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Vocabulary learning through reading: The effects of multimedia glosses for contextualized vocabulary use and acquisition

by

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ABSTRACT

Research in the field of incidental vocabulary learning through reading has concentrated on various types of foci. In particular input enhancement techniques such as glosses have been the subject of many studies (Ariew & Ercetin, 2004; Ko, 2005; Miyasako, 2002; Yoshii & Flaitz, 2002), leading to the conclusion that multimedia glosses added to reading tasks are beneficial for students' comprehension of texts and learning of new vocabulary. However, studies have produced mixed results with respect to the effects of L1 vs. L2 glosses (Bell & LeBlanc, 2000; Jacobs, DuFon & Fong, 1994; Ko, 2005; Yoshii, 2006). While this area of research thus far has focused on students' ability to retain new lexical information, their ability to use words within specific contexts has not yet been examined.

This study aimed at testing to which extent students can understand texts, and retain and produce new vocabulary in context when reading with glosses featuring explanations in the L2 and L1 translations. To this end, 108 students in their second semester of German at the University of Alberta were given three texts, each including the same 15 target words glossed under three conditions: (1) picture + English translation, (2) picture + German explanation, (3) no gloss. Students were asked to participate in productive and receptive posttests, and finally they took part in an online chat in which they were to use the target words in context.

The results indicate that the use of glosses for new vocabulary learning not only helps students to retain and produce the individual words, but also to use

these words in context. The language used in the glosses, however, did not seem to make a difference, neither on the receptive and productive tests, nor for retention of contextual information.

The results and observations from this study therefore confirm the importance of the use of glosses for reading comprehension and vocabulary learning and show their potential for material development to introduce and use vocabulary in context more successfully.

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1. INTRODUCTION

Learning vocabulary is an essential part of learning and mastering a second language and has remained a key issue in second language research. Research in second language (L2) vocabulary teaching and learning has investigated many aspects (Huckin & Coady, 1999), such as cognitive processes (Hulstijn, 2001; Robinson, 1995), incidental learning through reading and listening activities (Joe, 1995; Krashen, 1989; Laufer, 2003; Xu, 2010), and interaction (de la Fuente, 2002; Dobinson, 2001), in order to understand the processes involved for students to retain and use new vocabulary and to develop pedagogical materials that help lexical instruction.

The use of computer-mediated communication (CMC) in the second language classroom has greatly increased in the last two decades as a tool used to generate more connections between teaching materials and authentic situations (Dubin & Olshtain, 1993; Gilmore, 2007, Wiberg, 2003; Zahar, Cobb, & Spada, 2001). Contextualized CMC materials and tasks, such as web-searches, chats, or online reading and listening activities, have been developed to facilitate incidental vocabulary learning while exposing second language students to authentic cultural materials (Chun, 2001; de la Fuente, 2002; Gettys, Imhof, & Kautz, 2001; Smith, 2004). Reading tasks that are especially beneficial for students' development of L2 literacy and intercultural knowledge (Gilmore, 2007) have therefore partly changed to be presented through CMC technologies, in order to offer students exposure to authentic pictures and videos to accompany reading activities.

Much more than learning word meanings through mere translations, the focus now resides in providing students with a cultural understanding of the use of specific vocabulary in context. Krashen's Input Hypothesis (1981) states that second language learners acquire new vocabulary through the exposure to comprehensible input readings, whereas unknown words can be inferred from comprehensible and authentic context, without lexical interventions. Laufer (1997) has argued that second language learners need to know 3000 word families and can successfully make form-meaning connections of new words if 95 to 98 per cent of the words are familiar to them. Since it is difficult to conceive such reading conditions for beginner learners of a second language, many studies (Horst, Cobb & Meara, 1998; Horst, 2005; Hulstijn, 2005; Peters, Hulstijn, Sercu, & Lutjeharms, 2009; Rott, Williams, & Cameron, 2002; Wode, 1999) have focused on incidental vocabulary learning through reading using various experimental paradigms, from extensive reading tasks to reading with different types of margin or in-text glosses. While showing the important role played by reading activities in general for students' success in making form-meaning connections for new lexical items, studies on incidental vocabulary learning using extensive reading (Bell, 2003; Parry, 1997; Pigada & Schmitt, 2006) have shown that the lack of input enhancements techniques in readings lead to low levels of vocabulary learning. Students inferring word meanings only from context tend to not notice new words when they understand the general context of the reading, or to infer incorrect word meanings (Horst, 2005). As a consequence, lexical interventions such as glosses have been used in order to help understand and

retain of new vocabulary. In addition, questions remain with regard to students' abilities to successfully use these new words within specific contexts and to include them within their own contextualized discourse.

Nation (2001) provides an extensive definition of the concept of word knowledge, ranging from receptive and productive 'form', 'meaning', to 'use' of a word. While the form refers to spoken (pronunciation) and written (spelling) forms (including word parts), the meaning of a word is characterized by the concept itself (what does the word refer to?), associations to other words, as well as the meaning-bearing form of the word, such as morphological characteristics. Furthermore, the 'use' of a word refers to patterns of occurrence of a specific word (grammatical functions), collocations (use around other specific words), and constraints such as frequency and register of use (p. 27). This view of word knowledge, therefore, refers to both receptive and productive knowledge of words, while considering their context of use.

This study aims at discovering whether students are able to acquire new lexical items and use them beyond vocabulary tests and activities focused on specific vocabulary. To what extent are students able to process lexical context information while reading L2 text passages and can they productively use this information in their own discourse? This study aims to answer these questions in order to further understand the processes involved in vocabulary learning and the types of tasks that lead to more successful learning in the second language classroom.

1.1 Background of the study

1.1.1 Learning vocabulary

This study is based on research in the field of incidental vocabulary learning through reading tasks and tests students' learning and understanding of lexical items through interaction. Although explicit instruction seems to be a more effective way to teach new vocabulary to students (Schmitt, 2008), it is inconceivable to include all relevant vocabulary into tasks and classroom activities and to control exposure to new vocabulary for students of a second language. Indeed, it is inevitable that students acquire new knowledge through incidental contact, therefore through contextualized reading or listening activities. Incidental learning can occur when students learn one concept while focusing on another, or in particular when students focus on the meaning of a text and learn new vocabulary items from the context of the reading. Students can consequently learn through comprehensible exposure to new vocabulary allowing context for meaning inferences, without any explicit instruction (Krashen, 1981; Saragi, Nation, & Meister, 1978). Research has shown that reading activities can provide students with such exposure, either through extensive reading activities (Hill & Laufer, 2003; Horst, 2005; Pigada & Schmitt, 2006) or through the use of meaning enhancement techniques such as annotations and glosses (Hulstijn, Hollander, & Greidanus, 1996; Jacobs et al., 1994; Knight, 1994; Ko, 2005; Kost, Foss, & Lenzini, 1999; Paribakht & Wesche, 1997; Watanabe, 1997; Webb, 2007; Yanguas, 2009; Yoshii, 2006).

Research with glosses – a definition or an explanation with regard to the meaning of a word (Jacobs, 1994) – has investigated their role for vocabulary learning and reading comprehension from various perspectives. The comparison of gloss conditions with non-gloss conditions has revealed that glossed readings are beneficial for enhancing incidental vocabulary learning (Chun, 2001; Hulstijn et al., 1996; Jacobs et al., 1994). Especially the discrepancy between the comprehension of words for understanding texts and the process of word-meaning connections for vocabulary learning is an important issue addressed in studies with glosses (Hulstijn et al., 1996; Ko, 2005; Levine, Bejarano, Carrell, & Vered, 2004). While a 'reading-only' approach can allow students to understand contexts, Hulstijn et al. (1996) in particular see drawbacks of such an approach for vocabulary learning, since students might not notice or choose to ignore new words in a text. In addition, the context itself might not be sufficient for students to infer meanings, or a rich context could allow for guessing of the meaning without leading to learning (Mondria & Wit-de Boer, 1991; Laufer, 2005). Another issue of learning vocabulary only from reading is the frequency of exposure to specific words. Saragi et al. (1978), while concentrating on L1 speakers, concluded that repetitive exposure to specific words enhances vocabulary acquisition. Research in L2 vocabulary learning has looked at the effect of frequency for students' learning of new vocabulary, finding gains in receptive and productive knowledge occurred after six (Rott, 1999) or even eight (Horst et al., 1998) exposures.

For Nation (2001), enhancing word meanings in reading passages through glosses has two main advantages: glosses give students the opportunity of being exposed to more complex texts, as they do not have to rely only on context to infer the meaning of unknown words. In addition, since glosses can be written within the text at hand, they require less reading interruptions and help students focus more on the context of their readings. Dictionary entries, for example, require students to stop reading the text to look up an unknown word. Therefore, 'internal' glosses, placed within the text (after a word, in the margin, as a footnote or as a hypertext) seem to be more beneficial for students' reading comprehension and vocabulary learning than external glosses (on a different sheet of paper or on another website). In general, studies using internal glosses, that is, glosses that appear within the text as opposed to external dictionary entries, have proven more beneficial for students' retention of vocabulary (Bowles, 2004; Gettys et al., 2001).

The question, therefore, has shifted from whether or not glosses are useful for incidental vocabulary learning, to investigating which type of gloss is most effective. For this reason, research in the field of incidental vocabulary learning through reading has started focusing on internal glosses only and compared various types, featuring and combining explanatory cues such as translations (Gettys et. al, 2001; Lomicka, 1998; Plass, Chun, Mayer & Leutner, 1998; Watanabe, 1997), textual explanations (Akbulut, 2007; Shahrokni, 2009), representative pictures (Kost et al., 1999; Yoshii & Flaitz, 2002), video (Al-Seghayer, 2001; Ariew & Ercetin, 2004; Chun & Plass, 1996) and audio cues

(Yeh & Wang, 2003). By comparing the effects of different types of internal glosses, research has shown that multimedia glosses, exposing students to more than one type of explanation of the vocabulary at hand (e.g. a textual cue combined with a pictorial cue), have been more beneficial for incidental vocabulary learning through reading activities (Akbulut, 2007; Chun & Plass, 1996; Kost et al., 1999; Nagata, 1999; Yanguas, 2009; Yoshii & Flaitz, 2002) than single glosses showing one type of explanation only (e.g. a pictorial cue). This confirms Paivio's (1986) dual-coding theory assuming that a verbal and a non-verbal representation of foreign words is necessary to achieve deeper levels of processing (Craik & Lockhart, 1972) and to successfully learn a new concept.

Although studies have shown that multimedia glosses are more efficient than single glosses for learning vocabulary, one aspect remains problematic and concerns the language used in the glosses (L1 or L2) and its effects on comprehension and retention of new vocabulary. A few studies have analyzed the differences between students reading with glosses written in their first language (L1) and students exposed to glosses presented in the L2 and have yielded contradictory results. Ko (1995) found positive effects of L1 glosses on a one-week delayed posttest, whereas there were no differences between the effects of L1 and L2 glosses on the immediate test. A study by Bell and LeBlanc (2000) did not find any significant differences in the text comprehension of students exposed to L1 and L2 glosses, while students seemed to prefer glosses in the L1. Yoshii (2006) confirmed Bell and LeBlanc's conclusions since he could not find any differences with regard to the effects of L1 and L2 annotations (see also Holly &

King, 1971; Jacobs et al., 1994). These results contradict Ko's (2005) results showing that students not only perform better with regard to text comprehension and vocabulary learning with L2 glosses, but also stated preferring the exposure to glosses in their second language. Miyasako (2002) found that L2 glosses used for text comprehension are more beneficial for advanced second language learners than L1 glosses.

