive relationships between L2 achievement and five classes of attitudinal-motivational variables (attitudes toward the learning situation, integrativeness, motivation, integrative orientation, instrumental

orientation), with motivation emerging as the strongest predictor of achievement. These composite findings are irrespective of the age of the learners or the availability of the target language in the immediate environment, although it should be noted that most of the studies analysed were conducted in a single country, Canada.

Regarding the claim that L2 motivation “always has an integrativeness component” (Gardner, 1985, p. 168), the empirical evidence has been more mixed depending on cultural setting (Noels *et al.*, 2000). Even in Gardner and Lambert (1972), data from their Philippines study suggested that parental instrumental forms of motivation were more significant, a finding mirrored in more recent investigations in East Asian settings such as Warden and Lin (2000), and Chen *et al.* (2005), where a “required motivation” factor emerged, reflecting culturally valued and internalized motivation to meet social and parental expectations. While factor analytical studies in other settings have often produced a factor reflecting a positive disposition toward native speakers and the cultural values linked to the language, it is not always clearly distinguished from more pragmatic instrumental aspects of motivation or defined with reference to a specific community of speakers (Irie, 2003). Such was the finding in a major longitudinal survey of Hungarian teenagers’ language learning attitudes and motivation, spanning the period from 1993 to 2004 and involving 13,391 respondents across three phases of data collection (Dörnyei and Csizér, 2002; Dörnyei *et al.*, 2006). Although an integrative motivation factor did emerge consistently strongly in the data, it was shown to be underpinned by both practical instrumental motivation as well as attitudes to target language speakers, thus raising questions about the conceptual distinctiveness of integrative and instrumental motivation. As we saw earlier, this finding has led Dörnyei (2005, 2009b) to reframe the process of identification theorized to underpin integrativeness as an internal process of identification within the self-concept, leading to his new conceptualization of the L2 Motivational Self System. Recent attempts to operationalize the self system and test its key claims in a diverse range of contexts (China, Hungary, Iran, Japan) with extensive datasets offer cumulative empirical evidence that future self-guides act as powerful motivators for L2 learning (Csizér and Kormos, 2009; Ryan, 2009; Taguchi *et al.*, 2009).

As noted earlier, within the last decade or so L2 motivation research has also been characterized by a growing number of more qualitative studies which seek to explore the process and experience of individual motivation and its dynamic interactions with contextual factors. In these studies, motivation is defined not in terms of measurable attitudes, effort or behavior, but in terms of how learners think about their learning and process relevant experience, and how their thinking affects their motivation and engagement in learning. Qualitative interview studies by Williams and Burden (1999), Williams *et al.* (2001), and Ushioda (1996a, 2001), for example, have provided a rich source of insights into causal attributional processes shaping learner motivation—that is, how L2 learners make sense of positive or negative outcomes in their learning experience, and how their thinking then shapes subsequent motivated engagement in learning. Ushioda’s (2001) longitudinal interview study of Irish learners of French also uncovered variation between and within individuals in the temporal frame of reference shaping learner motivation, depending on how strongly motivation was perceived to be shaped by past learning experiences or future goals. Her findings suggested that goal-orientation may be better conceived as an evolving dimension of motivation, rather than as its defining rationale. Examining motivational change on a more extensive timescale, Shoaib and Dörnyei (2005) conducted retrospective qualitative interviews with 25 learners of English ranging in age from 18 to 34, and identified a number of recurring temporal patterns and key transformational episodes affecting motivation, such as transitions to new life phases (e.g., leaving school and entering the world of work) or experiences of being in an English-speaking environment. More recently, Kim (2009) has used longitudinal interview data from Korean ESL learners in Canada to provide qualitative evidence in support of Dörnyei’s

(2005, 2009b) concepts of the *ideal* and *ought-to selves*, and to elaborate the possible interrelationship between these self-guides by drawing on analytical perspectives from Vygotskian sociocultural theory and activity theory (see Lantolf, Chapter 4, this volume).

Applications

A key criticism of the social-psychological tradition of L2 motivation research was that it provided few genuinely useful insights for teachers, beyond highlighting the desirability of promoting students' positive attitudes to the target language culture (Crookes and Schmidt, 1991). As noted earlier, the shift to more cognitive-situated approaches in the 1990s brought about a stronger emphasis on the classroom context of L2 learning and on pedagogical issues such as how motivation might be generated and sustained. In particular, attention was drawn to the importance of intrinsic motivation and how it could be fostered through engaging students in setting optimal challenges or short-term (proximal) goals and promoting feelings of success and competence (Ushioda, 1996b; Williams and Burden, 1997). Personalizing learning content and making it meaningful and relevant were also emphasized as important strategies for promoting intrinsic motivation (Chambers, 1999). In addition, certain aspects of teacher behavior and teacher-student relations were identified as significant in shaping students' intrinsic motivation. For example, Noels *et al.* (1999) found that teachers who were perceived to adopt an autonomy-supportive (rather than controlling) communicative style and provide informational feedback on students' learning were likely to reinforce students' sense of self-determination and intrinsic enjoyment of learning. This finding has been mirrored in research exploring connections between L2 motivation and learner autonomy (e.g., Ushioda, 1996b, 2003), and points to the importance of adopting a democratic (rather than authoritarian) leadership style in the classroom (Dörnyei, 2007b). Among other things, this means involving students in some of the decision-making processes that shape their learning (Ushioda, 2003), and fostering trust, good interpersonal relations, and a cohesive learner group (Dörnyei, 2007b).

More generally, these and other implications of relevant theory and research have been developed into a comprehensive framework of classroom motivational strategies by Dörnyei (2001a). The framework comprises 35 motivational strategies organized according to four key phases of the teaching-learning process: creating the basic motivational conditions, generating initial motivation, maintaining and protecting motivation, and encouraging positive retrospective self-evaluation. This framework of motivational teaching practice was derived in part from empirical research with Hungarian teachers, which led to the development of an influential set of "ten commandments" for motivating students (e.g., Set a personal example with your own behavior. Increase the learners' linguistic self-confidence) (Dörnyei and Csizér, 1998). More recently, the framework has been used as the basis for large-scale investigations of teachers' motivational strategies in Taiwanese and Korean EFL contexts (Cheng and Dörnyei, 2007; Guilloteaux and Dörnyei, 2008). The research findings provide empirical confirmation that the teachers' motivational instructional practice does have a positive bearing on student motivation, but also suggest that motivational strategies may vary in importance according to cultural setting, and that context-appropriate strategies may indeed be influential in increasing student motivation. However, interesting questions remain about how far teachers can be trained to use motivational strategies or adopt a more motivational teaching practice (Kubanyiova, 2009), as well as whether the impact on student motivation may depend on how strategies used by teachers are actually perceived by students (Bernaus and Gardner, 2008).

While teachers' motivational strategies focus primarily on teacher behaviors and practices for motivating students, a related but separate angle of inquiry has focused on what has been variously

called self-motivational strategies, self-regulation of motivation, or motivational thinking (Ushioda, 2008). This angle of inquiry has been shaped by theoretical and research perspectives on the process-oriented dimension of L2 motivation (Dörnyei and Ottó, 1998; Dörnyei and Tseng, 2009; Ushioda, 2001, 2003), and has been informed in particular by theories of action control, self-regulation, and autonomy. Although concerned principally with developing L2 learners' own capacity to sustain, enhance, and protect their motivation (in the face of negative affective experiences and competing distractions), this growing literature on motivational self-regulation has clear implications for instructional practices. In particular, it highlights the important role of teacher feedback and teacher–learner dialog in helping learners to reflect on their learning process, to attribute negative outcomes to factors within their control such as effort or choice of strategies, and to engage in constructive thinking about themselves as active agents of their learning (Ushioda, 2003, 2008).

Most recently, this focus on how L2 learners think about themselves has been developed further in the context of Dörnyei's L2 Motivational Self System, which has led Dörnyei (2009b, c) to speculate about practical pedagogical strategies for helping learners (a) to construct and sustain visions of their future ideal selves as L2 users, using visualization techniques and guided imagery; (b) to develop action plans comprising interim goal-setting and self-regulatory strategies in order to operationalize the vision and build realistically toward it; and (c) to counterbalance this image of their desired self with that of their feared self (i.e., the consequences of not learning the language or failing in one's aspirations), in order to stay firmly committed to their future ideals. These ideas have been developed into a collection of practical classroom activities for teachers and learners by Hadfield and Dörnyei (in press), providing, for example, various visualization scenarios as well as protocols to substantiate the ideal self image by looking at potential obstacles and ways by which certain role models have overcome those.

Future directions

There is no doubt in our minds that future research *should* be moving toward increasing integration between: (a) group-based quantitative approaches representing a macro-perspective and (b) individual-centered social approaches representing a situated, micro-perspective. However, we cannot currently say with certainty that this direction will achieve mainstream status in L2 motivation research because there are certain salient obstacles currently blocking the way. Therefore, in this concluding section we first reiterate the main reasons why such an integration would be desirable and then discuss some obstacles that will need to be overcome by future research.

We have argued recently (Dörnyei and Ushioda, 2009b) that the study of SLA—including L2 motivation research—has been characterized by a “schizophrenic” situation whereby research approaches have been framed through polarizing dichotomies such as positivist-interpretive, quantitative-qualitative, or cognitive-sociocultural, and scholars have by and large occupied “two parallel SLA worlds” (Zuengler and Miller, 2006; see also Lafford, 2007). We have two main concerns with this state of affairs: on the one hand, we believe that both approaches can shed important and unique light on research questions—the history of L2 motivation research outlined earlier offers convincing evidence for this. On the other hand, we also feel that pursuing research agendas in such a demarcated fashion may prevent scholars from doing justice to the complex and dynamic nature of most acquisitional/developmental phenomena within the broad remit of SLA. In an inherently social process such as language acquisition, the learner cannot be meaningfully separated from the social environment within which he/she operates, and therefore the challenge is to adopt a dynamic perspective that allows us to consider simultaneously the ongoing

multiple influences between environmental and learner factors in all their componential complexity, as well as the emerging changes in both the learner *and* the environment as a result of this development (Dörnyei, 2009d).

The other side of the coin is, however, that while adopting a complex, dynamic systems perspective to the study of L2 motivation—and more generally, of individual differences—seems so beneficial in theory, it turns out to be a rather challenging task in practice. How can we meaningfully operationalize the dynamic relationship between language, learner, and the environment on the one hand, and motivation, emotion, and cognition on the other, in specific measurement terms? Admittedly, there are no easy answers or simple templates to follow, because what is needed, in essence, is changing our natural and traditional research outlook from trying to identify cause-effect relationships on the basis of selected variables to focusing on overarching processes and changes in a fluid tapestry of interrelated factors. Howe and Lewis (2005) explain that developmental psychology has been grappling with this issue for over a decade, but while many scholars have highlighted the value of dynamic systems-based thinking in theoretical articles, research in the dynamic systems vein remains a clear minority. Their conclusion of why this might be so is not at all optimistic:

We think this is because the trajectory of developmental psychology, like other dynamic systems, tends toward stability much of the time. Researchers stick to well-established habits of thinking and working, and their students acquire the same habits, often because that is the easiest road to publication and career advancement.

(Howe and Lewis, 2005, p. 250)

In sum, the current challenge in the study of L2 motivation appears to be a research methodological one: How can we establish valid “stories of motivation” which are powerful enough to resonate in the audiences and to offer concrete suggestions for application; which are backed by sufficient empirical evidence, whether qualitative or quantitative; and which are comprehensive rather than reductionist so that the complexity of motivation is not treated in a simplistic manner by focusing on one or two selected aspects only? We conclude this chapter by listing three potentially fruitful (and interrelated) research areas for future investigations in this vein:

- How does motivation change over time, and what factors drive this change? This question can be explored with regard to individual learners (i.e., multiple case studies) or whole groups of learners (i.e., longitudinal studies). The emphasis should be on trying to identify constellations of specific learner variables that form optimal patterns with environmental factors, thus constituting powerful channels of progress.
- How are aspects of one’s identity/self related to facets of one’s motivational intentions or motivated behaviors? The framework offered by the L2 Motivational Self System is obviously helpful in structuring such an investigation, but other self-aspects (e.g., professional or gender-related identities—see in particular the work of Norton, 2000; see also Duff, Chapter 25, this volume) are also likely to interact with motivational factors. A particularly relevant corollary of this issue is how identity changes may reflect motivational changes.
- How do environmental influences and contingencies shape motivational dispositions? From a theoretical point of view, this question concerns the social dimension of motivation and may lead to the exploration of motives rooted in one’s situated language identity (see Clément *et al.*, 2007). From a practical perspective, the question concerns conscious attempts to increase motivation by applying various motivational strategies or by generating language-specific vision in the learners.

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Appendix 2: Session 2 – Screen-capture data about scaffolding

<i>Action</i>	<i>Type of scaffolding</i>	<i>Average length of use in minutes per task per student</i>	<i>Number of students (out of 13)</i>	<i>Successful completion of tasks</i>
<i>Creating a step-by-step guide</i>	<i>Instructions</i>	<i>1 minute</i>	<i>8</i>	<i>11</i>
	<i>Feedback in the forum area</i>	<i>2 minutes</i>	<i>12</i>	<i>11</i>
<i>Answering the pre-reading questionnaire</i>	<i>Peer feedback from classmates on forum</i>	<i>4 minutes</i>	<i>13</i>	<i>11</i>
	<i>Teacher feedback</i>	<i>2.5 minutes</i>	<i>12</i>	<i>11</i>
<i>Summarizing each paragraph in one sentence</i>	<i>Feedback from looking at peer answers</i>	<i>2.5 minutes</i>	<i>9</i>	<i>12</i>
	<i>Task instructions</i>		<i>11</i>	<i>12</i>
<i>The general idea</i>	<i>Instructions</i>	<i>1 minute</i>	<i>13</i>	<i>13</i>
	<i>Peer results</i>	<i>4 minutes</i>	<i>10</i>	<i>13</i>
<i>Multi-task (Quiz and Glossary)</i>	<i>Instructions</i>	<i>1 minute</i>	<i>13</i>	<i>11</i>
	<i>Feedback</i>	<i>1.5 minutes</i>	<i>9</i>	<i>11</i>
<i>Creation of a concept map</i>	<i>Task instructions</i>	<i>1 minute</i>	<i>13</i>	<i>11</i>
	<i>Peer feedback on forum</i>	<i>3 minutes</i>	<i>8</i>	<i>11</i>
	<i>Teacher feedback on Forum</i>	<i>3.5 minutes</i>	<i>13</i>	<i>11</i>
	<i>One-to one workshops</i>	<i>5 minutes</i>	<i>6</i>	<i>11</i>
<i>Identify the function of sentences</i>	<i>Test feedback</i>	<i>3.5 minutes</i>	<i>13</i>	<i>13</i>
	<i>Score</i>	<i>1 minute</i>	<i>13</i>	<i>13</i>
<i>Rate the terms</i>	<i>Peer and teacher feedback on forum</i>	<i>4.5 minutes</i>	<i>10</i>	<i>11</i>
<i>Concept diagram</i>	<i>Peer feedback</i>	<i>4.5 minutes</i>	<i>9</i>	<i>11</i>
	<i>Diagram example</i>	<i>5 minutes</i>	<i>6</i>	<i>11</i>
<i>Quiz with key terms description</i>	<i>Process comments</i>	<i>4 minutes</i>	<i>13</i>	<i>12</i>
	<i>Feedback</i>	<i>2 minutes</i>	<i>12</i>	<i>12</i>
	<i>Score</i>	<i>1.5 minutes</i>	<i>13</i>	<i>12</i>

Appendix 3: STI and Bloom's levels of cognitive development during session 2 of the training

Bloom's levels of cognitive development	STI	Session 2 stages	Session 2 tasks	STI
Remembering Understanding	Orienting	1. Developing reading and understanding of keywords	a. Warm up polls	Orienting
			b. Creation of an article diagram	Materialisation
			c. Prediction strategies quiz	Orienting
			d. Creation of a questionnaire (prediction strategies)	Materialisation & Verbalisation
			e. Vocabulary activity	Orienting
Reasoning Creating Evaluating	Materialisation and verbalization	2. Reading and understanding to develop conceptual and critical thinking	a. step by step creation guide	Materialisation
			b. answer student guide	Verbalisation
			c. general idea	Orienting
			d. summary task	Materialization
			e. glossary creation	Materialisation & verbalisation
			f. mind map creation	Materialisation
			g. identifying the function of sentences	Conceptual thinking

Creation (General)	Integrated: materialization, verbalisation and conceptual thinking	3. Preparing presentation notes and note-taking	a. formality task	Orienting
Understanding for task A				
Reasoning – task b			b. author's purpose & tone	Orienting
Creating– task c			c. summary practice	Orienting
Evaluating – task d			d. presentation content outline	Materialization
Creating – task e			e. presentation preparation	materialization
Creating		Delivery of presentation		Verbalisation

Appendix 4: Activities and modules of the Moodle platform

Activities and modules of the Moodle platform (adapted by Costa et al. (2012))

Bloom's taxonomy	Piotrowski's Classes	Module	Description	STI
	Creation	Database	-allows to build, display and search a bank of record entries about any topic -allows to share a collection of data	Conceptual thinking
	Organisation	Lessons	-represent a set of ordered topics summarizing the instructional materials and allow the -access to them through the respective link	Orientatin / Materialisation
Synthesis	Delivery	Assignments	-allow teachers to collect work from students -allow teachers to evaluate the student's work and provide feedback including grades, in a private mode -allow students to upload assignment files	Materialisation/verbalisatin
		Workshops	-represent a peer assessment activity with many options -allow students to submit their work via an online text tool and attachments	
Application	Communication	Chats	-allow synchronous conversation	Verbalisation
		Forums	-represent a communication tool where students and teachers can exchange ideas by posting comments	
		News	-represent a special forum for general announcements allow teachers to add posts and to send emails	
	Collaboration	Glossary	-allows creating and maintaining a list of definitions -represents a mechanism for collaborative activities that can be restricted to entries made by the teacher	Materialisation
		Wikis	-Wikis allow users to edit collaborative Web pages -provide space for collaborative work	
Evaluation // Comprehension	Assessment	Choice	-allows teachers to ask questions and specify multiple choice answers -represents a useful mechanism to stimulate thinking about a topic	Conceptual thinking
		Quiz	-allows teachers to design and build quizzes with a variety of questions, with different types of answers, such as multiple choice, true/false, short answer	
		Survey	-allows teachers to gather feedback from students using prepackaged questionnaires	
		Feedback	-allows teachers to create surveys to collect feedback	

Appendix 5: Participant information sheet and consent form

University of Essex, Department of Language and Linguistics

Project: Scaffolding understanding in an L2 academic context: A Sociocultural theory (STC) approach

What is the project about?