Since both types of glosses featuring students' L1 and L2 have therefore proven beneficial for the expansion of their lexical knowledge, and the comparisons between glosses in either language yielded contradictory results, further research is needed in order to understand to what extent the use of the L1 and the L2 help students for the processes involved in inferring meaning from context and learning new vocabulary using glossed readings. One goal of this study is to once again compare the learning effectiveness of glosses using the L1 and the L2 with regard to the retention of vocabulary meanings and forms. However, this study is also concerned with another aspect of vocabulary learning (to be explained in the following section) and aims at linking the role of glosses to students' processing of lexical context information, based on the definition by Engelbart and Theuerkauf (1999) provided in section 1.2 below.

The studies researching the effects of glosses for students' retention of vocabulary mentioned above have focused on participants' performance in productive and receptive tests or on students' comprehension of the texts at hand. To date, research featuring glossed readings has not investigated the extent to which students gain knowledge from reading with glosses that will enable them to

communicate with the newly learnt vocabulary in contextualized situations. Meaningful interaction using new lexical items from reading activities has not been applied to research with glosses. In an effort to find out if repeated exposure to new vocabulary using glossed readings can provide students with sufficient contextualized input to be able to understand and use context information, students in the present study participated in a role-play using a chat task in order to show their ability to use specific words in a contextualized situation.

On the one hand, the present study, therefore, aims at finding out whether students are able to process meaningful context information presented through glosses in reading activities in order to use this information in their own discourse, and on the other hand whether the use of the L1 or the L2 in these glosses affect their ability to process context information and use it in a meaningful task. In other words, this study tests lexical input conditions (multimedia glosses in L1 and L2, no gloss) and their effects on the use of learnt vocabulary in output.

1.1.2 Rationale

This study aims at understanding the effects of reading interventions in the form of glosses in second language readings for the reinforcement of form-meaning connections leading to comprehension, retention and use of new vocabulary. While using glosses as input enhancement techniques, this study is also concerned with the role of tasks featuring input-output cycles (Rott, 2003), in which students are given specific input to learn and asked to produce words in output-based tasks, by analyzing how students can carry a conversation with

newly learnt words in an activity featuring interaction. As stated by Swain's Output Hypothesis (1985), students process language information more successfully through production by creating their own context and relying on their interlanguage to practice newly learnt concepts. By asking students to participate in a chat task at the end of the study, the present research aims at using an activity featuring pushed output in order to gauge how students transfer context information learnt through reading activities and reconciles textual input exposure with students' ability to use new words in communicative situations. By reading foreign language texts, students are exposed to new lexical items in various contexts and can infer the meaning of these new words according to these different contexts. The interaction occurring in the chat task therefore gives insight into the way that students use new vocabulary in contextualized communication situations. The goal of this study is not to identify how students learn vocabulary from interaction, but rather how they use interaction to practice newly learnt vocabulary items. In other words, the purpose of this study is not only to find out which types of glosses are beneficial for students' learning of new vocabulary, but also to address the role of glossed readings and contextualized vocabulary exposure for developing students' communicative competence as defined by Canale and Swain (1980) and Canale (1983). Communicative competence refers to the "underlying systems of knowledge and skill required for communication" (p. 5) and includes 'grammatical competence' (language code and rules), 'sociolinguistic competence' (the understanding of the sociocultural rules of discourse), 'discourse competence' (the combination of grammatical

forms and meaning), as well as 'strategic competence' (the ability to enhance the effectiveness of communication and to compensate for communication breakdowns).

As mentioned above (and shown in more detail in the next chapter), many studies have focused on second language vocabulary learning through tasks featuring glossed readings. However, these studies concentrate on students' recognition and production of lexical items in an isolated manner by presenting participants with tasks in which they are to show their learning by recognizing and producing words according to their forms and meanings in specific situations. Considering the importance placed on communicative activities in the second language classroom in order to provide students with tools to be able to communicate in their second language, research in vocabulary learning – through readings, listening activities, or interactional tasks alike – needs to concentrate further on the learning processes allowing second language students to use new knowledge in a contextualized manner and in real-life situations. Enhancing students' communicative competence through meaningful tasks can occur in various classroom situations and activities. The present study aims at understanding whether reading activities can enable students to include target words in their own interlanguage by asking the participants to use interaction in order to strengthen and use their knowledge of newly learnt vocabulary items.

The premise underlying this study consists of providing students with contextualized information about new lexical items and to analyze their interaction behavior when using these new words in a communicative situation

that they can create through a role-play. Much more than the ability to recognize and learn forms and meanings of new words, this study intends to find out how students can then use newly learnt vocabulary in their own discourse for communication purposes. By providing students with opportunities for interaction through a CMC chat task, they are able to create a situation in which they can try to use the new words and will be able to achieve deeper levels of processing (Craik & Lockhart, 1971). The present study therefore aims at understanding how reading activities can help students further their communicative competence and their understanding of lexical contextualized information in order to use their second language in communicative situations.

To this end, this study proposes to answer the following research questions:

1. Does the type of gloss (L1 text and picture, L2 text and picture) influence students' comprehension of glossed readings?
2. Do different types of glosses (L1 text and picture, L2 text and picture) have different effects on students', retention and production of new vocabulary items?
3. Do glosses in a reading task help students to use the targeted words in a productive, contextualized post-reading task?
4. Do various types of glosses (L1 text and picture, L2 text and picture) have different effects on students' contextualized understanding and use of the target words in a contextualized post-reading task and their ability to negotiate the meaning of the target words through communication strategies?

1.2 Definitions of key concepts

Before presenting the outline of this dissertation, important concepts used for this study need to be explained and defined. As stated above, this study uses reading passages with input enhancement in the form of glosses to help students infer the meaning of new words and use these words in a contextualized chat task. It has been mentioned and will be shown more comprehensively in the next chapter that multimedia glosses are beneficial for students' learning of new vocabulary. This study aims at finding out whether students can also use these new words in context, beyond vocabulary recognition and production tests. Consequently, the concepts of 'gloss' and 'context' need to be further explained and defined.

As mentioned above, the term 'gloss' refers to explanations provided about certain words of a text in order to enhance text comprehension and vocabulary learning. Glosses are different from dictionary entries in that they show one meaning of a word, either through a definition, an explanation, a translation or even through pictorial, audio or video cues. They can also be designed as a combination of the above, which has been shown to be more effective for students' text comprehension and word learning.

Whether studies aim at measuring students' learning of new vocabulary through contextualized input (Nassaji, 2003; Webb, 2007) or through students' contextualization of new vocabulary as in this study, an accurate definition of the term 'context' needs to be provided. Engelbart and Theuerkauf (1999) give an overview of various definitions of this concept and differentiate between a *verbal*

and a *non-verbal* context of a word. The *verbal* context of a word is defined as its grammatical (syntactic, morphological and phonological) properties, as well as its semantic properties, and is as such inherent to the word itself and defines its linguistic environment. *Non-verbal* context refers to four types of 'content-oriented aspects' (p. 61) to describe the content-related environment of a word. The *situative* aspect describes the person using the word, the time, the place, and the interlocutor. The *descriptive* aspect of a word is similar to a definition but refers to only parts of the word's meanings, such as those described by a gloss. The third aspect of a non-verbal context is called *subject* context (p. 61). This denotes the knowledge that the learner has of the subject matter of the text. The learner's world knowledge that interacts with their ability to infer word meanings from their readings is then called *global* context. The term *context* can therefore have different types of foci and can be defined with regard to various aspects. As the authors note, "not all of the above mentioned contexts have to apply to a given passage" (p. 62).

For the purposes of this study measuring students' ability to learn from context and use new vocabulary in a contextualized task, it is important to define the meaning of 'use in context' in the last test of the study presented as a role-play in chat form. It is not possible to test subject and global contexts in students' chat interactions, but rather the verbal context, especially the semantic use of words, is vital to the question at hand. In addition, the use of a descriptive context definition is equally important to observe students' understanding of the target words and the effects of the various glosses for their learning process.

1.3 Outline

This dissertation is divided into six further chapters. The next chapter presents relevant studies and sources that give an overview of previous research in the fields of incidental vocabulary learning and reading activities. After an overview of studies analyzing the effects of extensive reading, it further concentrates on studies using enhancement techniques in readings such as glosses for vocabulary comprehension and learning.

The third chapter introduces the methods used to gather the data for this study. The research design is explained by presenting the treatments as well as the procedures and instruments used in the analysis. The scoring procedures for the quantitative tests are explained and definitions of the communication strategies observed throughout the chat data are provided.

The fourth chapter is concerned with the presentation of the results yielded from the quantitative analyses. Results gathered throughout the pretest, comprehension questions, the immediate and the delayed receptive and productive posttests are introduced. In addition, the results from the questionnaire administered at the end of the study are presented.

The fifth chapter of this dissertation deals with the results gathered from the chat task administered at the end of the study, and both quantitative and qualitative findings are presented with regard to students' use of the new vocabulary in context as well as their use of communication strategies to perform the contextualized chat task.

The sixth chapter aims at answering the research questions introduced in chapter 3. In order to do so, the quantitative and qualitative results presented in chapter 4 and 5 are discussed and interpreted.

Finally, the last chapter of this dissertation discusses pedagogical implications of the results, limitations encountered while collecting data and analyzing the results of this study, as well as possibilities for further research based on the present findings with regard to the use of reading activities for students' abilities to use new vocabulary in a more contextualized manner.

2. PREVIOUS RESEARCH

This chapter provides an overview of previous research focusing on relevant theories and empirical data for the study presented in later chapters. This study concentrates on the ability of students to retain, produce and use new vocabulary in context based on glossed readings. In order to gain a complete overview of the relevant literature, several research domains need to be addressed. Research on vocabulary learning, and specifically previous results and theoretical considerations concerning incidental vocabulary learning, will be presented in the first part of this chapter. The second part deals with literature on learning vocabulary through reading activities, from extensive reading tasks to various experimental conditions used in reading passages. The third and final part of this chapter is concerned especially with glossed readings, differentiating the different types of glosses that have been used to introduce new vocabulary to foreign language learners.

2.1 Incidental vocabulary acquisition

Research in SLA has long focused on the role of reading and listening for the acquisition of new vocabulary. Vocabulary learning has been subject to theories and studies in order to identify the processes and techniques that facilitate the acquisition of new lexical items for second language learners. There is an important dichotomy of views about the factors that are considered beneficial for vocabulary acquisition. On the one hand, one perspective sees vocabulary learning as an intentional process that requires learners to study and consciously learn

vocabulary items and grammar rules from lists. This theoretical concept is illustrated through studies such as one conducted by Griffin and Harley (1996), who aimed at finding out the most beneficial order of learning word pairs for vocabulary retention (L1-L2 vs. L2-L1). Participants of the study, high-school learners of French as a second language, were asked to consciously learn a vocabulary list in either order to allow a comparison. A written vocabulary test conducted three times over the course of three weeks showed that if students need to learn a list of vocabulary, a L1-L2 order seems to be more beneficial.

On the other hand, some research also focuses on the role of incidental vocabulary or grammar learning, which happens through exposure to the language in context, either through reading or through listening activities (Elley, 1989). According to this view, students can learn forms of a language through activities requiring them to focus on the meaning of the language used in them. Schmidt (1994) offers the following definition for incidental learning: "[Incidental learning means the] learning of one thing (e.g., grammar) when the learner's primary objective is to do something else (e.g., communicate)" (p. 16). Research on incidental vocabulary learning can be problematic, since the cognitive and pedagogical processes involved in incidental learning are not fully understood (Huckin & Coady, 1999, p. 182). According to Lawson and Hogben (1996), it can be difficult to "clearly draw the distinction between comprehension of word meaning in context and the acquisition of word meaning from context" (p. 105).

Hulstijn (2005) offers an overview of studies concentrating on incidental learning featuring various theoretical frameworks. On the one hand, Krashen's

Input Hypothesis can be applied to reading activities (Krashen, 1989) highlighting the role of incidental learning for acquisition of vocabulary and spelling, considering that students learn vocabulary and spelling through extensive reading; on the other hand, more studies have focused on the role of specific text features and their effects on the retention and acquisition of new vocabulary items (Hulstijn, 2005; Laufer, 2005; Peters et al., 2009), hence controlling the type of input given to the students in specific reading activities, such as translations of new words (Yanguas, 2009), textual explanations (Akbulut, 2007; Shahrokni, 2009), representative pictures (Kost et al., 1999; Yoshii & Flaitz, 2002), video (Al-Seghayer, 2001; Ariew & Ercetin, 2004; Chun & Plass, 1996) and audio cues (Yeh & Wang, 2003). The present study finds its place within the latter type of empirical research by analyzing the role that glosses added to reading passages can have on students' retention and production of new words, but also on their ability to use new words in context.

Closely linked to the dichotomy of incidental vs. intentional learning is another differentiation made between implicit and explicit learning of language forms. Even though these concepts are sometimes used interchangeably, they refer to different types of knowledge and learning processes. As Hulstijn (2005) points out, "incidental and intentional learning have been given various interpretations, sometimes indistinguishable from two more widely used terms, namely implicit and explicit learning, respectively" (p. 349). However, it is important to make a distinction between incidental and implicit learning. Definitions of implicit learning (DeKeyser, 2005; N. Ellis, 1994; Schmidt, 1990 & 1994) underline the

student's lack of awareness or consciousness at the time of learning. Incidental learning therefore defines the act of learning language forms without focusing on learning them, whereas implicit learning refers to the unconscious learning of language aspects, leading to the ability of using specific language forms without conscious previous knowledge. According to Hulstijn (2005) therefore, "incidental learning […] is always implicated in implicit learning; implicit learning thus entails more than what is meant by incidental learning" (p. 360).

R. Ellis (1994) defines implicit knowledge as being "intuitive, in the sense that the learner is unlikely to be aware of having ever learnt it and is probably unaware of its existence" (p. 85). As the dichotomy between implicit and explicit learning therefore refers more to the cognitive processes and the level of awareness at the time of learning, the difference between incidental and intentional learning can be linked to the task itself. If students concentrate on an activity involving reading or listening, they might learn vocabulary and forms through the activity without focusing on the learning act itself. Raising students' attention to new words can therefore be achieved by using resources, such as glosses, directed at helping students understand a specific reading passage. The question remains, however, whether students benefit from these interventions beyond text comprehension, for mapping word meanings to form (Hulstijn, 2001).

The present study is concerned with the ability of students to learn new vocabulary through contextualized readings as well as to use the new words in context in a posttest task. The concept of incidental learning and previous research dealing with it in the context of reading is thus important for the study at hand and

will be presented in the next part of this chapter.

2.2 Incidental learning through reading

Research on incidental vocabulary learning has often focused on learning new lexical items through reading or listening activities asking students to concentrate primarily on the meaning of written or oral texts. The purpose of such research is to identify how beneficial reading or listening activities are for the acquisition of new vocabulary by students of a second language, as it is for language development in the first language (Peters et al., 2009). This section deals with research exploring the effects of reading activities for incidental vocabulary learning in the L2. As mentioned above, there are two main strands of research in this area, one considering the effects of language exposure in context through extensive reading alone (Krashen, 1989), and the other one using experimental and controlled conditions to test the effects of specific features of reading activities (Hulstijn, 2005).

The first part of this section concentrates briefly on the first strand of research that was conducted without controlled conditions to show the general effects of reading for vocabulary learning.

2.2.1 Extensive reading

The effect of written input on the way that students learn new vocabulary is a widely discussed theme in second language vocabulary acquisition. One important question has been whether reading has comparable effects for L2

vocabulary acquisition and for L1 vocabulary acquisition (Hulstijn, 2005). Based on the premise that L1 speakers' vocabulary knowledge cannot be accounted for by formal instruction only, researchers have argued that people can learn a second language in the same incidental way that they learned their first language. Consequently, researchers in the field of L2 vocabulary learning have claimed that most words are acquired incidentally through reading (Horst et al., 1998; Horst, 2005; Saragi et al., 1978; Wode, 1999).

One stream of research concentrates on students' learning of new vocabulary through uncontrolled extensive reading tasks. According to this view, vocabulary learning and acquisition happens through the learner's concentration and attention to the meaning of the words and the contexts of use. By reading in a foreign language, learners can therefore acquire new vocabulary without formal instruction or focus on form. Considering incidental learning as a form of learning that occurs while concentrating on a specific task type (communication, comprehension etc.) as opposed to concentrating on learning the actual vocabulary presented in an activity, the argument is that incidental learning will only occur when the learner focuses on the meaning, not on the form of the word. Following this argument, incidental vocabulary learning is therefore seen as a result of an unconscious process happening through extensive exposure to language. In this context, attention to meaning is the main factor for language acquisition. Therefore, incidental vocabulary learning should happen through the reading of a text by inferring word meanings from context, not by being provided with definitions or word lists. Bell (2003) presents advantages and teaching practices to

successfully introduce extensive reading to students of a foreign language.

In a text in a foreign language, students will notice unknown words but should be able to understand their meaning from the contextual environment of the word. In order to administer an extensive reading activity, any other sources of word learning should be excluded, such as formal instruction or access to word translations or explanations; however, the context of texts given to students in an extensive reading activity needs to be simplified enough for the readers to be able to infer the meaning of unknown words. Grabe and Stoller (2002) define extensive reading activities as presenting students with "large quantities of material within their linguistic competence" (p. 259). Research on the effects of extensive reading has partly concentrated on students' overall gain in linguistic competence, measuring reading comprehension or writing abilities (Bell, 2001; Mason & Krashen, 1997). A few studies, however, have also specifically tested vocabulary learning through the use of extensive reading tasks. Horst (2005) conducted a study giving students the opportunity to choose their reading material over the course of six weeks. The results of her studies show that participants were able to learn over half the previously unknown words tested in her study. Another study by Pigada and Schmitt (2006) concentrated on various aspects of vocabulary learning through extensive reading activities. The results of their study were divided into three categories of vocabulary learning: spelling, meaning, and grammatical features of the words. Students were able to improve and retain word spelling to a higher extent, and meaning and grammar to a lesser extent.

Studies in this field seem to show more benefits for extensive reading

activities with regard to retention and recognition of vocabulary items than in terms of recall knowledge, especially for word meanings (Brown, Waring & Donkaewbua, 2008; Waring & Takaki, 2003). While reading, students have the opportunity to understand and process the meaning of new words in context and therefore have a chance to learn them. However, researchers have shown that reading alone does not always lead to positive results for lexical acquisition. Hulstijn et al. (1996) provide different reasons why reading only might not always benefit students' comprehension and learning of new words. They present several factors that might influence the effects of reading on lexical acquisition, such as the frequency of occurrence of the new words, or students' lack of attention to new words that are not explicitly taught. In other words, students tend to not notice unknown words in a text and do not try to figure out their meaning from context. Based on these considerations, researchers (Hulstijn et al., 1996; Rott et al., 2002) focused on different types of pedagogical interventions that can increase the acquisition of new lexical items during reading activities, e.g. use of a dictionary, enhancement of new words (e.g. through glosses, as presented in the next section) or providing a higher frequency of the new words throughout the reading.

The factor of attention to both form and meaning and the role of consciousness is therefore one important criterion in research on incidental vocabulary acquisition. As Huckin and Coady (1999) point out, "there is no reason to believe […] that extensive reading for meaning does not lead automatically to the acquisition of vocabulary. Much depends on the context

surrounding each word, the nature of the learner's attention, the task demands, and other factors" (p. 183). There are problems in relying on students guessing word meanings from context in order to acquire new vocabulary. It is difficult to find texts providing students with such precise context that they can unquestionably infer the meaning of new words. In addition, the context surrounding an unknown word needs to be well understood in order to lead students to guess meanings correctly.

While extensive reading as a means to achieve incidental vocabulary acquisition has been the subject of some successful studies (Joe, 1995; Parry, 1997; Wesche & Paribakht, 1998), some studies have, however, also shown the drawbacks of expecting vocabulary acquisition through extensive reading tasks (Horst, 2005; Huckin & Coady, 1999; Laufer, 2005). Joe (1995), in particular, conducted a study giving students a text to read and asking them to retell the story. Using generative processing implies giving students the opportunity to process the new vocabulary in more depth, to elaborate on new concepts by using them in known contexts. By retelling a story, students can use new words with their own interlanguage, which helps them process the meaning of the new words. Her study shows that extensive reading can trigger positive results for vocabulary learning when combined with activities requiring generative processing.

As mentioned above, some studies have also shown that extensive reading is not always a successful way to learn new vocabulary. Huckin and Coady (1999) identify a few problems linked with extensive reading as a means to learn new lexical items. According to them, the context in which the target words are used

can influence students' learning and retention of those words. If words are used in a rich context, students could potentially understand the text without making the effort of inferring the meaning of unknown items. Laufer (2005) also considers that the context around a specific word can be a drawback for students' attention to the word and their retention of new concepts. In addition, she points out that some word forms can be deceiving to students, which can be misleading in context and create problems for reading comprehension.

According to Horst (2005), many studies on extensive reading tend to analyze the effects of reading on students' comprehension, reading speed, or writing skills. Whereas extensive reading seems to help students improve on general language skills, it is difficult to show students' vocabulary gain through extensive reading activities.

Another problem with the extensive reading strategy for vocabulary learning is the amount of exposure required for students to successfully acquire a new word. For successful acquisition, students arguably need eight to twelve exposures to a word in different contexts (Pigada & Schmitt, 2006; Saragi et al., 1978; Webb, 2007). Even though extensive reading activities have shown vocabulary gain, the rate of vocabulary learning remains quite low through extensive reading only (Hill & Laufer, 2003) and other factors seem to influence the rate at which students acquire new words.

While attention to meaning is widely considered essential for vocabulary learning, another strand of research in the field of incidental vocabulary acquisition sees attention to form as an important part of the task for students to be

able to acquire new words. Laufer (2005) summarizes the limitations of extensive reading activities as follows:

> […] learners who understand the overall message of the text do not pay attention to the precise meanings of individual words. […] With respect to the ability to infer words from context, very often clues are unavailable, misleading, and most importantly, may appear in words which themselves are unknown to the learner and are therefore unusable. […] Words that can be guessed with difficulty will usually be ignored if the learners have to read a long text and if the words are not crucial for comprehension. Those guessed easily are easily forgotten. (Laufer, 2005, p. 226)

In addition, the amount of exposure necessary for successful vocabulary learning only from context would require students to read too many texts which is not feasible in the foreign language classroom. It seems from previous research in the field of extensive reading that vocabulary learning can happen successfully without focus on form. However, vocabulary gains have shown to be limited, since learners cannot always notice unfamiliar words in a reading task, and guessing the meaning of unknown words can be difficult (Laufer, 2003 & 2005). Attention and motivation remain important factors for students to retain words that they read and for them to be able to infer meaning from context (Schmitt, 2008). In addition, it seems that some conscious attention to new words is necessary for vocabulary learning (Schmidt, 1993).

Furthermore, formal instruction cannot always provide learners with enough input and vocabulary encounters in order for students to acquire a large

amount of new vocabulary (Peters et al., 2009). It seems, therefore, that reading with attention-raising activities could benefit students more than extensive reading or formal instruction only. To this end, studies have been conducted using controlled experimental conditions in order to enhance students' noticing of new words in the texts. The tasks presented to students are designed to expose them to various reading conditions, allowing them to notice the form of a word while concentrating on its meaning (Robinson, 1995; Schmidt, 1990). The next part of this section will present research focusing on controlled experiments and pedagogical measures to analyze specific influences that reading can have on incidental vocabulary learning for L2 learners. The main focus of this section will be research with different types of glosses and annotations, text-internal and text-external designs, and their effect on lexical development.