The purpose of this study is to investigate the use of content management environments like Moodle to create meaningful contexts for enabling University students to develop their language skills for academic purposes, e.g., to meet the needs of the university environment. The main aim is to investigate the feasibility and effectiveness of scaffolding mechanisms in a specifically designed pedagogical unit called Scaffolding Advanced Academic Skills (SAAS) which will be available on Moodle.

What does participating involve?

If you are happy to participate in this project, you will be asked to perform a series of tasks on content management environment, i.e., Moodle; your performance will be audio and video-recorded while you are working on the tasks on-line. You might also be asked to fill in a questionnaire and/or take part in an audio-recorded interview so that we learn about your experience and views about the tasks and the learning environment. In total, participation will take about two hours per day for a total of 5 days. Your participation will be voluntary, but as a small token of gratitude for your time, you will be given a USB memory stick.

Please tick the appropriate boxes

Yes No

Taking Part

I have read and understood the project information given above.

☐ ☐

I have been given the opportunity to ask questions about the project.

☐ ☐

I agree to take part in the project. Taking part in the project will include ☐ ☐
being interviewed and audio and video-recorded.

I understand that my taking part is voluntary; I can withdraw from the ☐ ☐
study at any time and I do not have to give any reasons for why I no longer
want to take part.

Use of the information I provide for this project only

I understand my personal details such as name, email address and phone ☐ ☐
number will not be revealed to people outside the project.

I understand that my words may be quoted anonymously in publications, ☐ ☐
reports, web pages, and other research outputs.

Use of the information I provide beyond this project

I understand that other genuine researchers will have access to this data ☐ ☐
only if they agree to preserve the confidentiality of the information as
requested in this form.

I understand that other genuine researchers may use my words ☐ ☐
anonymously in publications, reports, web pages, and other research
outputs, only if they agree to preserve the confidentiality of the information
as requested in this form.

_____	_____	_____
Name of participant [printed]	Signature	Date
_____	_____	_____
Researcher [printed]	Signature	Date

Project contact details for further information:

Researcher: Vasiliki Antoniou

Email: vanton@essex.ac.uk

Supervisor: Dr. Adela Gánem-Gutiérrez

Email: aganem@essex.ac.uk

Appendix 6: Oral presentation assessment rubric for the pilot study

Focus (Weight)	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
Organization & Structure Weight: 1	Not possible to understand presentation due to absence of structure.	Difficult to follow presentation due to erratic topical shifts and jumps.	Most information is presented in logical order which is easy to follow.	All information is presented in a logical, interesting and novel sequence, which is easily followed.	
Content & Knowledge Weight: 3	No grasp of information. Unable to answer questions about subject.	Uncomfortable with information. Capable only of answering rudimentary questions.	At ease with content and able to elaborate and explain to some degree.	Demonstration of full knowledge of the subject with explanations and elaboration.	
Visual Aids & Neatness Weight: 2	No visual aids.	Occasional use of visual aids, however they barely support text or presentation. Several misspellings and/or grammatical errors on slides.	Visual aids are related to text and presentation. Minor misspellings and/or grammatical errors.	Text and presentation are reinforced by the use of visual aids. Negligible misspellings and/or grammatical errors.	
Delivery & Speaking Skills Weight: 2	Significant mumbling and incorrect pronunciation of terms. Voice level too low or too high. Monotonous, no eye contact, rate of speech too fast or too slow	Occasional mispronunciation of terms. Little eye contact, uneven rate, only little expression	Voice is clear and at a proper level. Most words pronounced correctly. Some eye contact, steady rate, excessively rehearsed	Clear voice and correct, precise pronunciation of terms. Good eye contact, steady rate, enthusiasm, confidence	
Presentation Length Weight: 1	Too long or too short. +/- 20 minutes	+/- 10 minutes	+/- 5 minutes	+/- 2 minutes	
OVERALL PERFORMANCE	Unacceptable	Marginal	Acceptable	Exceptional	TOTAL
POINTS REQUIRED	0–6	7–13	14–20	21–27	

Appendix 7: Results of the test that demonstrate the very close textual richness of all three treatment texts

Feedback article	
sample set size: 100	
0.887: 0.879: 0.864: 0.864: 0.871: 0.872: 0.860: 0.865: 0.858: 0.854: 0.855: 0.852: 0.848: 0.845: 0.851: 0.850:	
best d	
119.83	0.0004
Check	
99.99	0.0023

Motivation article	
sample set size: 100	
0.887: 0.878: 0.876: 0.872: 0.870: 0.876: 0.850: 0.862: 0.849: 0.850: 0.848: 0.841: 0.845: 0.844: 0.842: 0.843:	
best d	
107.88	0.0005
Check	
99.99	0.0016

Attention – noticing article	
sample set size: 100	
0.876: 0.880: 0.872: 0.860: 0.871: 0.864: 0.862: 0.855: 0.851: 0.853: 0.860: 0.845: 0.848: 0.845: 0.85: 0.844:	
best d	
108.35	0.0003
Check	
99.99	0.0015

Appendix 8: Moodle screen-capture

The following screen-captures indicate the section on Moodle where the course documents were located and where the articles were made available to students.

The screenshot shows the Moodle course interface. The top navigation bar includes 'MOODLE', 'Courses', 'Archive', 'FASER', 'Listen Again', 'IT @ Essex', 'Help', and 'Logout'. The user is logged in as 'Hello Vasiliki Antoniou (Log out)'. The left sidebar shows the 'ADMINISTRATION' menu with options like 'Course administration', 'Turn editing on', 'Edit settings', 'Course completion', 'Users', 'Filters', 'Reports', 'Grades', 'Outcomes', 'Badges', 'Backup', 'Restore', 'Import', 'Reset', 'Question bank', and 'Repositories'. The main content area displays 'Session 3 - Summing Up!' with a diagram showing a central question mark surrounded by 'WHERE', 'WHEN', 'HOW', 'WHAT', and 'WHO'. Below this, the 'Course documents' section is visible, showing 'Folders: 6' and 'Progress: 0 / 5'.

The screenshot shows the 'Course documents' section. At the top, there is a 'Your progress ?' indicator. Below it, a list of documents and folders is displayed. The documents are organized into folders: 'Article', 'Session 1_Task 6: Student examples', 'Session 1 - Task 10_Student examples', 'Session 2 - Task A_Student examples', and 'Session 2 - Task F_Student examples'. Each folder contains a list of documents, such as 'Task 6 - Student 1.docx', 'Task 6 - Student 2.docx', 'Task 6 - Student 3.docx', 'Task 10 - Student 1.docx', 'Task 10 - Student 2.docx', 'Steps for reading an academic article.docx', 'Task F-Student 2.docx', 'Task F - Student 3.docx', 'Task F-Student 4.docx', and 'Task F Student 1.docx'. Each document has a checkbox next to it, indicating its progress status.

Appendix 9: Retrospection task, aspects of analysis and coding

Imagine that you have to read an academic paper in your field. Think about whole process that you go through in order to read the paper and understand its main points. Also think about which elements help you understand it (e.g., charts, tables, etc.) and which parts or aspects of reading academic papers are particularly difficult for you. I'll give you 10 minutes to think about this and

Based on this task the researcher explored the introspection tasks for the following areas that arose by examining the recorded data:

Reading process
• Top down
• Bottom up
Reading strategies
• Connect what I already know to what I'm reading
• Connect what I'm reading with other sections of the text
• Connect co-textual elements (i.e. graphic illustrations, charts, and highlighted concepts"
• Identify main ideas and concepts (i.e. underline, highlight, italicised terms)
• Predict the reading content (i.e. look for concepts, charts, titles)
• Ask questions about the content (i.e. turn titles or headings into questions)
• Identify the organisation of arguments (i.e. follow the outline of the article)
• Identifying a purpose for reading the paper
• Skimming
• Scanning
• Identify the article type (Seymour, 1996):
○ Explanation
○ Definition
○ Sequence
Academic paper structure
• Abstract
• Introduction
• Review of the research / literature review
• Methods and materials
• Procedures
• Results
• Discussion
• Implications
• References
Paralinguistic elements
• Glossaries
• Tables / Graphs / Charts
Paragraph structure
• Topic sentence
• Supporting arguments
• Summary sentence
• Extension of the idea

Discourse markers
• Classification (i.e. categories / bullets /headings)
• Process (i.e. cardinal numbers / adverbs such as next, as soon as, while)
• Illustration (i.e. for example. For instance, etc.)
• Cause/ effect (i.e. consequently, therefore, for these reasons, etc.)
• Comparison (i.e. similarly, in the same way, etc.)
Difficulties
5. Deducing unknown Vocabulary / Terminology
6. Interpreting Charts
7. Identifying the topic
8. Identifying the paper's topic and relating to their purpose for reading
Solutions to difficulties
1. –dictionary use
–further exemplification reading
–consultation of glossary with terms

Introspection task – Coding scheme (42 codes)				
Code	Description	Example	When to use	When not to use
RP1	Reading process: Top down	“I start by paying attention to the general text elements and then I move on to reading..”	To describe a student’s general approach to reading	Use RS5 if the student refers to predicting content by paying attention to general text elements
RP2	Reading process: Bottom up	“I like reading an article in detail right from the start..”		
RS	Reading strategies			
RS1	Connect what I already know to what I’m reading	“I tend to think of the general topic and see if I know anything about it first..”		
RS2	Connect what I’m reading with other sections of the text	“and at times, while reading, I check the next paragraphs to see what follows..”		
RS3	Connect co-textual elements (i.e. graphic illustrations, charts, and highlighted concepts”	“When I read I also pay attention to charts, etc. to check if they relate to what I’m reading..”		
RS4	Identify main ideas and concepts (i.e. underline, highlight, italicised terms)	“I find it useful to look for the main idea in a paragraph and make a note”	When a student looks for the main idea, concepts, key words while reading	Not be used when a student mentions for instance underlining without explaining the purpose
RS5	Predict the reading content (i.e. look for concepts, charts, titles)	“Before I read the article I look for keywords, or try to understand what it will be about by reading the headings..”	When a student briefly checks for concepts, etc. before the reading process starts	This should be viewed as a pre-reading (preparation strategy)
RS6	Ask questions about the content (i.e. turn titles or headings into questions)	“I tend to read by having specific questions in mind like when did sth happen and when I locate information I use the wh word to make a note next to the title of this section..”		
RS7	Identify the organisation of arguments (i.e. follow the	“It is also useful to check the structure of the		

	outline of the article)	article just to understand the organization of content better...”		
RS8	Identifying a purpose for reading the paper	“I’m almost always looking for sth when reading and keywords for example help me understand why I’m reading an article		
RS9	Skimming	“There was a time when I read an article got the main idea very quickly, like within 10 minutes..”	When a student refers to general skimming tips	
RS10	Scanning	“In certain cases I tend to look for specific information because I’m working on an essay i.e. definitions of behaviourism..”	Or general scanning tips	
IAT	Identify the article type (Seymour, 1996):			
IAT1	• Explanation	“I know for example when an article states a problematic area in the field and then explanations and solutions are provided..”	Only if the students clearly explains how they distinguish the article type	Justification required
IAT2	• Definition	“I try to see if the article develops around a specific concept or not..”	Only if the students clearly explains how they distinguish the article type	Justification required
IAT3	• Sequence	“When I read I’m also looking at the structure and if there are stages for example in the way content is grouped..”	Only if the students clearly explains how they distinguish the article type	Justification required
APS	Academic paper structure			
APS1	• Abstract	“I then tend to look at the abstract to find out more information..”		
APS2	• Introduction	“The introduction also helps me to understand the topic..”		
APS3	• Review of the literature review	“If I decide to read in detail then the lit review is very important..”	Covers also mentions to parts such as background information, etc.	
APS4	• Methods and materials	“The methodology section is a part read if I want to find more about instruments, participants, etc.)		
APS5	• Procedures	“When I try to understand how the researcher got the results I read about how the experiment was conducted..”		
APS6	• Results	“I do not tend to read the results because at times the description is not very clear..”		

APS7	Discussion	"I like this part if I have understood the method because it explains the results even further..."		
APS8	Implications	"If I want to understand more about issues or problems then there's usually a section about this..."	Can also be used if the students make reference to sections such as Limitations, etc.	
APS9	References	"At times I might look at the list of references to find out more sources about the same topic..."		
PE	Paralinguistic elements			
PE1	Glossaries	"If there's a glossary I look there for more information about terms..."		
PE2	Tables/Graphs/Charts	"I might have a look at charts to see if I can understand anything extra..."	In case the students consult these elements not just for prediction purposes but to get more in depth knowledge	
PS	Paragraph structure			
PS1	Topic sentence	"When I read quickly I tend to focus on the first sentence in each paragraph."	It is not necessarily the first sentence in a paragraph though	
PS2	Supporting arguments	"For reasons or examples I check paragraphs to see if there extra arguments..."		Can be the main body only if it includes evidence that supports the paragraphs topic
PS3	Summary sentence	"...I then read the last sentence from each paragraph to get an idea quickly"		
PS4	Extension of the idea	"If I find the topic sentence interesting then I read the whole paragraph to understand more..."	Can refer to the main body of a paragraph or the number of paragraphs that explain the idea further	
DM	Discourse markers			
DM1	Classification (i.e. categories / bullets /headings)	"I like bullet points because they sort of guide me and make information stand out..."	Subtitles can also be used as classification symbols	

DM2	Process (i.e. cardinal numbers / adverbs such as next, as soon as, while)	“At times I’m looking for connectives to understand when the next section starts or when did the discussion on a topic begin within the article..”		
DM3	Illustration (i.e. for example., for instance, etc.)	“..or if I need an example I look for i.e., etc..”		
DM4	Cause/ effect (i.e. consequently, therefore, for these reasons, etc.)	“Conclusions are quite obvious and this is where I find reasons for something too..”		
DM5	Comparison (i.e. similarly, in the same way, etc.)	“If I want an example I might look for similar situations that sometimes authors discuss..”		
D	Difficulties			
D1	Deducing unknown Vocabulary / Terminology	“Quite often I find it difficult to understand specific terms in the field but then I read the rest of the paragraph and I get the meaning of these terms...”	This covers, context, related or relevant vocabulary as well...	
D2	Interpreting Charts	“I think charts are quite difficult because I don’t know how to read them..”		
D3	Identifying the topic	“There are moments where I read and read and the text is so theoretical I can’t figure out what the main topic is..”		
D4	Identifying the paper’s topic and relating to their purpose for reading	“In other cases I read the article but I can’t decide If I really need it for my reading purposes..”		
StD	Solutions to difficulties			
StD1	Dictionary use	“I use dictionaries a lot, like online, books, terminology dictionaries..”	Covers all sources of this type and function	Are article-external sources
StD2	Further exemplification reading	“If I’m not able to understand then I keep reading certain parts over and over...”	Reading further and in details	
StD3	Consultation of glossary terms	“Some articles provide like a list of terms and definitions so I find this useful when I can’t follow..”	Not extra source, it is part of the article structure	

Appendix 10: Concept map task

Now imagine that you are going to give a 10 minute presentation to your peers based on the paper given to you. You need to complete the following tasks:

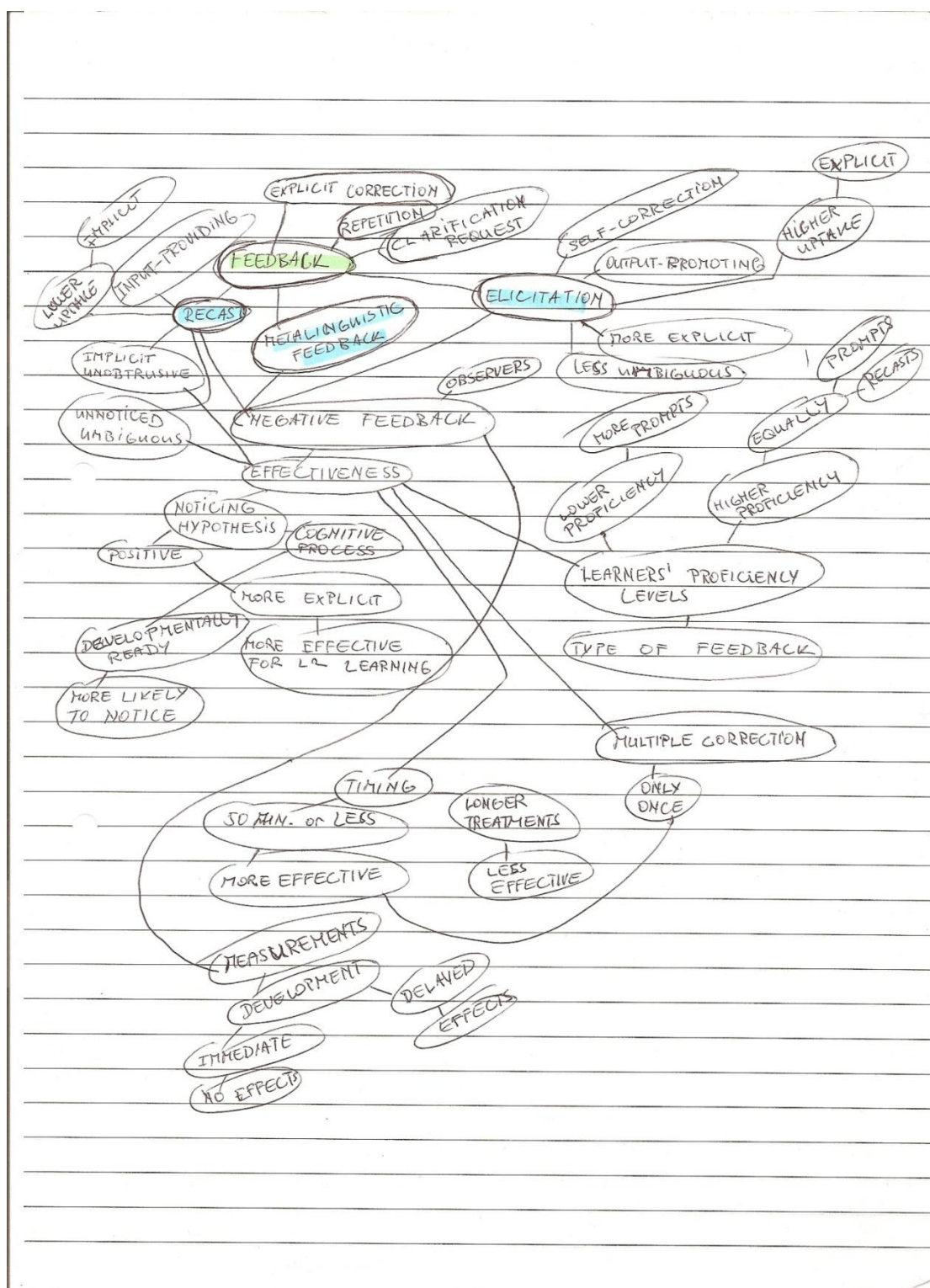
- a) Construct a concept or mind map
- b) Deliver your presentation (you can rehearse for 20 minutes and after that you will be asked to deliver it).