2.2.2 Incidental vocabulary learning through reading tasks under experimental conditions

Research on incidental vocabulary learning through reading has focused on different techniques and factors that can influence vocabulary retention, such as frequency of exposure (Rott, 2007; Zahar et al., 2001), glossing or dictionary use (Hulstijn et al., 1996). Peters et al. (2009) identify three criteria for successful vocabulary acquisition. "First, learners should discover the meaning of unfamiliar words. Second, they should process the lexical information elaborately. Third, the form-meaning connections of these words should be reinforced by means of repetition" (p. 114-115). In order to achieve vocabulary learning, tasks need to

provide students with tools and techniques that will enhance word retention and help processing lexical information, following the "depth-of-processing" hypothesis (Craik, 2002; Craik & Lockhart, 1972) stating that remembering information is strongly and directly related to the way that the information is processed. Learning a word is therefore not only linked to understanding its meaning through contextual clues or remembering its form, but it also requires students to process the information they are exposed to. Hulstijn (2001) understands the processing of lexical information through learner's attention to different aspects of a word: its meaning, semantic field, grammatical category, spelling and pronunciation.

In order to test students' learning of new vocabulary through different types of processing, Sagarra and Alba (2006) conducted a study with three groups learning vocabulary with three different conditions. The first group was to learn a list of the L2 words with their L1 translation (rote memorization). The second was shown L1 words that were semantically related to the L2 words (semantic mapping). For the third group, the keyword method was used, which consists of students learning their L2 words by making a link between an acoustically or orthographically similar word (keyword) in the L1 and learning the translation of the L2 word by connecting it with the keyword. These methods are considered beneficial for students' vocabulary retention because they involve more in-depth processing of the L2 words. The study shows positive results for retention of vocabulary, especially with students participating in the group using the keyword method, suggesting that students could achieve better results in vocabulary

learning at early stages of language acquisition.

Laufer (2003, 2005) also found that word-focused activities generate better results than reading activities only, showing that productive tasks following a reading activity enhance word retention. Studies conducted by Paribakht and Wesche (1997, 1998, 1999) have shown similar results, with students in Reading Only conditions gaining in word retention and knowledge, whereas students in Reading Plus conditions were able to also show vocabulary gain in production tasks. Particularly in the first study, they compared the vocabulary gains of students divided in two groups: the first group read texts accompanied by vocabulary exercises using the target words. The second group read in the Reading Only condition but was exposed more often to contextualized vocabulary. Whereas both groups seemed to gain vocabulary knowledge, the authors conclude that more focused instruction is more beneficial for students to enhance their knowledge of new vocabulary (Paribakht & Wesche, 1997). In general, the form-meaning connection of new vocabulary is reinforced when students are re-exposed to new words immediately through glosses or vocabulary-based activities (Nation, 2001). Wesche and Paribakht (2000) also conclude that reading based activities have more beneficial effects on students' learning of new vocabulary than repeated exposure alone.

The next part of this chapter presents studies that incorporate vocabulary enhancement techniques, either text-internal or text-external, and that compare the effects of secondary activities on students' retention and production of new vocabulary.

2.3 Enhancement techniques

Based on the idea that students can retain vocabulary more successfully by inferring meaning from context because it requires them to process word meanings more deeply (Grace, 1998; Rott & Williams, 2003), research has looked at input enhancement as a means to draw students' attention to word meanings. As mentioned above, studies researching incidental vocabulary learning aim at making students concentrate on the meaning of unknown words while focusing their attention on the form in order to achieve a better form-meaning connection process and enhance learning. Enhancement techniques are not viewed as explicit instruction, but merely as attention-raising tools for students to create connections between meanings and forms while reading. This type of focus on form is therefore not contrary to incidental vocabulary learning but can accompany and reinforce students' retention and learning of unknown words encountered in readings. According to Long (1991), "focus on form […] overtly draws students' attention to linguistic elements as they arise incidentally in lessons whose overriding focus is on meaning or communication" (p. 45-46). While Long referred to focus on form in the context of teaching new grammatical structures, other researchers have applied this concept to vocabulary learning (Laufer, 2005; Laufer & Rozovski-Roitblat, 2011). This type of incidental focus on form thus occurs in activities in which students are exposed repeatedly to new words in different contexts, and in which students' attention is raised towards learning specific new vocabulary without explicit instruction.

Research on incidental vocabulary learning in experimental conditions

therefore aims at enhancing students' exposure to new vocabulary and raising their retention level by encouraging processes that will allow them to use and reflect on new words. Therefore, such activities do not only use strategies within the reading tasks to help students understand the meaning of new words (translation, explanation, glosses etc.) but also aim at giving students opportunities to produce the newly learnt vocabulary within various posttests.

In order to provide students with modified input and to test the effects of that input on their ability to recognize, remember and use new vocabulary, different strategies have been used to accompany reading texts with vocabulary enhancement techniques. This part of the chapter is organized according to the type of input enhancement used in the presented studies. Some studies have focused on text-external techniques, allowing students to use dictionaries (Luppescu & Day, 1993), or other images or videos that were not provided in the reading passage (Al-Seghayer, 2001).

Rott (2003 & 2005) found that applying glosses to a reading passage enhances form-meaning connections and retention of vocabulary. Other studies have compared the different effects of text-external and text-internal input enhancement and glosses (Aust, Kelley & Roby, 1993; Bowles, 2004; Levine et al., 2004; Taylor, 2006). Text-internal glosses can occur in varied forms such as a marginal gloss (e.g. translation, picture etc.) or as a hypertext linking an unknown word to a variety of multimedia clues (textual, pictorial, audiovisual, etc.). Furthermore, other studies have compared the effects of different types of text-internal annotations and hypertexts only (Akbulut, 2007; Ariew & Ercetin, 2004;

Yoshii, 2006). In the context of vocabulary acquisition, the term "gloss" is used to refer to a definition or an explanation with regard to the meaning of a word (Jacobs, 1994). Therefore, a gloss can be written in the L1 or the L2; it can also be a pictorial, a video or an audio cue. Glosses are therefore annotations added to a text that are designed to help students understand the context of a reading passage by providing them with additional information on unknown vocabulary items. In the present discussion, the terms "gloss" and "annotation" both refer to the cues given to students in a reading task.

Glosses have been used in research in order to investigate their effects on reading comprehension (Jacobs et al., 1994) as well as retention of new vocabulary. Jacobs et al. (1994) gave students two versions of one text to read in Spanish. One text included textual glosses on some of the unknown words and the other text did not provide any explanation. The study shows that students performed better on a reading recall text if they were given glosses, showing that the glosses improved their reading comprehension of the text. Lawson and Hogben (1996) provided students with index cards containing a target word, a definition, and a sentence with the target word as a context clue. Through think-aloud protocols, they were able to isolate the definition and the target words as the more popular clue for students, whereas students did not rely on the contextualization of the target words. The study conducted by Luppescu and Day (1993) provided students in one group with the possibility of looking up words in the dictionary while reading, whereas the control group did not have access to a dictionary during the reading task. They found that dictionary use can be

beneficial for students' comprehension of the text, although they found a few instances in which the dictionary hindered comprehension, which they interpreted as a mistake of the students choosing an inaccurate vocabulary entry in the dictionary itself. In addition, students using the dictionary took twice as long to complete the reading task. This extra time has been considered a hindrance for students to gain an overall comprehension of the reading passage assigned, since their attention was often distracted by dictionary search (Koyama & Takeuchi, 2004; Prichard, 2008).

Even though dictionary use has shown positive effects on learners' reading comprehension, this technique therefore presents disadvantages, especially when students look up too many words and pay less attention to the overall context of the reading. Although electronic dictionaries limit the time spent looking up words, studies conducted with either an electronic or a paper dictionary do not seem to yield different results for reading comprehension and vocabulary posttests (Koyama & Takeuchi, 2004). Chen (2010) compared paper dictionary and pocket electronic dictionaries regarding comprehension, retention and production of new vocabulary and could not find any differences concerning students' performances, although the time spent on the task was significantly higher for users of paper dictionaries.

The amount of words that are looked up in the dictionary also depends on the task and the text itself. Peters (2007) and Peters et al. (2009) have focused on a comparison of different enhancement techniques and their effects on retention of form and meaning of new vocabulary. The purpose of these studies was to analyze

the influence of various parameters on students' behavior towards looking up vocabulary in the dictionary and towards word retention. The parameters used in this study were a vocabulary test announcement, task-induced word relevance, and a vocabulary task. In this context, a relevant word was defined "as a word that needed to be used receptively to answer a text comprehension question, whereas an irrelevant word was not linked to a comprehension question." (Peters et al., 2009, p. 116). The results of these studies showed that students tended to look up more words when they were given notice of the vocabulary testing posttest. In addition, students showed better retention of the relevant words processed through the reading, the comprehension questions and repeated in the post-reading vocabulary task. The least retention was achieved by students in the non-task induced relevance group, even though they had the same access to the dictionary (Peters et al., 2009, p. 141). It seems, therefore, that the nature of the task itself can influence the way that students learn new vocabulary through reading with a dictionary.

As mentioned above, research on reading in a foreign language (Aust et al., 1993; Chun & Plass, 1996; Hulstijn et al., 1996; Taylor, 2006) has tested the effects of different types of reading materials and of glosses, comparing text-external and text-internal enhancement techniques with regard to their benefits for students' reading comprehension as well as retention of glossed words. Aust et al. (1993) compared two groups with access to paper dictionaries and hypertexts. Whereas students with access to hypertext references consulted definitions more frequently than the group with access to a paper dictionary only, this study also

did not yield any significant differences between the two methods. Hulstijn et al. (1996) conducted their study with three groups: access to a paper dictionary, marginal glosses to accompany the text, and a control group without input enhancement. The three groups were also given a recall test after the reading task. They found that repetitive exposure to specific words with access to the meaning of words (experimental conditions) was more beneficial than contextual reading only (control condition). In addition, the groups with access to marginal glosses outperformed the group with access to the dictionary, which the authors explain by the fact that students in the dictionary group did not look up as many target words as the students in the group with access to the marginal glosses.

Levine et al. (2004) compared the reading comprehension, short-term and delayed retention of vocabulary in an online reading task. They worked with three different groups; the first group had access to online glosses, the second group to an online dictionary and the third group to a paper dictionary. While the frequency of vocabulary consultation was higher for the online groups, no significant differences were found between the three groups. Taylor (2006), on the other hand, compared the use of computerized and paper L1 glosses for L2 comprehension and found positive results for the computerized glosses. Chun and Plass (1997) studied the link between the lookup behavior of students and their vocabulary learning. They divided their participants in three groups with access to annotations such as pictures, printed text and video. They found that the students working in a multimedia environment showed a higher retention of vocabulary on the posttest. Another study that found positive results for electronic enhancement

techniques was conducted by Roby (1999). Among the four groups in this study, one used a paper dictionary, the second group used a paper dictionary and glosses, the third group used a computer dictionary, and the last group used a computer dictionary and glosses. Students in the computer conditions were able to look up more unknown vocabulary items and to show a better understanding of the texts than the students participating in the groups with the paper conditions. While there do not seem to be many differences between access to text-internal and text-external techniques for understanding new vocabulary found in a reading task, text-internal glosses allow students to consult explanations more often than text-external dictionary entries and other external enhancement strategies.

One factor that could explain the positive results of text-internal glosses found in some studies is the convenience of looking up a word, a definition or any type of gloss if it is given in the margins or through online hypertexts. Lenders (2008) conducted a study on learners' attitudes towards electronic glosses. He also wanted to find out when and how students use glosses and concluded that students use glosses for low-frequency vocabulary items (e.g. words that would not be easy to find in a standard dictionary) and for vocabulary relevant to their field. In addition, students had positive attitudes towards the usefulness and the appropriateness of online glosses for second language reading tasks. Access to glosses as part of the reading task also helped students process more vocabulary and learn vocabulary through reading.