When presenting you will only be allowed to have an A4 piece of paper with your concept map as a prompt to give your presentation. No other notes or materials (e.g., PowerPoint) will be allowed).

Appendix 11: Example of quantitative student and expert concept map analysis

An example of a student pre-concept map and an expert map is presented below:

Expert map



The student's map received a score of 44 for the established relationships between concepts, a score of 35 for the 7 identified levels ($7 \times 5 = 35$), no points were awarded for cross-links as there were no relevant instances and finally 2 points for the two examples that the student brought up (2×1). The total raw score was therefore 81 and the student's map was therefore 66.9% similar to the expert's map.

Appendix 12: Online feedback Moodle questionnaires

Session 1:

What did you think?

Continue

There are required fields in this form marked *.

How would you rate this session in terms of the new content you have acquired? (1-bad - 10 very good)* (1 - 10)

What did you think about the tasks you completed?*

How would you rate the time available for the training? (1- bad - 10 best)* (1 - 10)

Did this session help you improve in your academic reading? How? If not, why?*

Any general suggestions?*

Session 2:

What did you think?

Continue

There are required fields in this form marked *.

How would you rate this session in terms of the new content you have acquired? (1-bad - 10 very good)* (1 - 10)

What did you think about the tasks you completed?*

How would you rate the time available for the training? (1- bad - 10 best)* (1 - 10)

Did this session help you improve in your academic reading? How? If not, why?*

Any general suggestions?*

Session 3:

What did you think?

[Continue](#)

There are required fields in this form marked *.

How would you rate this session in terms of the new content you have **acquired**? (1-bad - 10 very good)* (1 - 10)

What did you think about the tasks you completed?*

How would you rate the time available for the training? (1- bad - 10 best)* (1 - 10)

Did this session help you improve in your academic speaking? How? If not, why?*

Any general suggestions?*

Appendix 13: Questionnaire for the evaluation of the EAP task content of the Moodle Pedagogic Unit

	Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)
1. The instructions are clear				
2. The questions are clear				
3. The feedback is useful				
4. There is a comprehensive overview of the course				
5. Materials are presented in a logical order				
6. The materials cover a wide range of areas and are interesting				
7. The materials are relevant to my needs				
8. The difficulty level of the materials is appropriate to my level				
9. The course is structured in a logical order				
10. The pace of delivery is appropriate				

Session 1 Tasks				
1. Task 1 enabled me to understand the article by representing it graphically				
2. The prediction polls were useful				
3. Task 3 allowed me to identify important text elements				
4. Task 4 was helpful to understand the article structure by using pictures				
5. Task 5 enabled me to create useful article comprehension questions				
6. Task 6 was a useful activity about discourse markers				

Session 2 Tasks				
1. Task 1 enabled me to identify reading strategies for approaching a text				
2. Task 2 allowed me to check predictions by answering comprehension questions				
3. Task 3 enabled me to understand the article's main idea				
4. Task 4 enabled me to identify the main ideas				
5. Task 5 allowed me to create a glossary of terms				
6. Task 6 was a useful mind map creation about the article				
7. Task 7 enabled me to understand the function of article sentences				
8. Task 8 enabled me to understand and rate the importance of key terms				
9. Task 9 enabled me to demonstrate the interpretation of key terms				
10. Task 10 allowed me to define key article terms				

Session 3 Tasks				
1. Task 1 helped me understand the concept of formality				
2. Task 2 helped me identify different types of formality				
3. Task 3 helped me identify the author's tone and purpose				
4. Task 4 helped me summarise the main points for a presentation				
5. Task 5 enabled me to create a presentation content outline				
6. Task 6 allowed to prepare for the presentation				

Appendix 14: Scaffolding questionnaire

The following questionnaire refers to the various scaffolding features that you have encountered during the training and aims at discovering the degree to which they have contributed to your understanding. You will be asked to mention whether you have found them to be helpful by providing answers within the range of 0 (not at all helpful) to 4 (very helpful).

I think	0 (Not at all)	1 (A Little)	2 (Somehow)	3 (A lot)	4 (Very much)
a) That uploading my work on the forum area helped my learning					
b) That the peer-assessment sessions helped my learning					
c) That receiving feedback after my tasks helped my learning					
d) That consulting the glossary of terms that I created helped my learning					
e) That viewing exemplary answers helped my learning					
f) That being given a retry helped me improve					
g) That being redirected after a task to view more information helped my learning					
h) That the task instructions helped me perform the tasks					
i) That receiving notifications about work submissions helped me consult useful examples from my peers					

General statement to be rated:

“During the course, being able to perform the tasks with scaffolded assistance helped me learn the covered content”.

Strongly disagree, disagree, no opinion, agree, strongly agree.

Appendix 15: Fu's scaffolding questionnaire (2009)

Table 4

Descriptive statistics of students' perceptions towards the usefulness of various scaffolding designs for the support of student question generation.

I think...	0 ^e f (%)	1 ^e f (%)	2 ^e f (%)	3 ^e f (%)	4 ^e f (%)	3 + 4 f (%)	Mean	Rank
1. Revising and refining questions I generated	1 (2%)	2 (4%)	9 (18%)	24 (49%)	13 (27%)	37 (76%)	2.94	8
2. Accessing different versions of my generated questions ^c	1 (2%)	6 (12%)	11 (22%)	21 (43%)	10 (20%)	31 (63%)	2.67	10
3. Having access to model questions generated by my peers during the question generation task ^d	0 (0%)	0 (0%)	6 (12%)	14 (29%)	29 (59%)	43 (88%)	3.47	1
4. Not revealing my real identity when contributing questions	2 (4%)	1 (2%)	10 (20%)	17 (35%)	19 (39%)	36 (73%)	3.02	7
5. Assessing questions generated by my peers on each chapter ^a	0 (0%)	0 (0%)	7 (14%)	27 (55%)	15 (31%)	42 (86%)	3.16	3
6. Accessing the interaction history between question-generators and assessors about the examined questions ^c	3 (6%)	3 (6%)	17 (35%)	16 (33%)	10 (20%)	26 (53%)	2.55	11
7. Receiving peers' feedback on my generated questions ^a	1 (2%)	0 (0%)	4 (8%)	17 (35%)	27 (55%)	44 (90%)	3.41	2
8. Follow-up interactions with peers regarding generated questions ^a	1 (2%)	1 (2%)	8 (16%)	21 (43%)	18 (37%)	39 (80%)	3.10	5
9. Having access to a set of criteria when engaged in assessing peers' questions ^b	1 (2%)	5 (10%)	11 (22%)	21 (43%)	11 (22%)	32 (65%)	2.73	9
10. Not revealing my real identity when assessing questions	1 (2%)	2 (4%)	7 (14%)	20 (41%)	19 (39%)	39 (80%)	3.10	5
11. Having access to a set of generic question stems with sample questions when generating questions ^b	0 (0%)	2 (4%)	11 (22%)	14 (29%)	22 (45%)	36 (73%)	3.14	4
Average	0.92 (2.04%)	2.00 (4.08%)	9.18 (18.74%)	19.27 (39.33%)	17.55 (35.81%)	36.82 (75.14%)	3.03	

^a Reflective social discourse.

^b Process prompt.

^c Process display.

^d Process model.

^e 0, none or almost none; 1, little; 2, some; 3, high; 4, major.

Appendix 16: Semi – structured interview questions, aspects of analysis and coding scheme

Interview Questions

1. What is your country of origin?
2. What is your mother tongue?
3. What is the level of your studies and subject?
4. What is it that you liked the most about the training?
5. What is it that you liked the least about the training?
6. Did using Moodle make things more difficult? Did you need more explanation on how to use things?
7. Were the instructions clear? Should anything else be more detailed?
8. What did you think about the articles and the topics?
9. Were you able to understand the articles better after the training?
10. Did you think the tasks were overdemanding?
11. Did you feel that you had to commit a lot of time to the project?
12. Which tasks did you like the most?
13. Which task(s) were the worst ones?
14. Was the feedback from the tasks adequate?
15. Were the feedback questionnaires adequate?
16. What did you think about the scaffolding options during the training?
17. Was there any point where you felt bored?
18. How well were you satisfied with the program?
19. Why or why not?
20. What do you think about the level of interaction a. between students b. with the instructor?
21. What program components or activities were the most / least effective?
22. Do you think the course objectives were achieved?
23. Do you feel that you gained the desired knowledge and skills?
24. Have the Moodle vocabulary exercises been helpful for your learning of academic English? Please explain why or why not.
25. Can your teacher improve the Moodle vocabulary exercises so that they better match your needs? If yes, please explain how.
26. Have the Moodle quizzes been helpful for your learning of academic English? Please explain why or why not.
27. Can your teacher improve the Moodle quizzes so that they better match your needs? If yes, please explain how.
28. Has the Moodle forum been helpful for your learning of academic English? Please explain why or why not.
29. Can your teacher improve the Moodle forum so that it better matches your needs? If yes, please explain how.
30. What additional opinions do you have with regard to Moodle and your learning of academic English?

Interview Aspects of analysis

For scaffolding:
• Reflective social discourse:
○ Comment boxes
○ Peer-evaluations
○ Notifications with message alerts
• Process prompts
○ Built in hints
• Process displays
○ Task completion indicators
• Process models
○ Exemplary answers
• Favorite scaffolding mechanisms
• Least favorite scaffolding mechanisms
• Clarity of instructions
• Clarity of task examples
• Forum area
• Glossary
• Suggestions
• Task feedback
• Feedback questionnaires

For Tasks:
• Task scaffolding
• Academic reading training tasks
• Academic speaking training tasks
• Conceptual development
• Helpful / unhelpful
• Concerns
• Confusion
• Suggestions

For Moodle:
Relevance: how relevant is online learning to students' academic practices?
2.Reflection: does online learning stimulate students' critical reflective thinking?
3.Interactivity: to what extent do students engage online in rich educative dialogue or in peer-feedback activities?
4. Tutor Support: how well do tutors enable students to participate in online learning?
5. Peer Support: do fellow students provide sensitive and encouraging support?
6.Interpretation: do students and tutors make good sense of each other's communications?

For the Pedagogic Unit:
• Pace of delivery
• Level of difficulty
• Relevance of topics
• Interesting topics
• Logical order of materials
• Comprehensive course overview
• Clarity of instructions
• Clarity of questions
• Task characteristics
○ Quizzes
○ Forums
○ Vocabulary exercises
• Achieved / non achieved objectives
• Most effective program components
• Least effective program components
• Satisfaction with program
• Level of interaction with students / with teacher
• Suggestions for unit structure
• Suggestions for task improvement

Semi-structured interview – Coding scheme (47 codes)				
Codes	Description	Example	When to use	When not to use
For scaffolding (15)				
RSDO	General comments about reflective social discourse options	“I think the course offered quite a few options with communicate you (the tutor) and get help.”		
RSDOi	Comment boxes	“It was very useful to have comment boxes and enter information, questions or upload materials”		
RSDOii	Peer evaluations	“I found particularly interesting the fact that we could evaluate each other’s work online”	When a student refers to work that was uploaded in the workshop area of Moodle	Not when students talk about the Forum area as this was mostly for announcements or task uploads.
RSDOiii	Notifications with message alerts	“I remember I would receive an email from the forum area whenever a new announcement was made”		
PP	Process prompts i.e. built in hints	“At some point I remember clicking on some extra help info and it was useful to come up with a hint”		
PS	Process displays i.e. task completion indicators	“I always love it when I can see how much more tasks are left to do!”		
PM	Process models i.e. exemplary answers	“There were quite a few tasks I think where we were given an example answer like the one about how to create a concept map etc.”	The examples can be attachments, external links, or files	
FSM	Favorite scaffolding mechanisms	“I think I liked the workshop area (peer evaluation), the Forum and the Glossary”		
LSM	Least favorite scaffolding mechanisms	“The email notifications can get a bit annoying”		
CI	Clarity of instructions	“Yes, each task had clear instructions and we knew how to proceed”	Only when the instructions affect the performance of students / final product	
FA	Forum area	“I really liked the forum because we		

		could post questions or work there and it was quite straightforward how to use it”		
G	Glossary	“We entered a few terms and definitions but were not sure how to use it at first or edit entries”.		
S	Suggestions	“Perhaps use shorter academic articles in the future?”		
TF	Task Feedback	“I liked that I could see a score or at least an explanation of why my answer was wrong”	Code all types of feedback here as well	
FQs	Feedback questionnaires	It was good that each session had a separate feedback form at the end cause we could comment on different aspects every time		
For tasks (11)				
TS	Task scaffolding	“I’m not sure if each task provided some kind of assistance but I can remember getting some hints for example..”	Code for general references to scaffolding features from each task	
ART	Academic reading tasks	“Yes, there were quite a few tasks that helped me approach an academic article from a different perspective”	Can code both positives and negatives	
AST	Academic speaking tasks	“I think I can now prepare a good academic presentation after all these tasks”	Can code both positives and negatives	
TCQ	Task characteristics: Quizzes	“They were quite fun, especially when we would get a score and a smiley face”	Can code both positives and negatives	
TCF	Task Characteristics: Forums	“I t was good that we could submit answers for a specific task via the forum area either by uploading docs or entering info there straight away...and each task had its own space there..”	Can code both positives and negatives	

TCV	Task characteristics: Vocabulary exercises	“Some of the tasks helped me think about key concepts but others where I had to rate the importance of terms were that easy to do within the time we had”	Can code both positives and negatives	
CD	Conceptual development	“I remember what I thought about the first article and the concepts I came across and I think that now I have developed a better understanding of key terms in Applied Linguistics”	For moments where students realize that they have improved in their use / understanding of content, the representation and verbalisation of ideas	
HELP	Helpful/unhelpful	“Some were very helpful, I can now get the main ideas from a text very quickly”		
CONCERNS	Concerns	“I think one of my classmates was not able to cope with the lexical demands of the article we were working on”	Use only if the students worry about sth, for confusion use the next code	
CONFUSION	Confusion	“I was not always quite sure where to submit a task”		
S	Suggestions	“Could you perhaps include more tasks that could also help with academic writing?”		
For Moodle (6)				
REL	Relevance	“I also liked that we were taught online, perhaps we could have more courses like this as it could help us practice more”	how relevant is online learning to students' academic practices?	
REFL	Reflection	“When peer checking work online I could start thinking about my own work too and how it compared to that of others”	does online learning stimulate students' critical reflective thinking?	
INT	Interactivity	“I would leave comments for the other student to check when I was giving feedback and then I think I got a response with my feedback too”	to what extent do students engage online in rich educative dialogue or in peer-feedback activities?	

TUSU	Tutor support	“..you were there to help with technical problems when I could not open the word doc..”	how well do tutors enable students to participate in online learning?	
PSU	Peer support	“I think one of the students who gave me feedback was a bit strict but it’s OK”	do fellow students provide sensitive and encouraging support?	
INTERP	Interpretation	“I thought the interaction online would be messy but it ended up being quite clear and well organized, everyone was following and paying attention”	do students and tutors make good sense of each other's communications?	
For the Pedagogic Unit (15)				
PDEL	Pace of delivery	“It was good but intensive, perhaps we could have had more sessions with less tasks?”	When the students manages to complete a task or not because the pace is normal or too fast	
LDIF	Level of difficulty	“During the training, some of the tasks were quite challenging like the concept map task, it takes a lot of time to focus..”		
RELT	Relevance of topics	“Yes, the course was clearly related to my field of studies”		
INTERTO	Interesting topics	“The topics were good but perhaps we could have shorter articles?”		
LOM	Logical order of materials	“Yes, I think the structure of the content for this course was good”	If the materials and exercises logically follow from one another	
CCO	Comprehensive course overview	“The course had a sort of outline where it was good to see the activities we had to do”		
CLI	Clarity of instructions	“I think it was pretty clear what we had to do and how the training worked”	Only information about general instructions during the training	
CLQ	Clarity of questions	“Questions were straightforward and there were also extra notes to help us		

		start each task so that was good at first”		
AO/NAO	Achieved / non achieved objectives	“I wanted to learn how to create a good presentation and I think that I’m able to do this”	When the students indicates they’ve achieved a skills they wished to develop	Can be used for instances where students wished the training had helped them more
MEPC	Most effective programme components	“Moodle itself as a platform offered lots of different tasks that other tutors should also exploit in other modules”	Can also refer to issues of the environment that might have improved the unit	
LEPC	Least effective program components	“I think the delay when logging in to Moodle was a bit irritating but then the other days it wasn’t that bad”	Can also refer to issues of the environment that might have affected the unit	
SP	Satisfaction with program	“Was good to take part in this training and experience this environment, it run smoothly. It was easy to use, I think I’ve gained a lot”	Code only satisfaction with the whole online training tasks (focus on unit)	
LIS	Level of interaction with students /teacher	“Yes, I felt I could talk to my peers or consult you whenever I had a question”		
SUST	Suggestions for unit structure	“No I think this was good and there was a logical order in the way everything took place [gradually]”		
STIM	Suggestions for task improvement	“Perhaps try to create shorter tasks that won’t require reading the whole article but just parts of it?”		

Appendix 17: Ohta's (2001) transcription conventions

Symbol	Transcription
?	Rising intonation
(())	Comments
(.)	Brief pause
(...)	Longer pause
:	Prolongation of a syllable
oo	Reduced volume – soft voice
oo oo	Reduced volume – whispered
CAP	Emphasis / stress
“ “	Reading aloud
=	Latching (when one speaks immediately after another has finished)
->	Text lines that are discussed

Appendix 18: Concept map – quality analysis framework

(Kinchin, 2001; Pearson 2011)

	SPOKE	CHAIN	NETWORK
Structure			
Hierarchy	single level	as many levels as concepts (but often these are unjustified)	several justified levels
Additions	additions to the central concept does not interfere with others	cannot cope with additions near the beginning of the sequence	additions and deletions have varying effects as 'other routes' are often available through the map
Deletions	generally have no effect on the overall structure unless the central (organising) concept is deleted (which leads to complete collapse)	disrupt the sequence below the deletion	
Links	often simple	often compound (making sense only when the map is read as a whole)	often rich and complex showing deep understanding
General	these structures indicate 'learning readiness' they are flexible and amenable to change in the course of learning	these structures are 'active' they are common to enterprise or to clinical practice where specific sets of actions must be carried out in sequence	these structures are 'scholarly' they often include alternative 'viewpoints' and even contradictory ideas

Unconnected – a map which contains content in the form of nodes but without links.

Linear – a map where the nodes are linked in a sequential fashion like the stops on an underground map. Each node is linked only to its predecessor and successor.

One-centred – a map with a clearly discernible central node from which links to other nodes radiate outward.

Several-centred – two or more nodes are detected in the map which act as centres of interest.

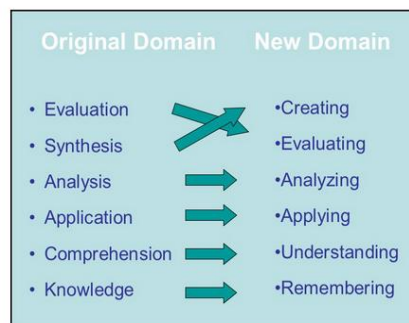
Spaghetti – this evocative term was used for a concept map in which the linkage between nodes was so intense that the map resembled a plate of spaghetti. It is interesting that the underlying architecture of the network is termed a "distributed system", where nodes are linked to many other nodes. This redundancy of connection, coupled with a routing protocol which allows the dynamic selection of routes for data gives a network certain

Appendix 19: Bloom's taxonomy

Lorin Anderson, a former student of Bloom, and David Krathwohl revisited the cognitive domain in the mid-nineties and made some changes, with perhaps the three most prominent ones being (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths, Wittrock, 2000):

- changing the names in the six categories from noun to verb forms
- rearranging them as shown in the chart below
- creating a [processes and levels of knowledge matrix](#)

The chart shown below compares the original taxonomy with the revised one:



Appendix 20: Unit of analysis model

<i>Gunawardena, Lowe & Anderson (1997)</i>	This model evaluates the social construction of knowledge in online discussion forum. It distinguishes between five phases of knowledge construction:
Unit of analysis: Whole message	● <i>Phase I: Sharing/comparing of information</i> which may include: - Statements of observation/opinion - Statement of agreements from one or more other participants - Corroborating examples provided by one or more participants - Definition, Description, or identification of a problem ● <i>Phase II: Discovery of dissonance</i> which may include: - Identifying and stating areas of disagreement - Asking and answering questions to clarify the source and extent of disagreement ● <i>Phase III: Negotiation/Co-construction</i> which may include: - Negotiation or clarification of the meaning of terms - Identification of areas of agreement or overlap among conflicting concepts - Proposal and negotiation of new statements embodying compromise ● <i>Phase IV: Testing tentative constructions</i> which may include: - Testing the proposed synthesis against "received fact" as shared by the participants and/or their culture - Testing against personal experience - Testing against formal data collected - Testing against contradictory testimony in the literature ● <i>Phase V: Agreement statement/applications of newly constructed meaning</i> which may include: - Summarisation of agreement - Applications of new knowledge - Metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking (cognitive schema) have changed as a result of the online interaction

Appendix 21: Coding scheme for the key dimensions of online learning environments checklist

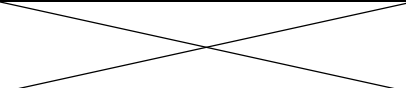
Possible Features of a Knowledge-centered, Online Learning Environment
• Digital content-area, curriculum or resources focused around specific issues or themes that is up-to-date, authentic, accessible and generative • Electronic networking forums to support knowledge sharing (e.g., links to additional resources; student work) • Interactive design tools (e.g., curriculum design tools) with electronic prompts to scaffold thinking • Interactive survey instruments encourage reflection on workplace practices
Possible Features of a Community-centered, Online Learning Environment
• Workshop environments that assist communication over • Synchronous mechanisms (e.g., via “chat” rooms, multi-user virtual environments or asynchronous e-mail, bulletin boards, threaded discussion forums) • Asynchronous mechanisms (e.g., e-mail, bulletin boards, etc.) that allow anytime-anywhere communication and archiving of discussions to assist the development of a group understanding over time
Possible Features of an Assessment-centered, Online Learning Environment
• Tools for or tools that encourage self-assessment, reflection, metacognition, feedback such as pop-ups or text boxes to write selected information (e.g., electronic feedback forms, etc.) • Tools for or tools that encourage peer exchange, constructive critique, networking, such as collaborative design tools (e.g., shared online spaces for posting and editing group work, etc.)

Appendix 22: Audio and screen-capture coding scheme

Audio and Screen-capture coding scheme (61)					
CODES	Description	Example – Screen captures	Example from recordings	When to use	When not to use
Tasks					
1.	Task scaffolding	The number of times students would make use of specific scaffolding options available and if so	“I think I’ll click on the feedback help..[to see the explanation for a task score)”	Whenever students consult task related scaffolding	
2	Academic reading training tasks	Activity logs that gave more information about reading tasks	“I’m not sure what we have to do at this stage with reading task 3..”		
3	Academic speaking training tasks	Activity logs that gave more information about speaking tasks	“Writing a presentation can be quite difficult at times..”		
4	Conceptual development	Relative ease with answering questions about concepts (Days 2+3)	“Yes, I can recognize this term from the article and it was related to this concept..”		
5	Helpful/Unhelpful	Visual evidence from a student that quits a task after consulting feedback	“I don’t think the comment box was helpful here when we have to answer this question..”		
6	Concerns	Student typing “I have also e-mailed by answer just to be sure you will receive it”	“I hope my word doc was uploaded in the right format..”	Mostly for cases that students worry about sth	If students make mistakes because due to confusion use code7
7	Confusion	When a student appears to click on multiple icons online as a result of confusion	“I’m not sure where the help option, is..oh wait here!”		
8	Suggestions				
9.	Distinguishing key ideas	When a student clearly identifies key ideas during a task (highlighting, etc.)	“And I’m going to highlight this key idea right here..”		
10	Understanding key concepts	A student’s recorded performance when creating a diagram or concept map online	“All of these concepts are part of the noticing hypothesis so...”		

11	Predicting	When the cursor moves to titles when reading a text for the first time	"Let's quickly check the title to find out about this section.."		
12	Identifying a purpose for reading	Evidence from performing a related online tasks	"OK so we're about to create a presentation in the end.."		
13	Using reading strategies o extract relevant information for topic and text comprehension	Evidence from performing related tasks	"I need one more concept (apperception) so I'll try to check the terms in italics quickly.." (scanning)		
14	Identifying the function of the sentences in the different article parts (e.g. trace cohesion, etc.)	Evidence from performing related tasks	"This part here is a very nice transition between the two.."	Focus should be on the functions and connections	Not to be used when students comment on specific vocabulary elements
15	Distinguish between formal and informal	Evidence from performing a related online tasks, from writing samples, etc.	"The language is so..scientific! lots of terminology..nice expressions too"		
16	Identify purpose and tone	Evidence from performing related tasks	"I think the author simply reports on this, he's not for or against"		
17	Identify the use of evidence	Evidence from performing related tasks	"Here there's a mention to an example from research that shows this"	When students locate instances of examples or supportive evidence in the text that the author uses on purpose to establish an argument	
18	Formulating assumptions	Writing an online task about conclusions	"Could this argument link to this then?"		
19	Article evaluation	Selecting the most important terms from an article etc, writing about the article's most important data	"I got the five most important concepts, these reflect the main ideas.."		
20	Summarising	Evidence from performing related tasks	"I need my sentences (brief ones) to create my summary.."		
21	Planning and structuring	Creating online outlines, the structure of a presentation, etc.	"First I need to find this definition, and then to write down the structure for this part		

			of the outline..”		
22. Moodle environment	Relevance		“This is going to help with that online task we have to do for Vineeta’s module”	how relevant is online learning to students' academic practices?	
23	Reflection	Evidence from the students' consultation of previous tasks and revisions at later points by adding / deleting concepts, stages, etc.	“I’ll check my older outline, I think I can use it to remember this part and then write the summary”	does online learning stimulate students' critical reflective thinking?	
24	Interactivity	Evidence from the students' interaction with other students in the workshop area	“I’m going to give feedback to Student 3 now for the questions they uploaded”	to what extent do students engage online in rich educative dialogue or in peer-feedback activities?	
25	Tutor support	Tutors comments online about activity	“Oh I can now see Celia’s comments in the workshop area”	how well do tutors enable students to participate in online learning?	
26	Peer support	Evidence from the students comments online and their quality	“I think my marker should have given more comments on this”	do fellow students provide sensitive and encouraging support?	
27	Interaction	Students typing questions in the forum regarding the feedback they got so it would be further exemplified	“I’m not sure what my marker means here by saying..”	do students and tutors make good sense of each other's communications?	
28. Moodle Unit	Task scores	Evidence about task scores after doing an exercise	“Oh the score comes up straight away and here you can see that too”		
29	Pace of delivery	Incomplete submission of tasks	“Ohhh I didn’t finish this on time..do we have to move on?”	Can be used for cases when students submitted on time as well	

30	Level of difficulty	Evidence from students dropping out of a task	"That's a bit challenging, this term is a bit difficult.."	This can also be used for students that have finished too early or on time	
31	Relevance of topics		"I remember this term from Karen Roehr's lecture.."	Can also be used for negative examples	
32	Interesting topics	Student spending more time and effort than needed on the creation of a concept map	"This topic was very interesting when we did it last year, I'll change this part here too.."		
33	Logical order of materials		"Is this what the next task is? Does not seem to follow from the previous?"		
34	Comprehensive course overview	Evidence from the students' movement of cursor over the overview information sections	"I checked the description, here (points) you can see what follows)"		
35	Clarity of instructions	Not obvious from screen-capture, only in a case where student misunderstands and gives the wrong answer but corrects later	"Oh it said we have to upload it, not enter the answer? .."	See in combination with audio data	
36	Clarity of questions	Not obvious from screen-capture	"Oups, it's asking sth else, need to change this part"	See in combination with audio data	
37	Task characteristics: Quizzes	In cases where the quiz does not show up properly or problems are created with the way the format of the task appears	"Oh this doesn't show properly, is it me?"	See in combination with audio data	
38	---: Forums	In cases where the forum does not show up properly or problems are created with the way the format of the task appears / feedback	"I can't see the comment I've entered yesterday, is it hidden?"	See in combination with audio data	
39	---" Vocabulary exercises	In cases where the exercise does not show up properly or problems are created with the way the format of the task appears	"Yes, this task is quite easy to perform when you click on all terms"	See in combination with audio data	
40	Achieved / non achieved objectives	No evidence from screen capture			
41	Most effective program	Evidence from the students moving		See in combination	

	components	from task to task in a smooth way, completing tasks without lots of pauses (technical or not) etc.		with audio information	
42	Least effective program components			See in combination with audio information	
43	Satisfaction with program	No evidence from screen captures			
44	Level of interaction with students	Number of discussions and peer-evaluations online			
45	Suggestions for unit structure	Evidence from the information inputed in the feedback questionnaire			
46	Suggestions for task improvement	Evidence from the information inputed in the feedback questionnaire			
Scaffolding features used at a Pedagogic Unit level:					
47	forum area: positives / negatives	Evidence from the students using the forum to check work, feedback, etc.	"I think we go back to forum to see the previous outline and feedback and then do task 4"	Can also be used when students comment on sth or ask questions	
48	notification system with message alerts	Evidence from a student receiving e-mail with information about activities in the forum area	"Oh no, another email, this gets a bit too much I think.."	Can also be used if the student avoids this measure or does not consult it	
49	glossary: positives / negatives		"I like the glossary, I can now see all the terms right here"		
50	workshops: positives / negatives	Evidence of how frequently students participate in workshops	"Hoho workshop time! Let's see what we'll get"		
51	Suggestions	Evidence from the comments entered in the feedback form	"They could perhaps use a shorter version of this article?"		
Scaffolding features at a task level:					

	Sessions 1, 2, 3				
52	Process models: Task examples	Evidence from the students consulting the example answers that accompany the tasks	"Oh I'll click on the example first to see how I could make one (concept map)"		
53	Process models: Task instructions	Evidence from students hovering over the instructions of a task	"I need to read first, I'm not sure what you tell me.."		
54	Quiz feedback	Evidence from the time a student spends reading the feedback	"There's a comment coming up after you finish the quiz here.."		
55	Maze feedback	Evidence from the time a student spends reading the feedback	"I saw the evaluation of my progress, you need to finish first"		
56	Process prompts: built in hints	Students who pause to read the pop ups with feedback	"Ahaha pop up! Nice!"		
57	Process prompts: Retries	Students who use the retry button after getting full feedback	"Oh cool! I can retry, my final was not that good"		Not for students who have not completed their first trial and retry to improve score
58	Process prompts: Redirections	Evidence from cases where the students make a mistake are directed to feedback	"Oh I got it wrong and I'm at a different stage now"	Can use for cases when the student does not read the feedback (duration of the visit)	
59	Process displays: task completion indicators	Evidence from the students paying attention to this online (cursor movement over the indicator)	"OK 3 more parts to complete for this quiz"		
60	Reflective social discourse: comment boxes	Evidence from the students commenting or entering answers	"I'll write the feedback straight into the box"	Both for cases of giving and reading received feedback	
61	Reflective social discourse: peer-assessment	Evidence from students peer-assessing, giving a score or commenting	"I'll give it 6 for overall quality"		Can be use both for positive and negative examples of assessment

General aspects of analysis for the audio and screen-captures

Tasks
Task scaffolding
Academic reading training tasks
Academic speaking training tasks
Conceptual development
Helpful / unhelpful
Concerns
Confusion
Suggestions

Conceptual development

Distinguishing key ideas	
Understanding key concepts	
Predicting	
Identifying a purpose for reading	
Using reading strategies (skimming, scanning), to extract relevant information for topic and text comprehension	
Identifying the function of the sentences in the different article parts (e.g. trace cohesion, etc.)	
Distinguish between formal and informal	
Identify purpose and tone	Purpose and background
	Author and text
Distinguish between factual and non factual information	Identify the use of evidence
Drawing inferences and conclusions	Formulating assumptions
	Article evaluation
Decision making	Summarising
	Planning and structuring

Moodle Environment
Relevance: how relevant is online learning to students' academic practices?
2.Reflection: does online learning stimulate students' critical reflective thinking?
3.Interactivity: to what extent do students engage online in rich educative dialogue or in peer-feedback activities?
4. Tutor Support: how well do tutors enable students to participate in online learning?
5. Peer Support: do fellow students provide sensitive and encouraging support?
6.Interpretation: do students and tutors make good sense of each other's communications?
Moodle Unit
Task scores
Pace of delivery
Level of difficulty
Relevance of topics
Interesting topics
Logical order of materials
Comprehensive course overview
Clarity of instructions
Clarity of questions
Task characteristics
Quizzes
Forums
Vocabulary exercises
Achieved / non achieved objectives
Most effective program components
Least effective program components
Satisfaction with program
Level of interaction with students / with teacher
Suggestions for unit structure
Suggestions for task improvement

5. Scaffolding features used at a pedagogic unit level:
forum area: positives / negatives
notification system with message alerts
glossary: positives / negatives
workshops: positives / negatives
Suggestions
Scaffolding features at a task level:
Session 1
Process models:
Task examples
Task Instructions
Quiz feedback
Maze feedback
Process prompts:
built in hints
Retries
Redirections
Process displays: task completion indicators
Reflective social discourse
Comment boxes
Peer- assessment
Session 2
Session 3

Appendix 23: Session 3 – Screen Captures

Tasks	Action	Type of scaffolding	Average length of use in minutes per task per student	Number of students (out of 13)	Task completion
Task 1	Lesson activity on formality	Teacher and student feedback on forum	3 minutes	9	13
		Example answer	2.5 minutes	11	13
Task 2	Rank text extracts	Peer feedback from classmates on forum	2.5 minutes	13	10
		Example answer	2 minutes	7	10
Task 3	Identify the author's purpose and tone	Example answer	1 minute	9	11
		Task instructions	0.5 minutes	10	11
Task 4	Summary practice	Instructions	0.5 minutes	13	11
		Peer feedback on forum		10	11
		Example answer	2 minutes	13	11
Task 5	Create a content outline for the presentation	Example answer	3 minutes	13	13
		Feedback on forum	4 minutes	9	13
		Instructions	1 minute	7	13
Task 6	Preparation for the presentation	Task instructions	0.5 minutes	13	13
		Peer feedback on forum	3 minutes	8	13
		Instructions	0.5 minutes	13	13
		Link to another site	3 minutes	6	13

Appendix 24: Concept maps – conceptual development coding (Reese, 2002; Kinchin 2000)

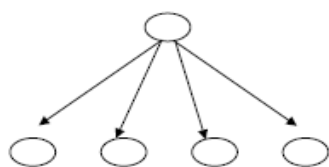


FIGURE 4 Hypothetical Concept Map Showing the Average Proportion of Levels to Concept Nodes. There are two levels and five nodes.

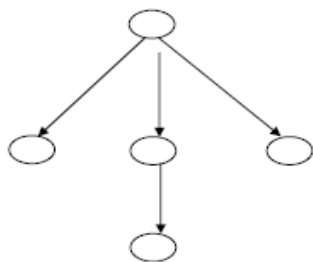


FIGURE 5 Hypothetical Low Achiever (Treatment) Concept Map Showing the average Proportion of Branches to Concept Nodes. There are three Branches and five Nodes.