In another study, Chun (2001) tested students' behavior with regard to different types of multimedia glosses (internal glosses as hypertexts in the reading

passage and external websites like dictionaries) and found out that students do not use external material as often as internal glosses. Consequently, more instant access through internal glosses was more beneficial for students' comprehension. Along with Knight (1994), Chun also concluded that annotation use seems to be more beneficial for lower proficiency learners. Jones (2006) carried out a study comparing the effects of annotations combined with student interaction for both vocabulary acquisition and listening comprehension. Students of French as a second language were given a listening passage in one of four conditions: listening alone, listening in pairs, listening alone with annotations (written and pictorial), and listening in pairs with written and pictorial annotations. The study shows that pair work and annotations were more beneficial for both learning of new vocabulary as well as aural comprehension.

The review of research on the comparison between the effectiveness of external and internal annotations shows that whereas some studies did not find significant differences between various types of glosses (Aust et al., 1993; Chen, 2010; Levine et al., 2004), text-internal glosses seem to produce better results with regard to text comprehension, vocabulary retention and production of new words (Chun, 2001; Chun & Plass, 1997; Roby, 1999). The studies presented above show that students reading with external dictionaries or lexical explanations look up fewer words during their reading activities and spend more time searching for word meanings than students who are given glosses within the texts or in the margins. It seems that internal glosses allow for fewer distractions while reading, which explains why students can better focus on the context of the reading itself.

In addition, text-internal glosses give students the opportunity of a direct hint towards word meanings and allow for a direct comparison of the explanations or definitions given to them and the context at hand. Therefore, students can focus on understanding the gloss and testing their hypothesis about the meaning of a word formed from a specific context in a more effective manner. In other words, form-meaning connections can be made more accurately with a direct comparison of the gloss information and the context at hand.

Another factor influencing students' success in learning new vocabulary is the type of external annotation given to them. Most studies allow students to use dictionaries – both paper and electronic. However, looking up the meaning of a word from the dictionary means selecting the correct meaning from a range of possible definitions and translations. More time is then used in order to link the correct translation to a particular context. Students reading in a dictionary condition therefore had to spend more time finding the accurate definition of an unknown word and away from the context of their reading. By giving students a more precise clue of the meaning of a word in context and hinting at the descriptive aspect of word's context as defined by Engelbart and Theuerkauf (1999), the lexical information of a new word can then be processed more deeply and accurately.

Considering these findings, other studies have concentrated on analyzing the effects of various types of internal enhancement techniques and glosses only, from textual, pictorial, audiovisual glosses to the difference between L1 and L2 glosses. The next section therefore deals with studies examining these types of glosses.

2.3.1 Text-internal enhancement techniques.

Since the emergence of computerized techniques in the L2 classroom, studies in this field have dealt with texts in different forms, including online reading conditions allowing the use of electronic glosses as hypertexts, in which the gloss is directly linked to the word it refers to. Using hypertext glosses in an online reading task provides the opportunity for expanding gloss formats to multimedia glosses such as videos, sounds and pictures. There are different types of glosses that can be used to achieve various pedagogical purposes (e.g. enhancement of cultural aspects, explanations of grammar rules etc.).

Bowles (2004) examined the different effects of paper-and-pen and computerized reading with text-internal glosses. Both experimental groups were given a text in Spanish with glossed words. Both groups were given the same definitions for the target words, one group working with pen and paper and one group working with the computer. A control group read the text and was not given any glosses. Both experimental groups performed significantly better than the control group, but no significant differences were found between the two glossing methods with regard to the amount of reported noticing through think-aloud protocols, text comprehension or acquisition of targeted vocabulary.

Gettys et al. (2001) compared formatting the glosses in a computer-mediated environment with a sentence-level translation for the first experimental group and with a dictionary entry for the second experimental group. Results of this study indicate that students retain vocabulary more successfully when exposed to dictionary entries while reading. On the other hand, the results on the reading

comprehension test were not significantly different. Lomicka (1998) conducted a qualitative study analyzing think-aloud protocols of learners of French who were asked to read a poem on the computer and who had access to explanations and definitions of new words through the software. The results of this study suggest that multimedia glosses and instruments in computerized environments may have positive effects on students' reading comprehension compared to traditional texts and dictionaries. Ariew and Ercetin (2004) concentrated on reading comprehension and tested whether reading in a hypermedia environment – i.e. the text was to be read on the computer with hypertext annotations – was beneficial for comprehension. They did not find any significant differences between intermediate and advanced learners regarding reading comprehension and annotation use; in addition, the use of contextual annotations such as videos, sound and background information about the text seemed to interfere with intermediate learners' reading comprehension. Other studies have analyzed the effects of annotations on reading comprehension as well as retention of new words. More specifically, Rott et al. (2002) tested the effects of L1 glosses for comprehension and retention of new words using a text reconstruction task after the reading task. Their results show a positive effect of glosses for immediate comprehension and retention; delayed vocabulary tests did not lead to significant results. In a more recent study, AbuSeileek (2011) compared the effects of textual glosses according to their placement on the computer screen. Students were divided in the following groups: (1) margin gloss, (2) gloss at the bottom of the page, (3) in-text gloss directly after the word, (4) gloss in a pop-up window and

(5) no gloss. This study showed that students who had access to glosses directly after the word significantly outperformed all the other groups in both the reading comprehension and the vocabulary posttests. The students reading the glosses at the bottom of the page were outperformed by the other three experimental conditions but were able to achieve significantly better results than the control group on both tests.

Whereas the previous section showed that text-internal glosses tend to lead to more successful vocabulary learning, studies researching various types of glosses used within reading activities have not produced conclusive results with regard to text comprehension or vocabulary retention. However, various factors have been taken into consideration, such as the medium (computer or paper), the type of explanation (dictionary entries, full sentences, simple translations or visual clues), the level of proficiency of the participants or the placement of the glosses. The inconclusive results yielded by these studies could be explained through a variety of factors, such as the cultural background of the participants, especially when using visual clues, the difficulty of the target words and the frequency of exposure to these target words, as well as students' attitudes to the reading and their aptitude to learn from specific explanations or visual clues. In addition, the type of tests conducted after the readings is an important factor influencing students' performance and will be discussed in more details in a later section of this chapter.

Considering the mixed results of studies administering readings with single glosses, however, other studies have attempted to compare the various effects of

single and multimedia glosses. Watanabe (1997) compared single glosses in the L2 with multiple-choice (two alternatives) glosses in the L2 and did not find any significant differences with regard to vocabulary learning. However, both groups performed significantly better than the control group and other experimental groups in the study reading with appositives (explanations), marginal glosses, or no gloss.

Based on Paivio's (1986) dual-coding theory stating that memory and cognition need two separate coding systems, namely a verbal and a non-verbal representation, further research on the use of glosses for reading comprehension and vocabulary acquisition dealt with the use of multimedia glosses, such as pictorial cues, sounds and videos, therefore introducing non-text and non-verbal glosses in order to reconcile these two parts of the cognitive process for a better retention of new words. Mayer's (2001) cognitive theory takes a further step in describing the processes involved in vocabulary learning. This theory is based on learning in a multimedia environment and divides the learning process into three components, namely selection, organization, and integration. Students select the information – verbal and visual – provided to them through the multimodal input; they organize that information into the verbal and the visual forms of the words and are then able to integrate them in order to gain a complete meaning-form representation of the word. Considering the important role of attention and noticing on vocabulary learning, the goal of research with glosses has been to compare the effects of different modes of meaning representation and their combinations. Researchers have examined whether a combination of glosses was

more effective than the use of one-way glosses.

In general, studies using both paper-and-pen as well as computer-mediated environments have led to the conclusion that students reading a text with both textual and pictorial glosses achieved better results in comprehension and retention than students who only saw textual glosses (Chun & Plass, 1996; Kost et al., 1999; Nagata, 1999; Yanguas, 2009; Yoshii & Flaitz, 2002). In Chun and Plass's (1996) study, students read a text in German with a program called CyberBuch designed by the researchers. This program allowed giving the students either one media type (textual (English), pictorial or a video), while other students had access to glosses including two types (text and picture or text and video). In addition, they added a video preview acting as an advanced organizer to facilitate reading comprehension. The task given to students was to fill out a recall protocol after reading the text. The video preview did seem to have positive effects on students' comprehension of the reading; in addition, words glossed with two media types were remembered better than words with only one media type – especially visual. Kost et al. (1999) compared the effects of pictorial and textual glosses on incidental vocabulary growth for foreign language learners. Learners of German as a foreign language were given a passage to read under one of three conditions including the following glosses: textual gloss alone, pictorial gloss alone, and text combined with pictures. Both a production and a recognition test of 14 words were carried out. The results showed that the group provided with a combination of text and picture outperformed the other groups on picture and word recognition tasks, because they had invested more cognitive effort to process

the provided gloss information (pictures and words), resulting in a stronger bond between the target words and their mental mappings, which again led to more opportunities for retrieval of the new lexical items. Shahrokni (2009) used textual, pictorial, and a combination of both glosses and compared the results on word recognition and picture recognition tests and therefore concentrated on students' retention and recognition of vocabulary items. The combination group outperformed the two other experimental groups on both the word recognition and the picture recognition tests.

The study by Akbulut (2007) confirmed that the use of various types of glosses (definition, definition and picture, definition and video) was beneficial for students' acquisition of new vocabulary, but it also presented significant results on the delayed posttest, since both groups reading with multimedia glosses outperformed the definition-only group. However, the study did not generate any significant differences between the results from the groups exposed to multimedia glosses. In addition, Plass et al. (1998) and Al-Seghayer (2001) examined the differences between the combination of textual and pictorial glosses on the one hand and textual and video glosses on the other. Both studies showed that the combination of different types of glosses were beneficial for students' comprehension and retention of new vocabulary. However, the study by Plass et al. (1998) showed that students achieved better results with text and picture, whereas the study by Al-Seghayer (2001) showed that the combination of text and video was more effective.

Yoshii and Flaitz (2002) conducted a study examining the effects of text

glosses (text only), pictorial glosses (picture only) and a combination of the two (text plus picture). Students participating in the study under the third condition showed significantly better results on the immediate and the delayed tests consisting of a definition-supply test, a picture-recognition test and a word-recognition test. Finally a more recent study conducted by Yanguas (2009) also confirmed that students reading with glosses (English translation, picture, and a combination of both) were able to outperform the control group with regard to the noticing and recognition of new vocabulary items. The group reading with combined glosses outperformed all other groups on the reading comprehension task, but none of the groups performed significantly better than the others on the production task consisting of writing the Spanish equivalent of a given English word.

In general, studies have therefore shown that glosses can be effective for reading comprehension and retention of new vocabulary. Especially by combining different types of explanations allowing deeper processing for students, multimedia glosses can have more positive effects than simple glosses. One study, however, shows that too many different glosses can hinder vocabulary processing and lead to worse results. Yeh and Wang (2003) conducted a study with 82 EFL students under three different conditions. One group was given annotations in the L1 and the L2 (Chinese translation and English explanation), the second group was exposed to annotations showing the L1 and L2 texts with a picture, and the third group had annotations adding sounds to the annotations from the second group, hence exposing students to three types of glosses at once. The results on

the productive and receptive recall tests show that the second group outperformed both the first and the third group on all tests. Yeh and Wang's interpretation of the results considers the background of the participants as well as the time allotted for the study. On the one hand, Chinese learners are exposed more frequently to visual input for learning English and are more successful at working with visual learning strategies. One of the reasons for this preference for visual input could be the pictorial nature of their first language. The audio component added to the glosses given to the third group might therefore have been detrimental because of the distraction it might have caused for a few students. On the other hand, the same amount of time was allotted to each group to complete the tasks and it is possible that the third group lacked the necessary time to process all three input methods. From the previous research, it seems, therefore, that a combination of text and picture yields more successful results than other possible combinations.

These studies examined the combination of text and multimedia glosses with either L1 or L2 glosses, but only few of them also incorporated a comparison between L1 and L2 glosses. Researchers have also focused on the different effects of L1 and L2 glosses for reading comprehension. If different types of input – textual, pictorial, audio-visual etc. – can make a difference, glosses written in the first language or in the second language might also yield contrastive results on students' comprehension, retention and production of new vocabulary. Research on the effects of glosses on students' vocabulary learning and reading comprehension has focused less on the difference between L1 and L2 use than the design of the gloss that students are presented with. A study by Cheng and Good

(2009) compared the effects of three types of glosses consisting of (1) L1 gloss and L2 example sentence, (2) L1 in-text gloss, (3) L1 marginal gloss, and (4) no gloss. Whereas the authors did not find significant differences for any condition on the reading comprehension, the combination of L1 gloss with an example sentence in the L2 had significantly positive effects on students' vocabulary retention.

The following part of the chapter concentrates on studies that have compared these two types of internal glosses, as well the combination of different types of media within one gloss.

2.3.2 L1 vs. L2 glosses

Jacobs et al. (1994) have studied the effects of glosses providing a translation of the target word into the L1 and an explanation of the target word in the L2 as well as students' preferences regarding the type and the language of glosses used. They found positive effects of both L1 and L2 glosses on the immediate posttest, therefore concluding that glosses are beneficial for students' reading comprehension; however, the delayed posttest showed no significant differences between the students who read the text with either type of gloss and students from the control group. In addition, they could not find any significant differences regarding the effects of L1 and L2 glosses. A study by Bell and LeBlanc (2000) also compared the different effects of L1 and L2 glosses and did not produce any significant differences between the two types. However, unlike the study by Jacobs et al. (1994), Bell and LeBlanc found a significant preference

from students towards L1 glosses. Based on these results, Ko (2005) researched the effects of L1 (explanation or translation) and L2 (explanation or synonyms) glosses on reading comprehension with Korean students as well as students' preferences for specific glosses. The results of this study after a multiple-choice reading comprehension task show that L2 glosses were more beneficial to students' comprehension of L2 texts than reading using L1 glosses or reading without glosses. In addition, students seemed to prefer using L2 glosses for reading. Research on L1 and L2 glosses has therefore generated mixed results regarding both comprehension effects and students' language preferences. In addition, Miyasako (2002) conducted a study comparing multimedia glosses and single glosses as well as the language used in each type of gloss. The study was designed around 6 groups: L1 (Japanese) text only, L2 (English) text only, multimedia glosses with L1, multimedia glosses with L2, no gloss and finally a control group (no reading). This study reveals that L2 glosses (multimedia and single gloss) were more beneficial for students' immediate comprehension of the texts. Other tests did not lead to significant results between either gloss types.

Based on these considerations, Yoshii (2006) conducted a study to compare both types of glosses (L1 and L2) in a multimedia environment. The conditions used in this study were as follows: (1) L1 only, (2) L2 only, (3) L1 with picture, and (4) L2 with picture. Research has already shown that glosses have positive effects on students' reading comprehension and vocabulary retention. The goal of this study was therefore not to show the benefits of reading with glosses, but to compare two sets of variables: the language used in the glosses and the use of one-

way or multimedia glosses. In other words, since students seem to achieve better results for text comprehension and vocabulary retention when reading with glosses, the question remained whether language choice in the glosses themselves made a difference as well. After the reading task, students were given a definition test consisting of showing a target word and asking students to provide a translation of it in their L1. This test was followed by a recognition test in which the participants were to check an appropriate definition of each target word in a multiple-choice format. A delayed posttest was also administered two weeks later in the same format. Students were not given a reading comprehension test. The results did not show any significant differences between the L1-only and the L2-only glosses on either test, which is consistent with other studies (Bell & LeBlanc, 2000; Jacobs et al., 1994). Regarding the difference between single glosses and multimedia glosses, only the definition test provided significant differences showing that multimedia glosses are more beneficial. In addition, significant differences between the L2 groups were found on the delayed definition test. No significant differences were found between the two groups using the multimedia glosses. Even though the results did not show any significant differences between both types of text glosses (L1 or L2), they support the findings from other studies about the benefits of pictorial cues combined with textual glosses.

Based on the previous research, combining different types of glosses (textual, pictorial) seems to have positive effects on students' comprehension and incidental vocabulary learning. Paivio's (1986) dual coding theory as well as Mayer's (2001) cognitive theory mentioned above therefore seem to apply to the

effectiveness of multimedia glosses. The previous sections have shown that research using single glosses yielded contradictory results, whereas the comparison of the effects of single glosses and multimedia glosses tend to show that using more than one representation of a new word's meaning helps students' understanding, retaining and learning the new vocabulary. Especially when considering students' various aptitudes and learning styles, providing several types of explanations can help them not only to achieve form-meaning connections more successfully, but also to process the lexical information at hand more deeply. By applying different types of explanations, students can therefore rely on various meaning-related input forms in order to analyze and test their hypothesis of the meaning of a word in the context of the readings.

Whereas the use of various modes for glosses shows positive effects for vocabulary learning, studies have, however, produced mixed results as for the effects of external and internal glosses, and especially concerning the comparison between L1 vs. L2 glosses. Several factors must be mentioned to explain the various findings presented above and the questions that remain unanswered.

On the one hand, a few criteria need to be mentioned with regard to the participants in the studies themselves:

a) Cultural background: This is an important factor when conducting research for second language vocabulary acquisition. In particular, the use of visual (pictures, videos, colors etc.) cues can influence students' perception of word meanings if a study is conducted in a heterogeneous group in which cultural background can play a role or if the script of the L2 is different from a few

students' L1. However, many studies, while mentioning the geographical setting, do not mention the various cultural backgrounds of their participants and do not account for its effects for the results gathered throughout the tests. Most studies were conducted with English speakers learning a foreign language. However, the studies by Al-Seghayer (2001) and Ariew and Ercetin (2004) were conducted with students of English as a second language who therefore had various backgrounds and L1 accounted for in the presentation of results.

b) Level of proficiency: All studies reported above have worked with students in academic settings, studying a second or a foreign language at the University level. It would be interesting to confirm the results from the above-mentioned research to schools and younger adults in order to understand the effects of age for learning vocabulary through glossed readings. Ariew and Ercetin (2004) compare intermediate and advanced learners and cannot find any significant differences between the groups with regard to their ability to learn through glosses. However, more research is needed in order to understand the correlation between the content (choice of mode) and language of the glosses on the one hand and the participants' level of proficiency on the other. Students with higher proficiency in a second language should be able to read more complex texts and make form-meaning connections to infer word meanings from context more successfully than beginners. Beginning students cannot necessarily rely on context or text explanations as well as more advanced learners because they might not have the necessary knowledge to understand the language of the glosses and of the contextual environment of a new word.

c) Learning styles: Although studies have compared glosses using visual, audio and textual cues, the factor of learning styles may influence the results of a study considerably. Studies have looked at other factors such as students' attitudes towards the types of gloss or the placement of the gloss or explanation (external or internal). However, the individual learning styles of the participants remain a factor that is not mentioned in the discussion of findings.

On the other hand, factors related to the texts and the research design themselves need to be considered when discussing the findings presented above and further research is needed in some areas:

a) Presentation of target words: The number of times a new word is present in a text influences students' ability to retrieve contextual information and link word forms to their meanings. Studies on extensive reading activities (Horst, 2005; Pigada & Schmitt, 2006; Waring & Takaki, 2003) give students the opportunity to be exposed to various contexts and to enhance their reading and comprehension abilities through repeated reading activities. However, it is difficult to quantify the amount of exposure to specific words. Studies using experimental conditions, however, account for the frequency of the target words and aim at measuring students' learning based on the occurrence of specific words in readings. Most studies presented in this section use the target words once with the respective gloss; studies are designed around a reading passage given to students prior to receptive and productive tests (Ariew & Ercetin, 2004; Jacobs et al., 1994; Yoshii, 2006). A more frequent exposure to the target words, achieved by the reoccurrence of target words in various passages of the readings or through

several reading activities, could enhance the effects of glosses for students' comprehension and retention of the words. Directly related to the issue of exposure frequency is the question of the text density. Depending on the level of proficiency of the students participating in the study, a shorter text might not provide the comprehensive context needed to infer word meanings or the context exposure needed for students to process the lexical information presented to them. Another related issue concerns the types of words used in research on vocabulary acquisition. Studies examine students' learning of new vocabulary using words describing concrete items. As stated in Xu (2010), higher concreteness is more comprehensible for students of a second language than lower concreteness. In addition, glosses are more easily designed to explain concrete items than abstract feelings or ideas. Consequently, studies have presented participants mostly with nouns describing inanimate, concrete items. In the present study, and as will be shown in the next chapter, 15 target words were used within three different reading passages and presented to students in comprehension questions for additional exposure. The words chosen for this study belong to various grammatical categories (nouns, adjectives and verbs) in order to allow for a variety of concrete items and more abstract ideas.

b) Time allotted between immediate and delayed tests: The interval allotted between the immediate and delayed vocabulary tests can greatly influence a within-group as well as a between-group comparison. In Yoshii's (2006), study for example, students were not given enough time (two weeks) between the tests, which may be a factor for the lack of significant differences between the L1 and

the L2 group.

c) Types of tests and assessment of learning: Finally, the types of posttests used to assess students' learning pose further questions that the present study intends to answer. The studies presented above have not shown how the use of glosses in a reading comprehension task can increase students' ability to use the new vocabulary items in a contextualized communicative situation. In the relevant literature, comprehension and incidental vocabulary acquisition were tested through immediate as well as delayed tests, using a multiple-choice format or a vocabulary test, e.g. asking students to provide a definition or an explanation of the words. However, in a communicative classroom setting, peer interaction in which students are to complete various tasks plays an important role for their acquisition and retention of words and structures through contextualized activities. So far, research has not tested whether students can accurately use the new words they have been exposed to through a glossed reading in a contextualized post-reading task. Investigating whether students can use the words they learnt through reading in a specific context can therefore lead to important pedagogical implications with regard to both vocabulary learning and the use of readings for vocabulary acquisition in classroom settings. In addition, further research is needed regarding the benefits of using glossed words from a reading task for delayed comprehension and retention of new words. Asking students to communicate on a specific topic provides an opportunity for them to use the words they have been exposed to in the reading task. Furthermore, the use of particular words and forms often leads students to notice a gap in their knowledge

(Swain & Lapkin, 1995) and to negotiate the meaning of new words, hence to focus their attention on the unknown items. A contextualized productive task following a reading activity might therefore complement the effects of an exposure to glosses during the reading for students' understanding and retention of new lexical items, providing them with a context to use the new words as well as feedback to strengthen their new knowledge.

Based on these considerations, the present study was designed in order to address some of these remaining questions. In order to test whether the language used in glosses had any effect on students' learning of vocabulary, and especially of its use in context, the present research design allows for a comparison of the gloss language towards vocabulary retention, production, and use in context.

The current study is based on the assumption that glosses in a L2 text help students understand the general context of the reading while exposing them to new vocabulary items, hence giving them the opportunity of learning new words through a specific context. In addition to analyzing the effects of glosses for retention and production of vocabulary in discrete-item posttests, this study also concentrates on the ability of students to use the target words in a contextualized task, therefore investigating the effects of different types of glosses beyond students' reading comprehension and retention of new vocabulary, and on students' ability to communicate with these new words in a meaningful context.

3. METHODOLOGY

This chapter deals with the instruments and procedures used to conduct the study and gather the data as well as to analyze the results. This study is based on the research questions already presented in chapter 1 and mentioned in the following for a better overview.