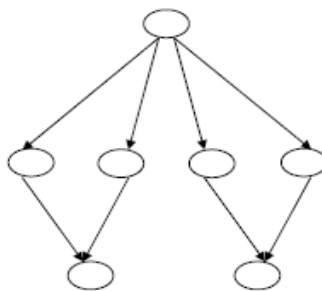


FIGURE 6 Hypothetical Low Achiever (Treatment) Concept Map Showing the Average Proportion of Cross-links to Concept Nodes. There are two Cross-links and seven Nodes.

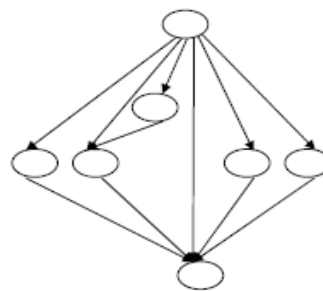


FIGURE 7 Hypothetical High Achiever (Treatment) Concept Map Showing the Average Proportion of Cross-links to Concept Nodes. There are seven Cross-links and seven Nodes.

Appendix 25: Concept map scoring protocol (numerical evaluation)

Novak and Gowin's Scoring Criteria for Concept Maps²

1. *Propositions*. Is the relationship between two concepts indicated by a connecting line and linking word(s)? Is the relationship valid? For each meaningful, valid proposition shown, score 1 point.
2. *Hierarchy*. Does the map show hierarchy? Is each subordinate concept more specific and less general than the concept drawn above it (in the context of the material being mapped)? Score 5 points for each valid level of the hierarchy.
3. *Cross links*. Does the map show meaningful connections between one segment of the concept hierarchy and another segment? Is the relationship shown significant and valid? Score 10 points for each cross link that is both valid and significant and 2 points for each cross link that is valid but does not illustrate a synthesis between sets of related concepts or propositions. Unique or creative cross links might receive special recognition or extra points.
4. *Examples*: Specific events or objects that are valid instances of those designated by the concept label can be scored 1 point each.
5. In addition, a criterion concept map may be constructed, and scored, for the material to be mapped. Then divide the students' scores divided by the criterion map score to give a percentage for comparison. (Note that some students may do better than the criterion and receive more than 100%.)

Scoring Model

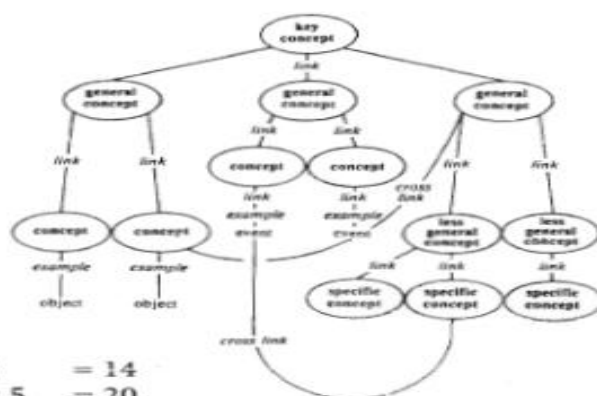
Hierarchy

Level 1

Level 2

Level 3

Level 4



Scoring for this model:

Relationships (if valid) = 14

Hierarchy (if valid) 4 x 5 = 20

Cross links (if valid

and significant) 10 x 2 = 20

Examples (if valid) 4 x 1 = 4

58 points total

Appendix 26: Oral presentation evaluation form

1. Content

	Yes	No	Comment
1. The presentation focuses on the article topic			
2. Main ideas are clear			
3. There enough details / facts / examples to support the ideas			
4. All ideas are directly related to the topic			
5. The presentation is logically structured			
6. The presentation flows smoothly			
7. The introduction evokes interest			
8. The conclusion is effective			
9. Main ideas have been summarized effectively			
10. Ideas are critically compared and contrasted			

2. Language

	Yes	No	Comment
1. Effective use of language			
2. Appropriate terminology and terms used			

Appendix 27: Oral presentation scoring scheme

a. Content

Code	Levels					
1. Coverage & Relevance	1st class	Upper 2 nd	Lower 2 nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	Maintains total focus on the topic/ topic throughout, while still successfully identifying a wide range of concepts and implications of topic and considering it from a number of angles and in depth. Is always relevant to the topic. Has an original and inventive approach to the presentation, and probably offers some of the student's own ideas, data, interpretations or proposals. Offers reader new insights and could form the basis for further research on the topic.	Shows a sound understanding of, and focus on, the demands of the topic. Identifies a wide range of concepts and implications of the topic and considers it from several angles and in some depth. Is always relevant	Focuses on the topic , and identifies the major areas which need to be addressed in answering the topic but may fail to address a wide enough range of issues and implications. Generally treats areas identified in sufficient depth. Is generally relevant to the topic.	Occasional failure to focus on the topic. Shows an understanding of the topic, and identifies most of the major areas which need to be discussed, but has failed to include all the issues which need to be addressed. May have been rather one-sided in considering the topic, or somewhat superficial. Is usually relevant.	Some failure to focus on the topic at times Shows some evidence of having understood the demands of the presentation but perhaps only covered part of the topic. Does not show the range and depth of coverage one would expect at this level. Contains some irrelevance.	Has failed to identify the areas which needed to be covered in the assignment. Strays off the task quite frequently, and is often irrelevant.

Code	Levels					
2. Analysis	Ist class	Upper 2 nd	Lower 2 nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	Shows a deep understanding of complex concepts, and also of a wide range of concepts involved in the topic. Analyses concepts and issues carefully and critically, and shows outstanding ability to challenge 'received opinion' where appropriate. Develops complex arguments lucidly and persuasively. Provides clear criteria for evaluations made and conclusions reached. Consistently and effectively relates theory to practice, and is able to use the presentation as a basis for new interpretations of previous research and proposals for change in practice.	Shows sound understanding of complex and wide-ranging concepts involved in the topic demonstrates the ability to analyse concepts critically . Develops complex arguments logically & clearly. Evaluates arguments and evidence from reading and experience and provides convincing reasons for conclusions reached. Relates theory to practice and may make well-founded proposals for changes in practice on the basis of work done for the presentation.	Shows reasonable understanding of a range of concepts, some of them complex. Often analyses and evaluates them critically, although the analysis may not always be thorough enough. Arguments are developed coherently. The presenter also makes some attempt to evaluate arguments and evidence. There is a quite frequent attempt to relate theory to practice. The presenter may make some proposals for changes in practice or suggest re-interpretations of current thinking.	Shows some understanding of a range of concepts, but sometimes neglects to critically analyse them. Arguments may not be sufficiently developed or complex. The presentation may miss opportunities to relate theory to practice. The presenter does not generate new interpretations or proposals for future practice.	Shows limited or partial understanding of major concepts, and neglects to consider a wider range of ideas. Overall, describes ideas rather than analyses them. Attempts to analyse the concepts tend to be rather superficial. Simple arguments not fully developed. Relationships between theory and practice not really drawn.	Shows little understanding of the major concepts, although very basic concepts to do with the topic of the presentation may be comprehended. Lacks any critical analysis or evaluation of concepts. Arguments either not stated, or briefly stated and not developed. No relation of theory to practice.

Code	Levels					
3. Support	Ist class	Upper 2 nd	Lower 2 nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	Shows evidence of wide and often critical reading Illustrates points with well-chosen examples drawn from reading and experience. Shows outstanding ability summarise reading.	Shows evidence of a range of relevant reading. Supports points well with examples drawn from reading and/or experience. Good ability to express ideas in own words.	Shows evidence of some relevant reading Supports most points with examples from reading and, occasionally, experience Shows ability to summarise though may be rather dependent on language of source material	Shows evidence of limited reading, but sources used may be limited, or basic, or some major sources which are central to the subject may have been omitted. Supports some points in the presentation with examples from reading/experience. Very limited ability to summarise	Shows evidence of very limited reading, Sources may be badly chosen, or too few. Support for the few points made in the presentation are superficial	The presenter shows minimal evidence of background reading. Points made in the presentation are unsupported, and appear to be based entirely on personal experience and opinion. May be major errors of fact.

b. Presentation skills

Code	Levels					
Voice/ delivery	Ist class	Upper 2 nd	Lower 2nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	Variability in tone and expression clearly linked to subject matter Clear, well-paced verbal delivery at suitable volume for the environment Appears calm and confident	Some variability in tone and expression linked to subject matter Clear, well-paced verbal delivery at suitable volume for the environment May appear to lack calmness/confidence	Clear, well-paced verbal delivery at suitable volume for the environment May lack variability in tone and expression. Some apparent lack of calmness/confidence	Mostly clear, well-paced verbal delivery at suitable volume for the environment Somewhat lacking in variability of tone and expression Apparent lack of calmness/confidence	Overall clear, though pace of verbal delivery and/or volume may be inappropriate Monotonous and lacking in expression Apparent lack of calmness/confidence	Lacks clarity Pace of verbal delivery and volume for the environment are inappropriate Monotonous and lacking in expression Apparent lack of calmness/confidence

c. Format/Structure

Code	Levels					
Format/ Structure	Ist class	Upper 2 nd	Lower 2 nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	The structure of the presentation is clear from the outset and is adhered to. The content is organised in such a way that each section links with and builds on the previous one, producing a coherent and logical development of arguments and ideas. Content utilises a range of sources and approaches which are interwoven efficiently to develop and support arguments or ideas. Clear evidence that the prior knowledge of the audience has been considered	The structure of the presentation is clear from the outset and is adhered to. The content is, for the most part, organised in such a way that each section links with and builds on the previous one, producing a coherent and logical discussion of selected material Content utilises a range of sources and approaches to develop and support arguments or ideas Clear evidence that the prior knowledge of the audience has been considered	The structure of the presentation is clear from the outset and is mostly adhered to. The content is generally organised in such a way that each section links with the previous one. However, material selected is not always presented in discussed logically or in a manner which enables the audience to follow the development of an argument. Content relies heavily on description and arguments or ideas are not well developed. There is some evidence that the prior knowledge of the audience has been considered	The structure of the presentation is unclear from the outset or is seldom adhered to. The content is somewhat fragmented and sections do not clearly link with each other or build on the previous ones. There is a general lack of coherence and logic. Content is mostly descriptive and arguments or ideas are either not apparent or well developed. There is little evidence that the prior knowledge of the audience has been considered	There is an apparent absence of structure The content is mostly disorganised Sections do not links with or builds on the previous one., There is an absence of coherence and logic There is little evidence that the prior knowledge of the audience has been considered	There is no structure to the presentation and content is covered in apparently random fashion There is an absence of coherence and logic There is no evidence that the prior knowledge of the audience has been considered

d. Preparation

Codes	Levels					
Preparation	Ist class	Upper 2nd	Lower 2nd	Third	Ordinary	Fail
Descriptions of the code's characteristics for each level	The presentation has been very well prepared in every respect i.e. There is evidence that the presenter has familiarised themselves with all the materials, the equipment and the content chosen	The presentation has been well prepared in every respect i.e. There is some evidence that the presenter is generally familiar with the materials and the content chosen	The presentation has been adequately prepared in most respects i.e. There is some evidence that the presenter is familiar with the materials and content, though there may be exceptions	There is evidence that the presentation has been hastily prepared, resulting in some aspects being underprepared The presenter is not familiar with the majority of materials and content chosen	The presentation has been very poorly prepared i.e. There is evidence of major gaps in the presenters familiarity with their content and/or materials.	The presentation has been carelessly prepared in every respect i.e. There is clear evidence that the presenter is unfamiliar with the materials and the content chosen and appears unprepared for the presentation

Appendix 28: Retrospection task – Coding scheme (42 codes)

Code	Description	Example	When to use	When not to use
RP1	Reading process: Top down	“I start by paying attention to the general text elements and then I move on to reading..”	To describe a student’s general approach to reading	Use RS5 if the student refers to predicting content by paying attention to general text elements
RP2	Reading process: Bottom up	“I like reading an article in detail right from the start..”		
RS	Reading strategies			
RS1	Connect what I already know to what I’m reading	“I tend to think of the general topic and see if I know anything about it first..”		
RS2	Connect what I’m reading with other sections of the text	“and at times, while reading, I check the next paragraphs to see what follows..”		
RS3	Connect co-textual elements (i.e. graphic illustrations, charts, and highlighted concepts”	“When I read I also pay attention to charts, etc. to check if they relate to what I’m reading..”		
RS4	Identify main ideas and concepts (i.e. underline, highlight, italicised terms)	“I find it useful to look for the main idea in a paragraph and make a note”	When a student looks for the main idea, concepts, key words while reading	Not be used when a student mentions for instance underlining without explaining the purpose
RS5	Predict the reading content (i.e. look for concepts, charts, titles)	“Before I read the article I look for keywords, or try to understand what it will be about by reading the headings..”	When a student briefly checks for concepts, etc. before the reading process starts	This should be viewed as a pre-reading (preparation strategy)
RS6	Ask questions about the content (i.e. turn titles or headings into questions)	“I tend to read by having specific questions in mind like when did sth happen and when I locate information I use the wh word to make a note next to the title of this section..”		
RS7	Identify the organisation of arguments (i.e. follow the outline of the article)	“It is also useful to check the structure of the article just to understand the organization of content better...”		

RS8	Identifying a purpose for reading the paper	"I'm almost always looking for sth when reading and keywords for example help me understand why I'm reading an article		
RS9	Skimming	"There was a time when I read an article got the main idea very quickly, like within 10 minutes.."	When a student refers to general skimming tips	
RS10	Scanning	"In certain cases I tend to look for specific information because I'm working on an essay i.e. definitions of behaviourism.."	Or general scanning tips	
IAT	Identify the article type (Seymour, 1996):			
IAT1	Explanation	"I know for example when an article states a problematic area in the field and then explanations and solutions are provided.."	Only if the students clearly explains how they distinguish the article type	Justification required
IAT2	Definition	"I try to see if the article develops around a specific concept or not.."	Only if the students clearly explains how they distinguish the article type	Justification required
IAT3	Sequence	"When I read I'm also looking at the structure and if there are stages for example in the way content is grouped.."	Only if the students clearly explains how they distinguish the article type	Justification required
APS	Academic paper structure			
APS1	Abstract	"I then tend to look at the abstract to find out more information.."		
APS2	Introduction	"The introduction also helps me to understand the topic.."		
APS3	Review of the literature review	"If I decide to read in detail then the lit review is very important.."	Covers also mentions to parts such as background information, etc.	
APS4	Methods and materials	"The methodology section is a part read if I want to find more about instruments, participants, etc.)		

APS5	Procedures	“When I try to understand how the researcher got the results I read about how the experiment was conducted..”		
APS6	Results	“I do not tend to read the results because at times the description is not very clear..”		
APS7	Discussion	“I like this part if I have understood the method because it explains the results even further...”		
APS8	Implications	“If I want to understand more about issues or problems then there’s usually a section about this..”	Can also be used if the students make reference to sections such as Limitations, etc.	
APS9	References	“At times I might look at the list of references to find out more sources about the same topic..”		
PE	Paralinguistic elements			
PE1	Glossaries	“If there’s a glossary I look there for more information about terms..”		
PE2	Tables/Graphs/Charts	“I might have a look at charts to see if I can understand anything extra..”	In case the students consult these elements not just for prediction purposes but to get more in depth knowledge	
PS	Paragraph structure			
PS1	Topic sentence	“When I read quickly I tend to focus on the first sentence in each paragraph.”	It is not necessarily the first sentence in a paragraph though	
PS2	Supporting arguments	“For reasons or examples I check paragraphs to see if there extra arguments...”		Can be the main body only if it includes evidence that supports the paragraphs topic
PS3	Summary sentence	“...I then read the last sentence from each paragraph to get an idea quickly”		
PS4	Extension of the idea	“If I find the topic sentence interesting then I read the whole paragraph to understand	Can refer to the main body of a	

		more..”	paragraph or the number of paragraphs that explain the idea further	
DM	Discourse markers			
DM1	Classification (i.e. categories / bullets / headings)	“I like bullet points because they sort of guide me and make information stand out..”	Subtitles can also be used as classification symbols	
DM2	Process (i.e. cardinal numbers / adverbs such as next, as soon as, while)	“At times I’m looking for connectives to understand when the next section starts or when did the discussion on a topic begin within the article..”		
DM3	Illustration (i.e. for example., for instance, etc.)	“..or if I need an example I look for i.e., etc..”		
DM4	Cause/ effect (i.e. consequently, therefore, for these reasons, etc.)	“Conclusions are quite obvious and this is where I find reasons for something too..”		
DM5	Comparison (i.e. similarly, in the same way, etc.)	“If I want an example I might look for similar situations that sometimes authors discuss..”		
D	Difficulties			
D1	Deducing unknown Vocabulary / Terminology	“Quite often I find it difficult to understand specific terms in the field but then I read the rest of the paragraph and I get the meaning of these terms...”	This covers, context, related or relevant vocabulary as well...	
D2	Interpreting Charts	“I think charts are quite difficult because I don’t know how to read them..”		
D3	Identifying the topic	“There are moments where I read and read and the text is so theoretical I can’t figure out what the main topic is..”		
D4	Identifying the paper’s topic and relating to their purpose for reading	“In other cases I read the article but I can’t decide If I really need it for my reading purposes..”		
StD	Solutions to difficulties			

StD1	Dictionary use	"I use dictionaries a lot, like online, books, terminology dictionaries.."	Covers all sources of this type and function	Are article-external sources
StD2	Further exemplification reading	"If I'm not able to understand then I keep reading certain parts over and over..."	Reading further and in details	
StD3	Consultation of glossary terms	"Some articles provide like a list of terms and definitions so I find this useful when I can't follow.."	Not extra source, it is part of the article structure	