3.1 Research questions

1. Does the type of gloss (L1 text and picture, L2 text and picture) influence students' comprehension of glossed readings?
2. Do different types of glosses (L1 text and picture, L2 text and picture) have different effects on students' retention and production of new vocabulary items?
3. Do glosses in a reading task help students to use the targeted words in a productive, contextualized post-reading task?
4. Do various types of glosses (L1 text and picture, L2 text and picture) have different effects on students' contextualized understanding and use of the target words in a contextualized post-reading task and their ability to negotiate the meaning of the target words through communication strategies?

The first part of this chapter concentrates on the instruments used in the study in order to assess students' learning. In the second part of the chapter, the scoring procedures and analysis are presented, first with regard to the first and second research questions, that is, with the quantitative data gathered during the

first part of the study. The last part of this chapter deals with the analysis of the qualitative data meant to answer the third and fourth research questions. The presentation and discussion of the results will take place in the next chapters.

3.2 The participants

This study was conducted with 6 sections (108 students) of English-speaking (L1) university students enrolled in beginning German (L2) at the University of Alberta. Data from students whose native language was not English had to be removed from the dataset in order to avoid issues related to gloss comprehension. Of the 108 students participating and whose data was analyzed in the study, 38 students participated in the German group, reading with glosses including a German definition of the target words and a picture. 35 students participated in the English group, presented with glosses featuring an English translation of the target words and a picture, and finally 35 students were in the control group (no gloss). The study was conducted during the second semester of the university course; the level of the participants needs to be taken into account in the choice and the design of the instruments and the task, but it allows for an additional control of students' background knowledge at the time of the study.

According to the proficiency guidelines of the American Council on the Teaching of Foreign Languages (ACTFL) in 2012, reading comprehension skills can be described through five levels of proficiency – Distinguished, Superior, Advanced, Intermediate and Novice. The last three levels are also divided into High, Mid, and Low sublevels. Considering the curriculum in which the

participants were enrolled and the fact that they were in their second semester at the University level, it can be said that the Intermediate Low category seems to describe the participants' level of proficiency for reading comprehension. The intermediate level is described as the ability to understand simple and short texts presented in a predictable context. Readers at this level are able to extract basic information from a text, although it is probable that they cannot understand the full content of the text. Within this level of proficiency, the Intermediate Low sublevel is described as follows:

> At the Intermediate Low sublevel, readers are able to understand some information from the simplest connected texts dealing with a limited number of personal and social needs, although there may be frequent misunderstandings. Readers at this level will be challenged to derive meaning from connected texts of any length. (ACTFL Guidelines, 2012, p. 23)

The participants were beginners of German in their second semester at the University and it was expected that they could therefore understand the context of the short texts given to them for the purpose of this study, as well as to extract information from the broader context of the readings.

The researcher was present throughout the data collection with all groups in order to help the instructor administer the tasks. The researcher was present to monitor the online sessions and did not interfere with the learners' discussions during the study.

In addition to signing a consent form before starting the study, students were

given the researcher's contact information and a brief summary of the study to take home and were advised to contact the researcher for any type of matter that they might encounter while the study was being conducted or afterwards. A copy of the consent form can be found in Appendix 1.

3.3 Instruments and procedures

3.3.1 Data collection

This study concentrates on the ability of students to learn new vocabulary through glossed readings. Such an empirical study on vocabulary learning needs to be designed around different tasks and tests in order to assess students' learning throughout the study as well as to shed light on the processes involved in their learning. Before explaining each test individually and presenting the rationale behind each of the tests administered throughout the study, Table 3.1 gives an overview of the test schedule.

Day 1	Day 2	Day 3	Day 4	Day 5 (4 weeks later)
• pretest • text #1 • five comprehension questions	• text #2 • five comprehension questions	• text #3 • five comprehension questions	• productive test • receptive test • chat	• delayed productive test • delayed receptive test • delayed chat

Table 3.1: Test schedule

a. A pretest was administered in order to assess the participants' previous

knowledge of the target words as well as to make sure that any skewed data can be eliminated from the analysis.

b. The 6 sections were divided into three groups (2 sections per group) and each group was given three texts to read, each under a different condition:

- Glossed in the L2 with a picture (German group)
- Glossed in the L1 with a picture (English group)
- No gloss (Control group)

c. After reading each text, students were asked to answer comprehension questions about the text.

d. A receptive recall test and a productive recall test were administered after the readings.

e. The last test of the study was a contextualized productive test in which students could communicate through a chat task, using the newly learnt words in a contextualized manner.

f. A delayed posttest consisting of a receptive, productive, and contextualized test was administered to assess the long-term effects of the three reading conditions tested in this study.

The following part of this chapter deals with describing the rationale and the procedures used to administer each test during the study. The scoring procedures for the tests administered in this study are presented in the next part of this chapter.

3.3.2 Procedures

This study was conducted online in order to gather results for the different tests in a homogeneous manner. In addition, the contextualized productive test was performed as an online written chat, which allows recording of all on-task and off-task communication. Having access to such data provides as much complete information about the processes involved in the task as possible. The platform chosen for this study was eclass. At the time of the study, eclass – powered by Blackboard Vista – was commonly used at the University of Alberta as an online course management system, offering the assessment procedures and the chat functions necessary for the study. The reason for using CMC in this study is threefold. First, CMC interaction has shown to feature face-to-face interaction patterns (Abrams, 2003; de la Fuente, 2003; Lai & Zhao, 2006; Lee, 2002; Warschauer, 1996) and allows students to participate in a natural dialogue. A second reason concerns students' habits in using computer technologies and chats in daily life, which reinforces the natural character of the chat task. Although the students participating in this study did not use chats in German in the classroom before the tasks given to them during the study, using CMC creates an environment that students are acquainted with and allows them to interrupt their interaction to ask questions about the task or the vocabulary without feeling observed. The third reason for using CMC for this study is simply methodological due to the opportunities that it offers for the analysis of the data. Synchronous chats, while featuring patterns of face-to-face interaction, are a written medium and allow for recording students' on-task and off-task interaction, which is vital

for observing and analyzing communication breakdowns and negotiated interaction episodes.

a) Treatment procedures

The treatment phase of the study took place in three different settings and presented the participants of each group with three readings (one reading per day) in which the 15 target words were glossed in the following ways (see Appendix 2): The first group was provided with glosses consisting of an explanation of the word in German and a picture (L2 text + pictorial cue); the second group saw glosses presenting an English translation of the German word and the same picture (L1 text + pictorial cue); and the third group was the control group and read the texts without glosses. For each reading, participants were allowed 20 minutes to read the text. Only after the time allotted for reading, students were asked to close the website and log on to the next website showing comprehension questions (presented in the next section). Students were not aware that a comprehension test would be administered after the readings, although the treatment format was not changed between the first and the third day of the study and students probably expected comprehension questions on the second and third days. Since previous studies have shown that multimedia glosses using various types of cues are more beneficial for students' retention and production of new words (Al-Seghayer, 2001; Plass et al., 1998), the glosses used in this study combined both a textual and pictorial cue in order to achieve better learning results and to compare the effects of the language choice within the glosses in a more accurate manner.

The readings (Appendix 4) were about 350 to 400 words in length and were specifically written by the researcher, keeping the exposure of the target words within one comprehensible context. In addition, the context of the readings was adapted to the topic of the book chapter that students were studying in class at that particular time, which dealt with travels and holidays. In all three texts, one protagonist relates his experiences on three different vacations; the first reading is about a holiday with his parents at the Northern Sea; in the second reading, he travelled with friends to the Black Forest; and for the third vacation, he decided to travel alone to a hostel in Berlin.

In addition to the glosses given to the first two experimental groups, it was important for the target words to be presented in a way that the context could help students understand their meaning. Writing the texts solely for the purpose of this study also presents the advantage of ensuring that they correspond to the students' level of proficiency.

The lexical items in this study were also specifically chosen according to the students' level of proficiency and syllabus. The words glossed in the texts and presented to the students are typically learnt during the second semester of the course and their accurate use in context does not require particular grammatical knowledge that the students had not been exposed to at the time. This study used words representing concrete items or actions – both for the students to be able to build a context around the words at their level of proficiency and to ensure the effectiveness of the definitions and of the pictorial cues used in the glosses. The students should not have been familiar with the words presented to them in the

reading passages and they were to not be introduced to these words in class during the time allotted between the immediate and the delayed tests.

The texts for the reading task were presented in a hypermedia environment and formatted with *Dreamweaver*. The targeted vocabulary items were glossed according to the different types of annotations presented above. Students were able to read the text on the computer screen and to click on the target words in order to see a specific type of gloss, depending on the group they had been randomly assigned to. Once the students clicked on a target word, the gloss appeared in a small pop-up window on the right hand corner of the screen, as shown in Figure 3.1:

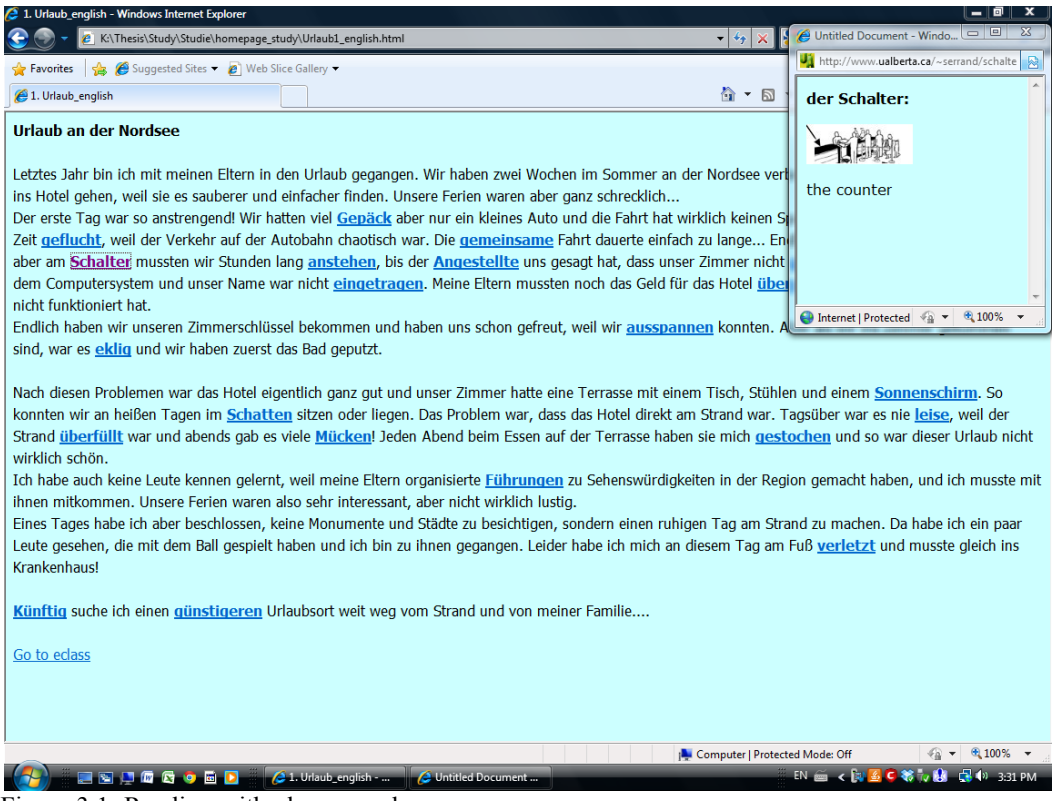

Figure 3.1: Reading with gloss sample

The texts were therefore still available for them to see on the screen at any

time in order to not interrupt the flow of reading and to allow students to have access to both the glosses and the reading context. Linking the gloss to a new website and asking students to change websites to have access to glossed information might have had negative effects on their comprehension of the words as well as on their retention of the context in which they saw the words. Since this study focuses on an analysis of students' ability to use targeted words in an appropriate context, it is therefore important to give them the opportunity to have access both to the meaning of the new words and to the context of the reading passage. Once the students clicked on the next vocabulary item, the gloss window reloaded and showed the next annotation to the new word according to the study group that the students belonged to.