Appendix 29: Revised taxonomy

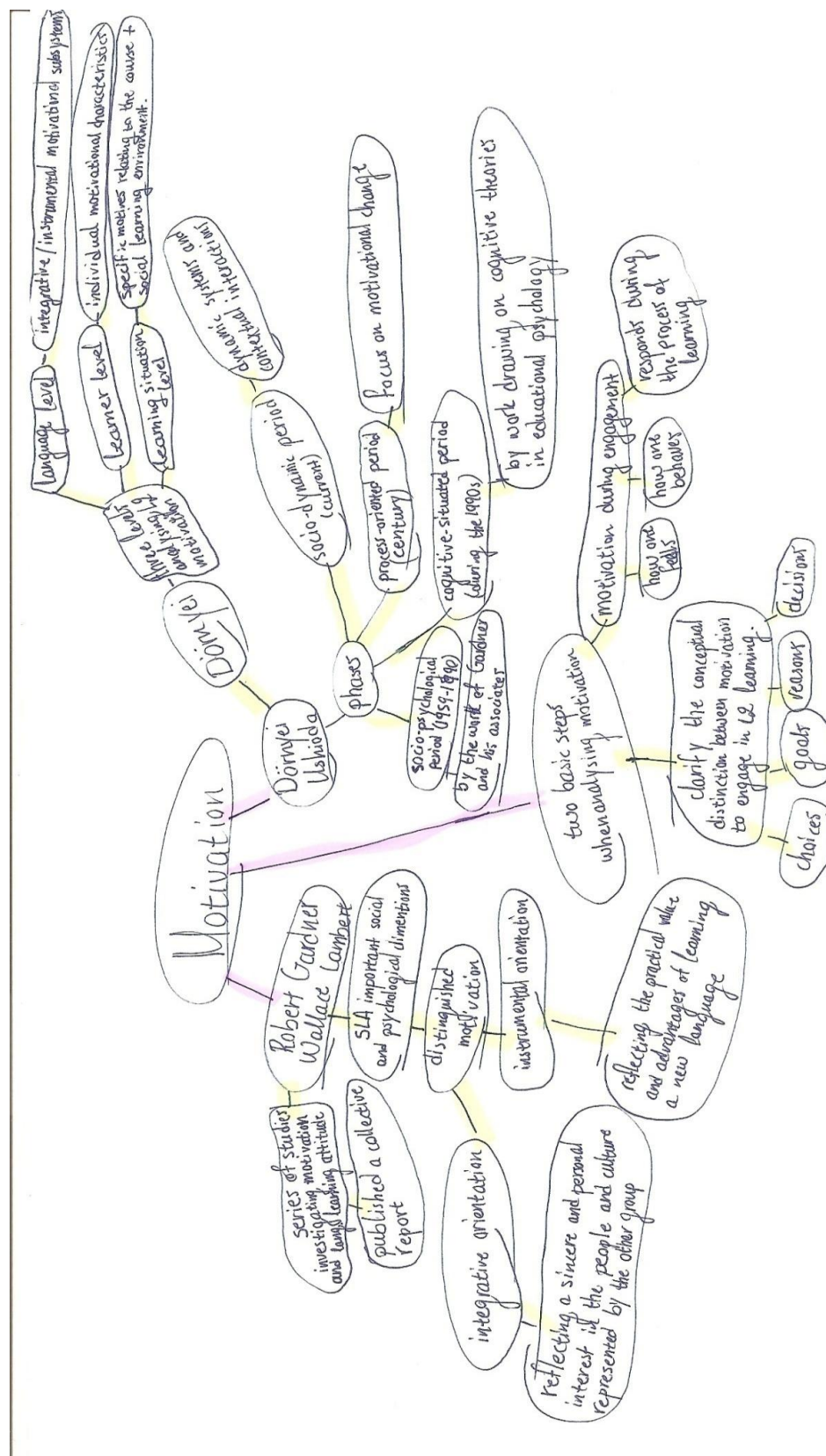
The following table shows how the Revised Taxonomy (2.3.5, Table 2.2) and the conceptual ability rubric (3.9.2.1.1, Tables 3.8 & 3.9) were combined to classify the reading strategies and processes that were employed by the students (4.1.1). The strategies are mentioned in random order and they emerged as it is described in 3.9.3.1, 3.9.2.1.2 and 4.1.1.

Conceptual Development Levels	Revised Taxonomy	Indicators	Strategies
Lower 1	Remembering	• Observation and recall of information • Knowledge of dates, events, places • Setting goals, orienting attention • Knowledge of major ideas • Mastery of subject matter	• Recognising terminology • Establishing a purpose for reading • Top down reading processes • Dictionary use
Lower 2	Understanding	• Understanding / gathering information • Grasp meaning • Translate knowledge into new context • Interpret facts, compare, contrast • Order, group, infer causes • Predict consequences	• Predicting reading content • Scanning • Skimming
Intermediate 1	Applying (Problem solving)	• Use information • Use methods, concepts, theories in new situations • Problem solving required skills or knowledge	• Guessing unknown vocabulary from the context • Identifying ideas and concepts
Intermediate 2	Reasoning	• Seeing patterns (voluntary attention) • Organization of parts • Recognition of hidden meanings • Identification of components	• Identifying topic sentences • Identifying the organization of arguments • Consulting bullet points, numbering, lists, etc. • Locating example discourse markers (such as i.e., etc.) • Consulting the introductory paragraph

			• Reading the summary sentences of each paragraph
Higher 1	Evaluating	• Compare and discriminate between ideas • Assess value of theories, presentations • Verify value of evidence • Recognize subjectivity	• Locating comparison discourse markers (i.e. similarly, etc.) • Chart interpretation • Identifying the article type (i.e. if it develops around the explanation of a definition) • Attention to discourse markers; cause and effect
Higher 2	Creating (Decision Making)	• Use old ideas to create new ones • Generalize from given facts • Relate knowledge from several areas • Predict, draw conclusions • Decision making	• Reading the article abstract • Summarising information from each paragraph • Identifying the paper's topic and relating to their purpose for reading • Consulting the literature review • Discovering a sequence / establishing connections • Activating prior knowledge

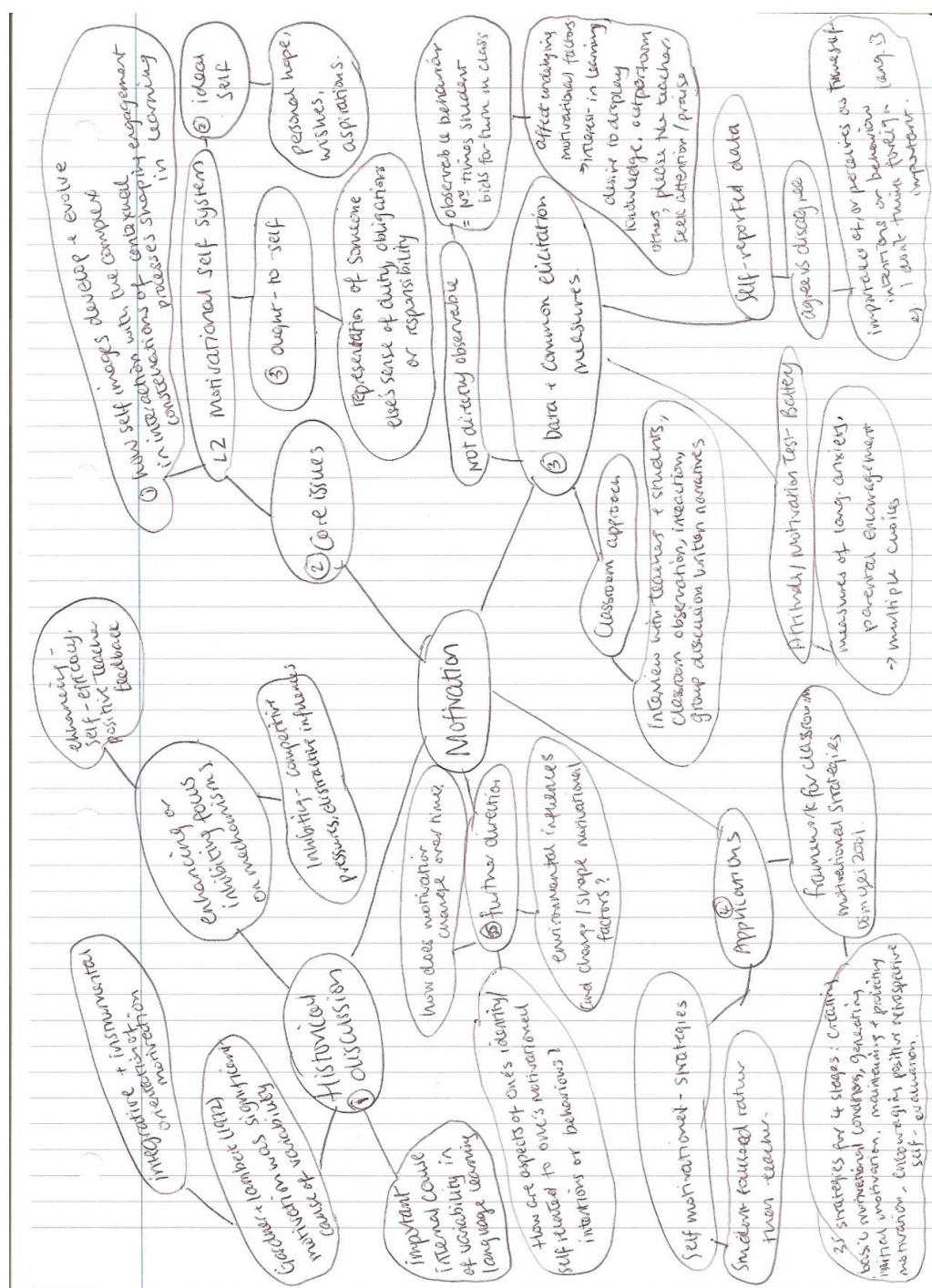
Appendix 30: Indicative concept map answers

Expert map



The above map received a score of 38 when counting the valid connections (number of links between the concepts, from the higher to the lower level). In terms of the levels of concepts there were 7 levels and each was awarded a score of 5, with a total of 35. There were no instances of cross-links between concepts from different levels and finally there were four instances of examples which were awarded 1 point and the total score for the expert map was 77.

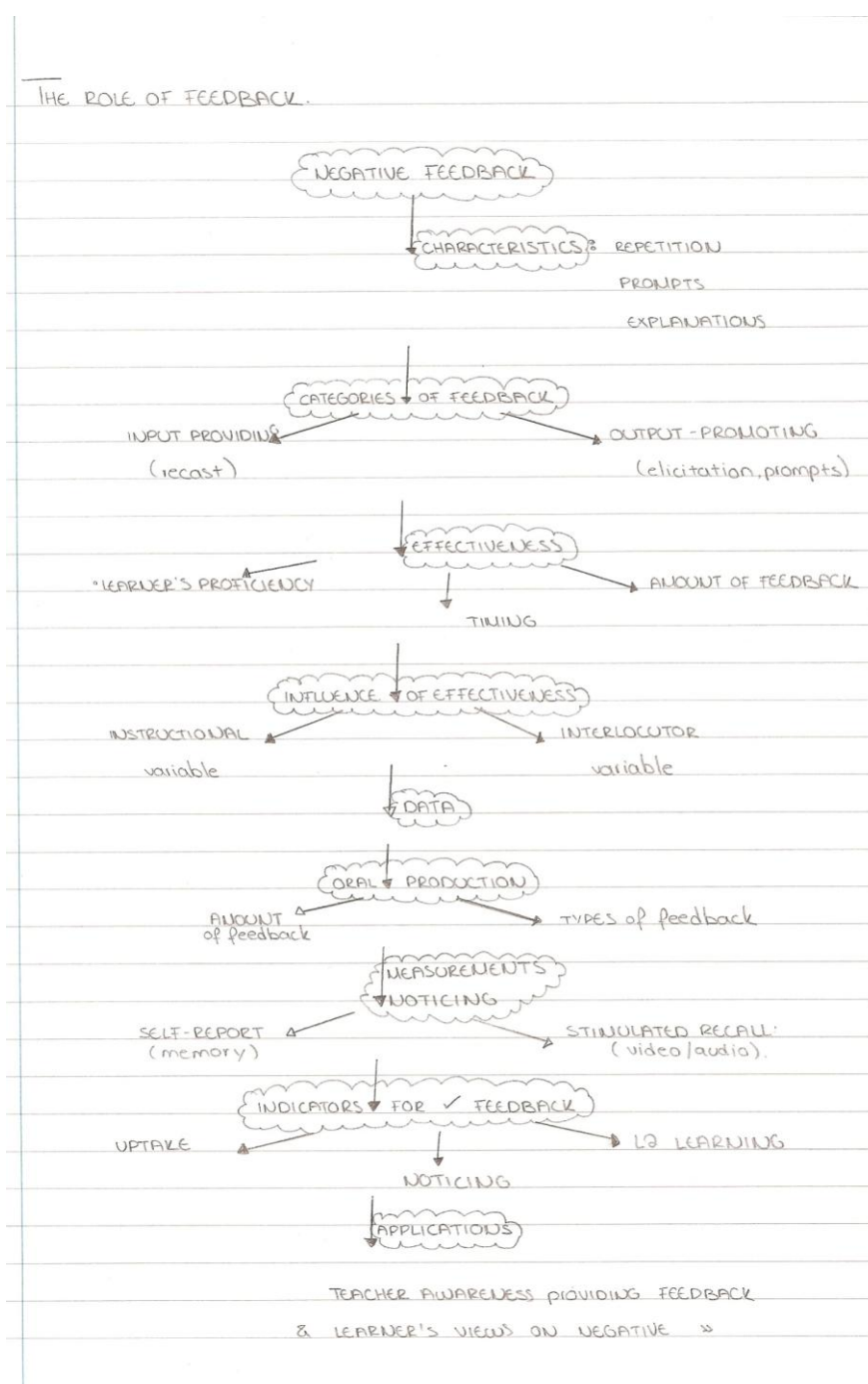
The following example is a concept map from a student of a high performance:



The student's map received a score of 34 for the established relationships between concepts, a score of 35 for the 7 identified levels ($7 \times 5 = 35$), no points were awarded for cross-links as there were no relevant instances and finally 2 points for the two examples that the student brought up (2×1). The total raw score was therefore 71 and the student's map was therefore 92.2% similar to the expert's map.

Appendix 31: Example of a student non-concept map

The example is taken from the pre-treatment sessions and is indicative of a linear, chain map where all the concepts link from one to another only. It is also indicative of a low conceptual development since the relationships between the various concepts are not developed in depth and there are no cross-links:



Appendix 32: Student individual scores for pre-treatment oral presentations

Themes	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
Coverage & Relevance	2 nd i	2 nd ii	Ordinary	3 rd	2 nd i	2 nd i	3 rd	2 nd i	2 nd ii	1 st	2 nd ii	2 nd i	Ordinary
Analysis	2 nd i	2 nd i	3 rd	3 rd	2 nd i	2 nd ii	2 nd ii	2 nd ii	2 nd ii	2 nd i	2 nd ii	2 nd i	2 nd ii
Supporting Evidence	2 nd i	2 nd ii	2 nd ii	2 nd ii	2 nd ii	2 nd i	2 nd ii	2 nd ii	2 nd ii	1 st	2 nd ii	2 nd i	3 rd
Voice and delivery	1 st	1 st	2 nd ii	2 nd ii	2 nd ii	2 nd ii	2 nd ii	2 nd i	2 nd ii	2 nd i	2 nd ii	2 nd i	3 rd
Format / Structure	2 nd i	2 nd ii	3 rd	2 nd ii	2 nd ii	2 nd i	2 nd ii	1 st	2 nd ii	2 nd i	2 nd i	2 nd ii	3 rd
Preparation	3 rd	3 rd	2 nd ii	3 rd	2 nd i	2 nd i	3 rd	2 nd i	2 nd ii	2 nd i	2 nd i	2 nd i	3 rd

Appendix 33: Student individual scores for post-treatment oral presentations

Themes	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
Coverage & Relevance	1 st	1 st	2 nd i	2 nd i	1 st	1 st	2 nd i	1 st	1 st	1 st	1 st	1 st	2 nd i
Analysis	2 nd i	1 st	2 nd i	2 nd i	2 nd i	1 st	1 st	2 nd i	1 st	1 st	1 st	1 st	1 st
Supporting Evidence	1 st	2 nd i	2 nd i	1	1 st	2 nd i	1 st	1 st	2 nd i	1 st	1 st	1 st	2 nd i
Voice and delivery	1 st	1 st	1 st	2 nd i	1 st	1 st	2 nd i	1 st	2 nd i	1 st	1 st	2 nd i	2 nd i
Format / Structure	1 st	2 nd i	2 nd i	1 st	1 st	2 nd i	2 nd i	1 st	2 nd i	1 st	2 nd i	1 st	2 nd i
Preparation	2 nd i	1 st	1 st	2 nd ii	1 st	1 st	2 nd i	1 st	1 st	1 st	1 st	1 st	2 nd i

Appendix 34: Screen-capture transcription example

Example of screen-capture transcription Day 2 – Task 2

Start time (h;min;sec)	Action/Event	Result of action	Comment	Duration	Step
0:10:01	Mouse move and scrolling up and down		Student reads the questionnaire	0:00:21	Reading
0:10:22	Moves mouse on the first question and the text cursor flashes	Text cursor appears	Thinks about the answer	0:00:12	Thinking about question 1
0:10:34	Starts typing the answer	The cursor types	Writes an answer	0:00:24	Answering question 1
0:10:58	No mouse move	Answer incomplete	Thinks about the correct answer?	0:00:08	Thinking
0:11:34	Opens up the article from the relevant Moodle section	Reading	Checks the relevant section in the article to answer the question	0:00:28	Checking the article for answers
0:12:02	Returns to word doc and types the answer	Mouse cursor moves over the word doc and types		0:00:15	Types final answer

Example of screen-capture transcription Day 3 – Task 3

Start time (h;min;sec)	Action/Event	Result of action	Comment	Duration	Step
0:30:05	Mouse does not move		Student reads the task instructions	0:00:17	Reading
0:30:22	Moves mouse on the first question and the cursor tops..	Text cursor appears	Thinks about the answer?	0:00:5	Thinking about question 1
0:30:27	Switches to the article	The cursor scrolls	Looks for the article section	0:00:22	Searches for the answer
0:30:49	Returns to multiple choice task	Mouse cursor selects answer	Answer selected	0:00:08	Submits answer
0:30:57	Feedback pops up	Reading	The answer is correct	0:00:5	Checking answer feedback

Appendix 35: Student comprehension questions, Day 1

Students	Questions
1	* What do you know about the concepts of attention and awareness in second language acquisition (SLA)? * How do these two concepts contribute to the process of learning and knowledge in SLA? * What kind of tools or mechanisms that have been already used under these two terms? * What were the findings of previous researchers on this topic and how did they tackle the issue? * In brief, can you state the main points that have been raised and the main solutions or proposals that have been suggested in this article? * What is your own understanding about the concepts of "Attention" and "Awareness" in SLA?
2	what is the focus of this article? where is it situated in the literature? what is the methodology followed? what are the findings? what is the conclusion?
3	* What are the main issues the authors investigated in the article? * What are the differences between implicit and explicit learning in terms of acquiring knowledge in L2? * What type of test did the author carry out on the participants? * Which linguistic area(s) do L2 learners pay more attention to when acquiring language? * It is said that "feedback in interactive settings" is important as it may allow subjects to pay more attention to problems or errors they have made. Do you think this is true? If so, why?
4	Why are attention and awareness important for in SLA? How are they connected to cognition? What do the SLA research findings say about them? What are the main issues of attention and awareness in SLA? How can we apply the findings to improve attention and awareness in SLA?
5	What are the key points and concepts of the article? Is the text valid and relevant to your subject? Is the writer biased or neutral in their opinions? Can you summarise the important elements of the text easily or does it require further reading? Can you create a mind map of the concepts and topics of the text?
6	1) what is the topic of the article? 2) What research has been done on this topic so far? 3) What are the methods used in order to investigate this topic? 4) What are the results of the research? 5) How would you evaluate the article? Was it informative, interesting etc
7	1. What is the definition of awareness and attention and their differences? 2. What is the function of the awareness and attention in SLA? 3. What is the difference between explicit and implicit learning and knowledge? 4. What is working memory? 5. How does working memory function in SLA?
8	1. What's the topic of this article? 2. What's the main idea of this article? 3. How many things did the author mention? 4. Why did the author take the examples? 5. What type is the article?
9	1, what content can you predict from the title of the article? 2. can you make a story just by linking every subtitle of this article? 3. after read the article tell me what the article is talking about? 4. which paragraph is the most important one in the article? 5. tell me your reading strategy
10	What is the article about? What is the writer's main argument? Do you agree or disagree with the author? what is the most important topic of the article? Create a concept map.
11	1. which draws your attention first when you receive the article? 2. what do you think when you see the topic 'attention and awareness in SLA'? 3. Do you have any terms that you don't understand when you go through the title and sub-headings? 4. what techniques do you usually use when you read an article in short time? E.g. 20 minutes. 5. If you have questions in the end of an article, do you read the questions firstly then read the article? Or do you read the article then answer the question immediately after reading ?
12	1. What is the main topic of this article? 2. What are the research questions? 3. What are the main points in core issues? 4. What are the main methods to research? 5. What are the findings?
13	What are the key points and concepts of the article? Is the text valid and relevant to your subject? Is the writer biased or neutral in their opinions? Can you summarise the important elements of the text easily or does it require further reading? Can you create a mind map of the concepts and topics of the text?

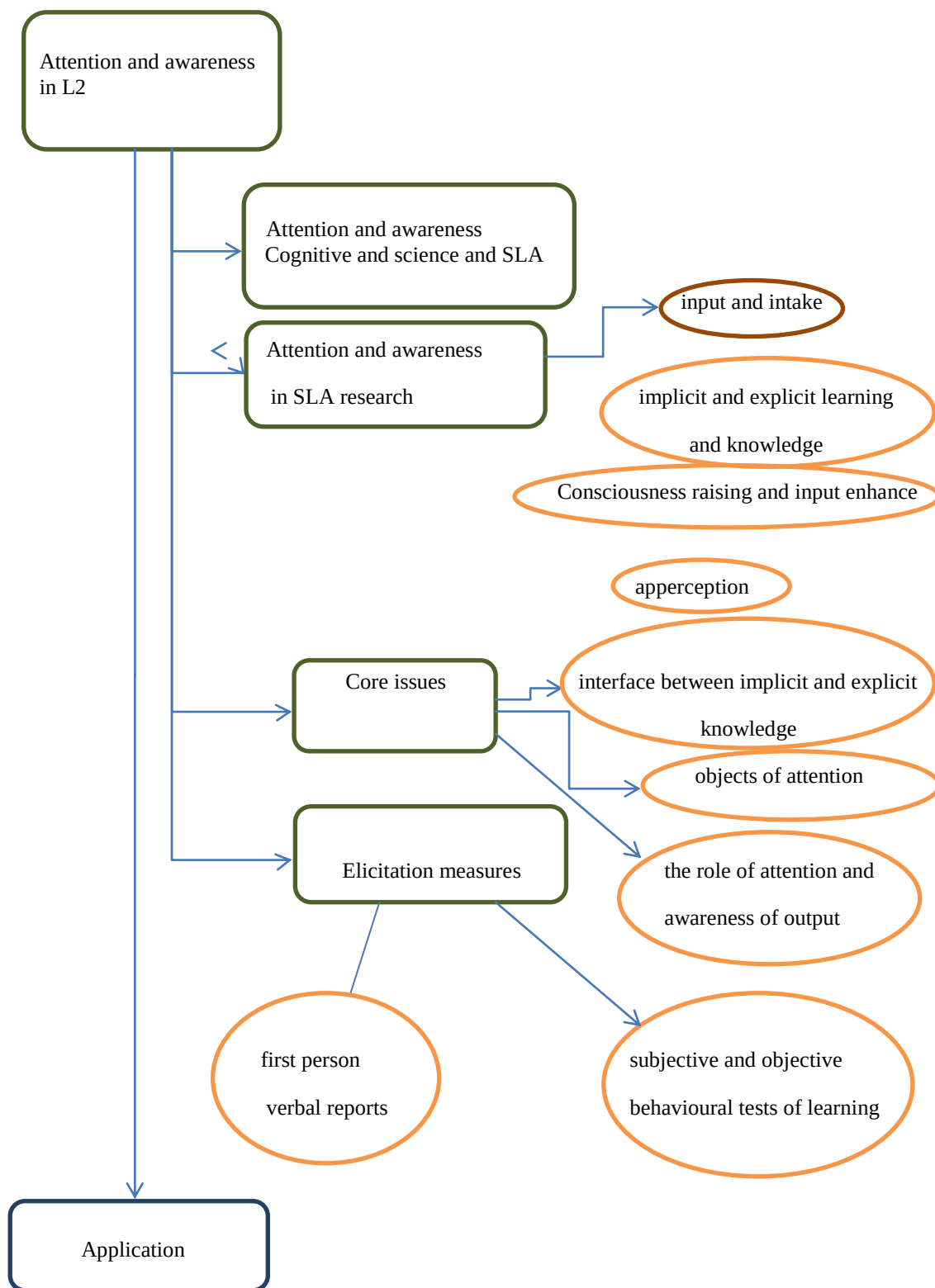
Appendix 36: Student responses - Task 4, Day 1

Task 4 – Day 1: Student responses to open-ended questions

Which of the aforementioned elements contributes more in enriching what you already know about the article's topic?	From the topics provided can you choose what do you think the text is going to be about?
Introduction and title	implicit and explicit language learning
the graphs	how we could assist students to improve their working memory
Graphs / Photos	implicit and explicit language learning the role of input and output in language learning how can instructors maintain the students attention how we could assist students to improve their working memory
the subheadings	how we could assist students to improve their working memory
Conclusion	implicit and explicit language learning
the subheadings	how can instructors maintain the students attention
Title	implicit and explicit language learning
introduction-conclusion references	how can instructors maintain the students attention
Sub-headings Introduction Conclusion Key words	implicit and explicit language learning
Summary Sub-headings Key words	the role of input and output in language learning
introduction, title	implicit and explicit language learning
the title	how can instructors maintain the students attention
The title	how can instructors maintain the students attention

Appendix 37: Student example answer – Diagram

The structure of the article (Student 4):



Appendix 38: Student entries on Moodle Glossary

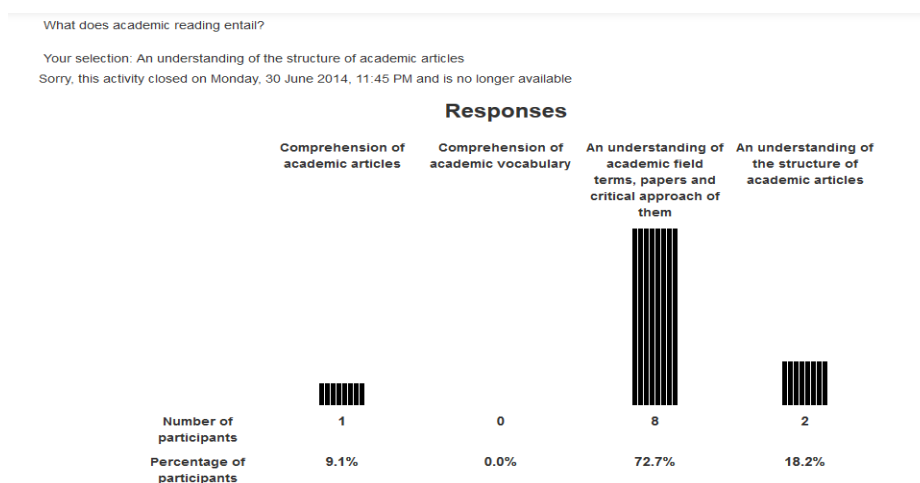
Students' entries on the Moodle glossary

Student	Terms	Correct definitions
S1	Acquisition Apperception: wrong Aptitude Competence: wrong	2/4
S2	Comprehension Explicit learning Implicit learning Focus on forms: wrong	$\frac{3}{4}$
S3	Explicit learning Implicit learning Input Intake	4
S4	Acquisition Intake Input Noticing	4
S5	Noticing Output Input Working memory	4
S6	Working memory Implicit learning Explicit learning Input	4
S7	Focus on form: wrong Focus on forms: wrong Input Intake	2/4
S8	Working memory Apperception Competence Acquisition	4
S9	Noticing Input Output Working memory	4
S10	Comprehension Input Working memory Intake	4
S11	Focus on form Working memory Input Output	4
S12	Intake Output Noticing Working memory	4
S13	Competence Implicit learning: wrong Explicit learning Input	$\frac{3}{4}$

Appendix 39: Student task responses – Day 1

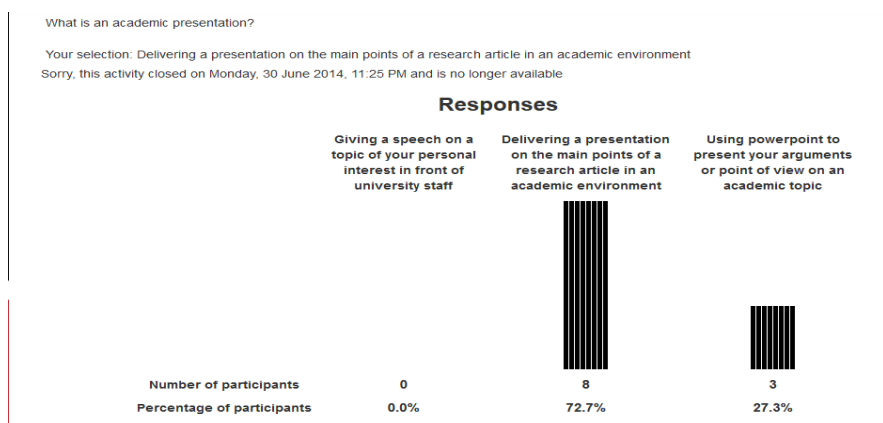
Day 1: Main treatment cycle First Poll (Orientation) question and student answers

Appendix H



Appendix I

Second Poll (Orientation) question and student answers



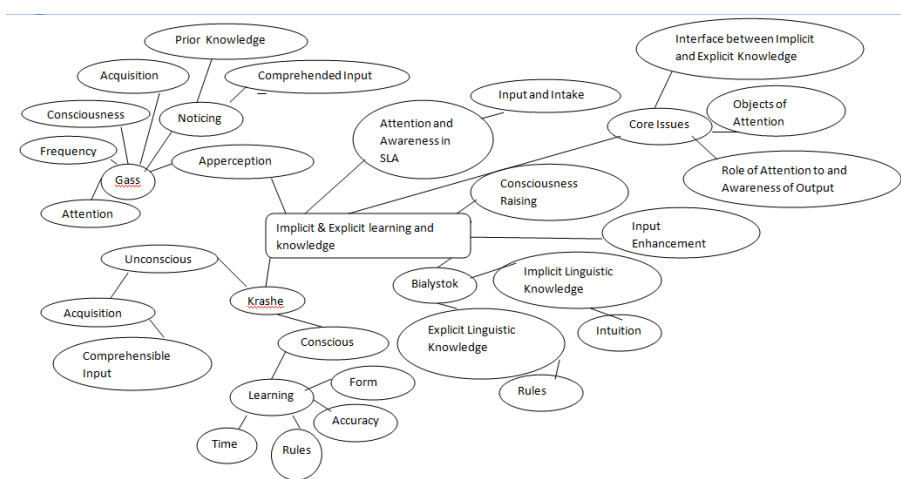
Appendix 40: Student results – Task 5, Day 1

Day 1 – Task 5: Student results of the online tasks

Average grade of first attempts	Average grade of all attempts	Average grade of last attempts	Average grade of highest graded attempts	Median grade (for highest graded attempt)	Score distribution kurtosis (for highest graded attempt)
84.44%	85.42%	91.11%	91.11%	100.00%	4,349

Appendix 41: Student and Expert treatment concept map examples

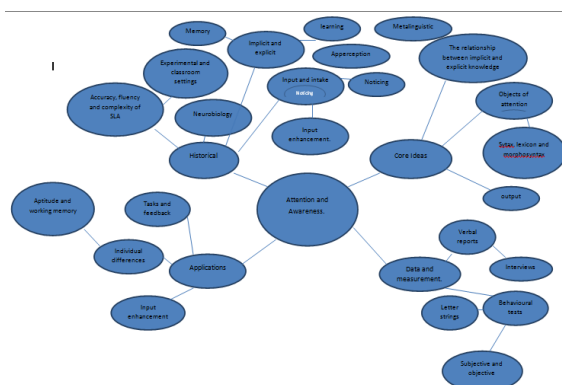
Expert treatment map



The map received a score of 32 for the relationships that were established between concepts, a score of 25 for the 5 levels of hierarchy that were created and 0 marks for examples or cross-links as the expert did not provide any. The total concept map score was 57 and the expert managed to create a concept map that depicts the connections between concepts and their classification according to article sections.

Below is the example of a high achiever who constructed a similar type of task. The map received a total score of 49 and it was 85.96% similar to the map that was constructed by the expert. It also follows a similar logic in the depiction of the connections between ideas according to article sections.

High achiever treatment map

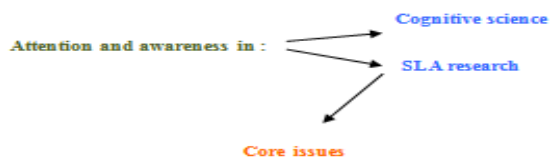


On the contrary the following example indicates the performance of a low achiever. This work did not receive a mark as the student did not create a concept map but rather a diagram of the article structure which contained the main ideas. If the map scoring strategy was followed the student's work would receive a total of 10 with 5 points for the number of relationships between concepts and 5 points for the number of hierarchy levels (1 level).

Low achiever treatment map

MIND MAP

Historical review (general)



Core issues

- 1) interface between implicit and explicit knowledge
- 2) objects of attention
- 3) the role of attention

Data collection measures:

- 1) first person verbal reports
- 2) subjective and objective behavioural tests of learning



Applications:

- 1) input enhancement
- 2) individual differences and attention
- 3) tasks in language learning

Appendix 42: Example answers for Task 2, Day 3

The nature of this exercise had mainly a reflective character and only extreme cases that would yield unacceptable processes would be marked down. An example of a low achiever's guide is provided below by Student 9:

Low achiever task answer, Task 2, Day 3

When we write a summary:

1. stressing the purpose of the study again;
2. Acknowledging the weakness of the study;
3. Proposing implications;
4. Suggestions for further studies.

It can be seen from the figure above that the low achiever places more emphasis on text comprehension and on the analysis of the various key words prior to the summary writing. There is also a lot of emphasis on non-necessary information such as further studies or future implications that are not typically included in summaries. When functioning at these levels the student is placed at lower conceptual levels according to the revised Bloom's taxonomy. A high achiever which functions at a higher conceptual level would concentrate on the process steps with a view to plan and evaluate steps that would lead to successful summary writing. An answer which was indicative of these levels is presented below and clearly identifies the elements of a successful process as well as the core parts of this type of writing. In other words, high achievers also demonstrated the skill to creatively combine information towards creating a concise report of the main ideas of a text:

High achiever task answer for Task 2, Day 3

Summary Practice

- Understand the general gist of the article, taking the introduction, discussion and conclusion into account
- Briefly go through the results of any experiments carried out in the paper
- Begin with the general idea of the article and any hypothesis the author had
- Name/quote any past research mentioned in the paper related to the experiment (but not all of those that the author mentioned may be relevant!)
- Mention briefly the participants and methods used to investigate the author's hypothesis
- Talk about the results in respect of the author's discussion
- Tell us what the author thought of his results
- Give any improvements you think would help to investigate further (i.e. different types of participants, different ways of sampling etc)

High achiever summary process 1 for Task 2, Day 3

- Firstly, find out what key words you are interested in

With this step you are going to pay attention on what interests you

- Skim and scan the article and find your key words

This step will guide you to find out the key words

- Take a note of them as bullet points

This step will help you to find specific information about the key words you have chosen

- Have a look at your bullet points and notes

With this step you check if you are satisfied with your notes, if yes then go to the following step, if not then go through your notes again

- Try write your summary

With the notes you have written before you can now start and prepare your summary.

Appendix 43: Example of student low and high achiever answers

High achiever

5 minute presentation.

1. The history of attention and awareness.
 - a. The noticing hypothesis
 - b. Apperception
 - c. Detection
 - Because a brief history is important to give the audience some background knowledge.
2. The a brief overview of the core ideas, backed up by others research
 - a. Interface
 - b. Objects of attention
 - it is important to spend more time on the core ideas because without knowing the audience won't follow the rest of the presentation
3. Data measurement
 - a. Verbal reports
 - b. Behaviour testing
 - Very briefly explain these topics as they are not as important but they lead into applications.
4. Applications
 - a. Input enhancement
 - b. Tasks
 - c. Individual differences
 - Aptitude
 - Working memory
 - More time is to be spent on this area as it is the bulk of the text and the most informative.
5. Future directions
 - This should be a brief ending to the presentation on what the author suggest happens next within this area, this is an appropriate closing topic.

Low achiever

Content outline of presentation

- 1) Overall information about the article
 - Attention and awareness in SLA
 - Attentional mechanisms
 - Implicit and explicit learning
- 2) Core issues
 - Interface between implicit and explicit knowledge
 - Objects of attention
 - The role of attention and awareness of output
- 3) Experiences and consequences of the researches related to attention and awareness.
 -
 -

Appendix 44: Task 1, Day 3

Task 1, Day 3

These four texts differ in formality. One of the reasons for this difference is the different audiences they are targeting.

Read the texts below carefully and then rank them from most formal (1), to most informal (4). When you have finished ranking the texts, submit your answer in the forum area.

Rank the Texts
A) Why write essays? In the modern world our thinking is largely transmitted by speech and through radio and television. At the university, however, you are required to do much of your thinking through writing. In the Humanities and Social Sciences you are inevitably required to produce a considerable number of essays. 2 Ranking:
B) It might be said that in-vitro fertilisation, at any age, is a matter of free choice, especially if the patient pays. If a woman wants the procedure, age should be irrelevant. But age can never be totally irrelevant. The line is unclear. But in the case of older mothers, questions of the "best interest of the child" press more insistently. And even when the patient pays something towards the cost of these procedures, there is some cost to the public. The issue of resource allocation remains. 3 Ranking:
C) In many radiotherapy centres where planning for external beam treatments is performed by radiation therapists, the treatment sheet and its calculations are independently checked by staff from a different educational background, typically a radiotherapy physicist. The benefits of this practice were evaluated in a radiotherapy department with two

linear accelerators: one combined superficial-orthovoltage unit and one telecaesium unit.⁴

Ranking:

D) It's a real shame that something as simple as a diet was not taken account of by nurses, thus causing unnecessary pain to the patient. It probably caused even more pain to the patient's family and friends having to see their loved one die like that. How would we feel if we saw our own relative go through that experience?

Ranking:

Appendix 45: Online scaffolding examples

Process models:

- *Task instructions*

Task 6: Identifying the structure of written texts and academic articles

Imagine you have to present the conceptual structure of an academic article visually.

- First, have a look at the article provided in the lesson and decide on the elements you would need to focus on with your partner
- Then draw a diagram of the article's structure.
- Finally, upload on the Forum area for peer feedback.

Process prompts:

- *Built-in hints*

es ▶ Department of Language and Linguistics ▶ LA_SAAS ▶ Session 2 - Hands on practice! ▶ Article terms and concepts Quiz ▶ Preview

Question 3
Not yet answered
Marked out of 1.00
Flag question
Edit question

Choose... are the brain-based skills we need to carry out any task from the simplest to the most complex. They have more to do with the mechanisms of how we learn, remember, problem-solve, and pay attention rather than with any actual knowledge. Any task can be broken down into the different cognitive skills or functions needed to complete that task successfully. When we learn languages learners need to go through certain stages. The Choose... states that learners cannot learn the grammatical features of a language unless they pay attention to them. Choose... alone does not mean that learners automatically acquire language; rather, the hypothesis states that this is Choose... for acquisition. The attention to and selection of input is called Choose... apperception levels usually have an Choose... for language learning that refers to the "prediction of individuals Article terms - Glossary: Apperception uage in a given amount of time and under given conditions. Chom mpetence and performance; he describes ' Choose... ' as an idealized capacity that is located as a property or function and ' Choose... ' as the production of actual utterances. In short, Choose... involves "knowing" the language and Choose... involves "doing" something with the language. The knowledge of the learner about language is called Choose... knowledge. More specifically, it is the type of knowledge that offers the learner the ability to consciously reflect on the nature of language, by using the following skills:

1. an awareness that language has a potential greater than that of simple symbols (it goes beyond the meaning)
2. an awareness that words are separable from their referents (meaning resides in the mind, not in the name ie. Sonia is Sonia, and I will be the same person even if somebody calls me another name)
3. an awareness that language has a structure that can be manipulated

- *Retries*

Your answer : in short
Wrong! This is a phrase to use in order to summarize and conclude. Click for more!
Yes, I'd like to try again
No, I just want to go on to the next question

- *Redirections*

Task 10: Mind map homework

Indicate how the ideas of the article link, include or exclude each other and how they link to the main idea of the text.

To do this you will have to use a mind map and you might want to use the attached example.

The mind map will serve as a conceptual guide to understanding the academic article alongside your previously constructed structure map.

Once your mind map is ready you will need to upload it on the forum to receive feedback.

Process displays:

- *Task completion indicators*



- *Learner portfolios*

General

- News from_Prior
- Article terms - Success/Fail
- Article terms - Success
- Article terms - Success
- Article terms - Success

5 Entries Thursday, 13 March 2014, 4:30 PM (1 year 241 days)

10 posts Thursday, 13 March 2014, 5:03 PM (1 year 241 days)

Session 1 - Induction and Orientation

- Test 1: Poll
- Test 2: Poll
- Test 3: Poll
- Test 4: Test elements and topics
- Test 5: Test elements and topics
- Test 6: Test elements and topics
- Test 7: Test elements and topics
- Test 8: Test elements and topics
- Test 9: Test elements and topics
- Test 10: Test elements and topics
- Test 11: Test elements and topics
- Test 12: Test elements and topics
- Test 13: Test elements and topics
- Test 14: Test elements and topics
- Test 15: Test elements and topics
- Test 16: Test elements and topics
- Test 17: Test elements and topics
- Test 18: Test elements and topics
- Test 19: Test elements and topics
- Test 20: Test elements and topics
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- Test 100: Test elements and topics

Session 2 - Hands on practice!

- Test 1: Test elements and topics
- Test 2: Test elements and topics
- Test 3: Test elements and topics
- Test 4: Test elements and topics
- Test 5: Test elements and topics
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- Test 99: Test elements and topics
- Test 100: Test elements and topics

Reflective social discourse:

- *Comment boxes*

Answers to Fotini's questions

Export whole discussion to portfolio

Display replies in nested form

Order of Terms and Diagram of Concepts

Move this discussion to ...

Move

Diagram of SLA article

by **Abdullah Thali** - Tuesday, 21 May 2013, 3:34 PM

Hello guys...

Please have a look at my diagram :)

[Abdullah Thali Diagram.docx](#)

Edit | Delete | Reply | Export to portfolio

Re: Diagram of SLA article

by **Gabor Muller** - Tuesday, 21 May 2013, 3:39 PM

That's superb! ^_^

Show parent | Edit | Split | Delete | Reply | Export to portfolio

Re: Diagram of SLA article

by **Abdullah Thali** - Wednesday, 22 May 2013, 3:22 PM

Glad you like it, Gabor :)

Show parent | Edit | Split | Delete | Reply | Export to portfolio

Re: Diagram of SLA article

by **Vasiliki Antoniou** - Wednesday, 22 May 2013, 11:38 AM

The main concepts look great and the visual element is also very good! The plus element here is the fact that you have managed to show how the concepts like to each other and how they're placed in the article as well.

Show parent | Edit | Split | Delete | Reply | Export to portfolio

Re: Diagram of SLA article

by **Abdullah Thali** - Wednesday, 22 May 2013, 3:21 PM

Thank you :)

Show parent | Edit | Split | Delete | Reply | Export to portfolio

Answers to Fotini's questions

Order of Terms and Diagram of Concepts

- *Peer-assessment*

Task 5

AI: Roger Williams
Submitted: 12/08/2016 10:58:12 AM | Last Modified: 12/08/2016 12:24:00 PM

• **Task 5: Robert Gould**

Assess

Assessment	Assessment settings
Assessment ID: Grade: SO of SO Assessment Form - Aspect 1	

Do you find the questions to be well formed?

Grade: 5 / 10

Comment: The questions seem very narrow in terms of how much of the article the student has to read to find out the answers to the questions because questions 1, 2 and 3 are related to each other.

Aspect 2

How helpful do you believe the questions would be to a student reader of the academic article?

Grade: 2 / 10

Comment: Like I have said before, the questions do not cover the entire article but only focuses on awareness importance in SLA rather than other aspects of the article such as the authors methods. Because questions 1, 2 and 3 are related to each other, and most students will have to answer them in a specific order for them to be able to answer the final question. That fact the student would not necessarily need to understand more than half of the article to answer these questions.
Also, question 4 seems like it should answered first because it is the first mention of attention and awareness.

Aspect 3

How successful is the relevance of the questions to the topics of the article?

Grade: 7 / 10

Comment: These questions are relevant to the article in terms of its main ideas.

Aspect 4

Any further comments??

Grade: 1 / 1

Comment: Overall, I think the questions are good questions individually. But it tends to aid the understanding and coverage of the paper for students. I feel that the areas asked in these questions are too specific to one single area. Seeing as there are 5 questions, there should be one covering each aspect of the article rather than having 4 questions concentrating on one area.

- *Notification system with message alerts*

▼

Subscription and tracking

Subscription mode ?

Optional subscription ▼

Read tracking ?

Optional ▼

▼

RSS

RSS feed for this activity ?

Discussions ▼

Number of RSS recent articles ?

None
Discussions
Posts

Quiz / Maze feedback

Your answer : Furthermore

Nope, this connector provides additional information in order to prove a point.

The glossary

Article terms - Glossary

This [glossary](#) must be enriched by you with terms that you find useful.

☒ Search full text

Browse the glossary using this index

[Search](#)
[A](#)
[B](#)
[C](#)
[D](#)
[E](#)
[F](#)
[G](#)
[H](#)
[I](#)
[J](#)
[K](#)
[L](#)
[M](#)
[N](#)
[O](#)
[P](#)
[Q](#)
[R](#)
[S](#)
[T](#)
[U](#)
[V](#)
[W](#)
[X](#)
[Y](#)
[Z](#)
[All](#)

Page: 1 2 3 4 5 6 7 8 9 10

0/10

A

Acquire

It is a sub-conscious that learners learn linguistic forms without awareness in their language learning.

[Comment](#) [0](#)

Acquisition

The unconscious ability to acquire grammatical rules in a language.

Keywords:

L2 (language acquisition) L1 L2

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Acquisition

It is the unconscious learning of the language

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Apperception

It is the process of understanding by which newly observed qualities of an object are related to the past experience.

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Apperception

According to Gess (1988), **apperception** concerns attention to and selection of **input**; more precisely the apperceived **input** is that bit of language which is noticed by the learner because of some particular features (p. 202).

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Apptitude

In a second language environment, aptitude is a key factor for indicating and predicting the development of the learner

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Appendix 46: Session 2 – Audio recordings

Tasks	Action	Type of scaffolding	Quotes	Number of students (out of 13)
Task 1	Creating a step-by-step guide	Instructions	<i>"Looks OK and that's clear.." Student 8</i>	8
		Feedback in the forum area	<i>"There's feedback in the forum area, I found mine and it was good.." Student 9</i>	2
Task 2	Answering the pre-reading questionnaire	Peer feedback from classmates on forum	<i>"Hahaha I knew I got this answer right!" Student 10</i>	3
		Teacher feedback	<i>"She has commented on my answers and has corrected a few mistakes" Student 9</i>	2
Task 3	Summarizing each paragraph in one sentence	Feedback from looking at peer answers	<i>"Oh I see what they have done, that's a different approach" Student 3</i>	9
		Task instructions	<i>"So, is this like writing a summary?" Student 13</i>	1
Task 4	The general idea	Instructions	<i>"That's good and simple" Student 6</i>	3
		Peer results	<i>"I saw that! It's not that bad!" Student 6</i>	1
Task 5	Multi-task (Quiz and Glossary)	Instructions	<i>"Oh OK so we have two parts here" Student 8</i>	3
		Feedback	<i>"Hahaha feedback popped up straight away!" Student 2</i>	9
Task 6	Creation of a concept map	Task instructions	<i>"So we have to create the map and upload.." Student 5</i>	3
		Peer feedback on forum	<i>"I don't think I can give this more than..it's not fully developed, just 3 nodes" Student 12</i>	8
		Teacher feedback on Forum	<i>"Did you see the tutor's comments? Check this out" Student 10</i>	3
		One-to one workshops	<i>"I can see what score I've given and what they've given me so the comparison is good, you think? Student 4</i>	6
Task 7	Identify the function of sentences	Test feedback	<i>"Aha! This shows where the right answer is" Student 6</i>	3
		Score	<i>"That's not bad, I thought I did worse!"</i>	1

			Student 5	
Task 8	Rate the terms	Peer and teacher feedback on forum	"Hmm I didn't like it for this task, it's not so clear why each term was rated like this but she explains here for example" Student 5	1
Task 9	Concept diagram	Peer feedback	"I'm not sure if this comment refers to this concept or not" Student 4	9
		Diagram example	"Yes, if you look at the example you can see you can have more nodes like.." Student 5	6
Task 10	Quiz with key terms description	Process comments	"Ok, I'm on track.." Student 3	3
		Feedback	"Yes, I know why I did great!" Student 9	2
		Score	"That's not as good as I thought to, can I retry?" Student 7	3

Appendix 47: Session 3 – Audio recordings Tasks

	Action	Type of scaffolding	Quotes	Number of students (out of 13)
Task 1	Lesson activity on formality	Teacher and student feedback on forum	"Oh now it makes sense why this answer is wrong, the feedback here says it exactly.." Student 5	2
		Example answer	"I have checked this document here, it's an example answer, have a look" Student 7	1
Task 2	Rank text extracts	Peer feedback from classmates on forum	"Hmm, so this is how they ranked it.." Student 4	8
		Example answer	"OK, so here is how we can rank a term like this one" Student 2	2
Task 3	Identify the author's purpose and tone	Example answer	"Cool, seems quite straightforward" Student 7	6
		Task instructions	"Instructions are OK but do we have an example?" Student 7	5
Task 4	Summary practice	Instructions	"Oh OK like a normal summary" Student 5	3
		Peer feedback on forum	"It seems I should have written in more detail" Student 8	4
		Example answer	"Hmm this is like the ones I'm creating but I have to find.." Student 10	4
Task 5	Create a content outline for the presentation	Example answer	"Looks like a list of headings to me..." Student 3	3
		Feedback on forum	"I could have added an extra section here, yes.." Student 8	8
		Instructions	"That's clear, let's see.." Student 4	7
Task 6	Preparation for the presentation	Task instructions	"Ok, good then" Student 1	3
		Peer feedback on forum	"More than 3 points here? But they're not so important.." Student 11	8
		Link to another site	"Oh good, there's an example here, it's like a presentation so that's fine" Student 1	6

Appendix 48: Student performance Task 7, Day 2

Student performance and mistakes for Task 7, Day 2

Students	Q1	Q2	Q3	Q4	Mistake
1	Correct	Correct	Wrong	Correct	Q3: Failed to identify a topic sentence
2	Correct	Correct	Correct	Wrong	Q4: Failed to identify a sentence that presented background information
3	Correct	Wrong	Correct	Correct	Q2: Failed to identify a concluding sentence
4	Correct	Correct	Correct	Correct	-
5	Correct	Correct	Correct	Correct	-
6	Wrong	Correct	Correct	Correct	Q1: Failed to identify a sentence which presented the results
7	Correct	Correct	Correct	Wrong	Q4: Failed to identify a sentence that presented background information
8	Correct	Correct	Correct	Correct	-
9	Correct	Correct	Correct	Correct	-
10	Correct	Correct	Correct	Correct	-
11	Correct	Correct	Wrong	Correct	Q3: Failed to identify a topic sentence
12	Correct	Wrong	Correct	Correct	Q2: Failed to identify a concluding sentence
13	Correct	Correct	Correct	Correct	-

Appendix 49: Student responses – Task 4, Day 2

Student responses to task 4, Day 2

<u>Question: What do you think are the main ideas of the "Awareness" article that you have read?</u>	<u>Responses</u>
<u>S1</u>	<u>The main ideas of the Awareness are mostly referring to implicit and explicit learning and knowledge, as well as contributing with memory</u>
<u>S2</u>	<u>The main ideas of the article is around the ways in which attention and awareness are employed by L2 learners in SLA and the ways in which attention can be tested on SLA learners such as first-person verbal reports.</u>
<u>S3</u>	<u>how students are aware of what they are searching for and what the most relevant parts could be</u>
<u>S4</u>	<u>Noticing
input
intake implicit and explicit learning</u>
<u>S5</u>	<u>Awareness is vital in processing input.</u>
<u>S6</u>	<u>how attention affects on different aspects of behaviour and learning</u>
<u>S7</u>	<u>the role of attention and awareness played in second language learning</u>
<u>S8</u>	<u>It talks about the implicit and explicit knowledge in SLA from different angles. And it gives application in different aspects about attention and awareness in SLA.</u>
<u>S9</u>	<u>Awareness is that during second language learning process, the learners' intention to try to turn the knowledge into long-term memory.</u>
<u>S10</u>	<u>That attention and awareness are important in the Second language Acquisition and it is essential its continuous.</u>
<u>S11</u>	<u>there are some arguments about the attention and awareness in different aspects. What is the interface between implicit and explicit knowledge, the objects and the role of input.</u>
<u>S12</u>	<u>that the core issues should be investigated with the particular methods proposed</u>
<u>S13</u>	<u>-input and output -noticing hypothesis -implicit and explicit learning -aptitude -attention</u>

Student reaction to article (Task 4, Day 2)

What was your very first reaction to the article?	Interesting	Informative	Boring	Illogical	Inaccurate	well-argued	scientific	too long
	2	7	2	0	0	1	1	6
	0,153846154	0,538461538	0,153846154	0	0	0,076923077	0,076923077	0,461538462

Appendix 50: Student responses to the task questionnaire

Student responses to the task questionnaire

	Strongly agree	Agree	Disagree	Strongly disagree
1. The instructions are clear	9	2	2	0
2. The questions are clear	10	2	1	0
3. The feedback is useful	11	2	0	0
4. There is a comprehensive overview of the course	9	3	1	0
5. Materials are presented in a logical order	10	3	0	0
6. The materials cover a wide range of areas and are interesting	8	4	1	0
7. The materials are relevant to my needs	10	3	0	0
8. The difficulty level of the materials is appropriate to my level	7	4	2	0
9. The course is structured in a logical order	8	4	1	0
10. The pace of delivery is appropriate	8	1	4	0