In the following, the various tests administered throughout the study to assess students' learning of new vocabulary through the glossed readings are presented chronologically.

b) Testing procedures

First, a vocabulary pretest was administered in order to identify whether the participants were familiar with any of the 15 target words – 5 verbs, 5 nouns and 5 adjectives (see Appendix 2). On the one hand, this test allowed taking students' background knowledge into consideration. On the other hand, it also allowed for measuring the effects of the glosses and of the contextualized task more accurately. Using a pretest was necessary in order to ensure that students did not have prior knowledge of the words. Asking students to participate in posttests

only would not provide an accurate assessment of their lexical knowledge regarding the target words. The pretest (Appendix 3) consisted of presenting the students with the target words as well as "distractors", which are additional words that were not part of the study. The reason for using distractors is to prevent having students be exposed to the target words only before starting the study. The first actual exposure to the target words should happen through the readings designed around a context and participants should not be aware of the words that they will need to focus on before the study starts. To this end, distractors need to be chosen from the same lexical field as the target words. Twenty-one words were presented overall in the pretest – 7 verbs, 7 nouns and 7 adjectives. The participants were given a list of words and asked about their previous knowledge of the words according to 3 categories:

a. I have never seen this word.
b. I have seen the word but I don't know its meaning.
c. I know the meaning of the word.

Throughout the course of a semester of a language class at the university level, students are presented with a large amount of new vocabulary and they might have been exposed to one of the target words, hence remember seeing a word without remembering its meaning. Nevertheless, previous exposure to the word might help them understand its meaning and remember its spelling during the reading activity or the tasks and skew the results. For this reason, it is essential to test whether students are familiar with specific words before beginning any study on vocabulary learning and it is important for the results of the study to gain

insight into students' background knowledge. If students indicated knowing the meaning of a specific word, they were asked to provide a translation into English in order to ensure that the words presented in the study are new to them.

Immediately after reading each text, students were asked to answer five multiple-choice comprehension questions related to the text they had just read. A comprehension test was necessary to ensure that students read the text carefully and that they understood the general context of the passage, since they were asked later in the study to complete a productive and a contextualized task based on the vocabulary from the readings. Considering the level of proficiency of the participants, it was not possible to ask them to write a summary of the text in German; instead, questions in a multiple-choice format allowed testing the basic understanding of specific parts of the text. These five multiple-choice questions per text each contained one of the new vocabulary items in order to provide additional exposure and contextualization of the target words. During this phase of the study, students were still able to access the respective glosses for each of the five target words featured in the comprehension questions through a hypertext gloss shown in the same format as the text they had just read, which gave them additional context exposure to the target words. Nevertheless, it was not possible to refer to the respective readings during that phase of the study in order to allow a better control of the time of exposure to the texts and the context. The time allotted for this comprehension task was limited to ten minutes and the participants were then asked to close the webpage. As indicated in Table 3.1, the readings and the comprehension questions were administered on three consecutive

days: on the first day, students filled out the consent form, answered the pretest questionnaire, read the first text and answered the first five comprehension questions. On the second day, the students read the second text and answered the second set of five comprehension questions containing five different target words from the ones they were exposed to in the comprehension questions on the first day. On the third day, the students were asked to read the last text and to answer the last set of five comprehension questions containing the last five target words.

On the fourth day of the study, participants were presented with a receptive and a productive test on eclass that allowed for comparing and giving insight into the effects of the different glosses for their retention of the new words. The productive test (Appendix 5) was administered first, since a receptive recall test gives students extra exposure to the target words and would therefore skew the results on the direct effect of the various glosses for the productive test.

The goal of a production test is to assess whether students are able to produce the words they were exposed to in an accurate manner. This test can take place in an oral or written form, depending on the design of the study and the research questions. Students participating in the present study were exposed to target words in a written context and were therefore asked to write the words they had read as accurately as possible.

The productive task needs to be designed in a way that none of the groups participating in a study benefit more from the format of the test than others. The explanations or pictures presented in the productive test thus need to be new to all groups while triggering recognition of the lexical items for the students to

successfully complete the task. In order for them to identify the context of the word that they were to write without giving an advantage to any group, neither the pictorial nor the textual glosses used for the readings were used in the productive test. The productive test was therefore designed to paraphrase the meaning of the target words without relying on participants' visual memory. They were given 15 explanations in English and were asked to write down the appropriate words as well as they could remember them. Figure 3.2 shows a portion of the productive test. The paraphrases used were different from the English translations provided to the English group during the readings. For the target word '*künftig*', for example, the English group saw the translation '*in the future*' accompanied by a picture representing the meaning of the word. The paraphrase used in the productive and receptive tests was '*at a later time*', thus expressing the meaning of the word, but avoiding to provide students with a similar verbal representation of the word's meaning (see Appendix 2).

After completing the productive test, the receptive test was administered. A receptive test consists of asking the participants of a study to recognize the target words. In this case, they were provided with the correct form of the words and the task was to indicate which option presented in a multiple-choice format described the meaning of the word in the most accurate manner. Similar to the productive test, the glosses from the text could not be used for the receptive test. Not using the glosses in this test also offered the advantage of eliminating answers given from memory connecting a picture to a word.

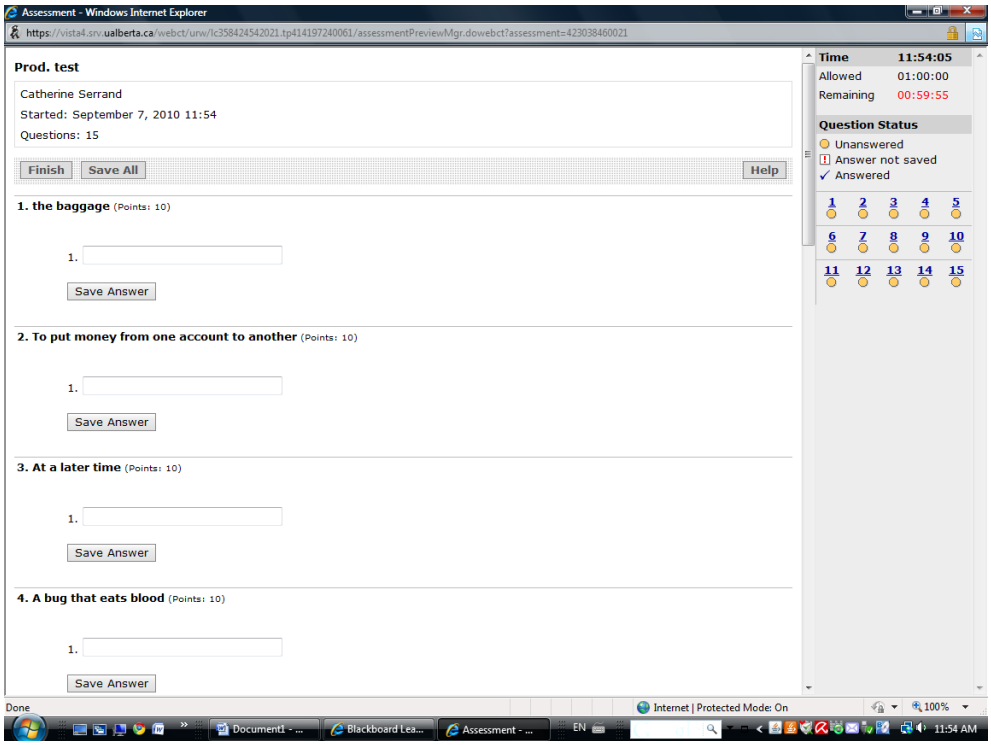

Figure 3.2: Productive Test

The receptive test in this study was also provided on eclass and consisted of presenting the students with the target words and five possible answers. Four answers followed the same format as the explanations of the target words shown in the productive test (English explanations of the German concept). The fifth possible answer provided for each of the 15 target words in the receptive test was "I don't know" for students who could not identify the word given to them. Having this option was important in order to avoid students clicking on any of the other four answers due to uncertainty. Figure 3.3 shows a small portion of the receptive test design. The receptive test as a whole is presented in Appendix 6.

Both the productive and the receptive tests showed the effects of the contextualized readings and the glosses on students' recognition and retention of new vocabulary items. These tests were both limited in time (10 minutes each) in

order to control the amount of reflection time allotted to the students to complete these tasks.

The procedures presented so far were designed to assess the effects of glosses on retention and recognition of new vocabulary, but they did not offer

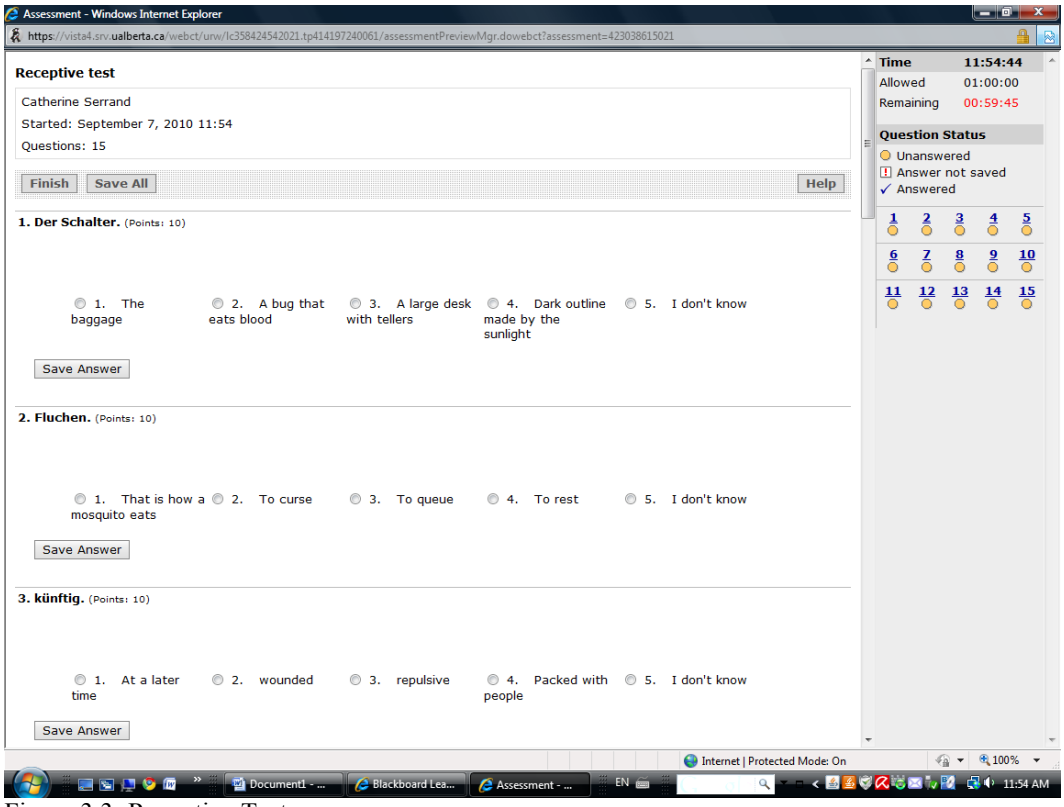

Figure 3.3: Receptive Test

students the possibility to use the target words in context after being exposed to the various glosses. In order to do so, a further task was presented to the students. They were asked to complete a productive contextualized task that required the use of the new words from the reading passages, consisting of a role-play in which students had to exchange information about a vacation (see Appendix 7).

Role-plays are often used in first-year language classes and allow students to create their own sentences and context using their own interlanguage. In order to

be consistent with the format of the study, the role-play was designed online as a written chat. Following the receptive and the productive tests, participants were divided into various chat rooms within each group, which allowed for assessing the effectiveness of each kind of gloss on the use of the target words in a specific context. They were randomly assigned to a chat room in groups of two or three students but were asked to sit on opposite sides of the classroom in order to avoid any oral communication between the participants and to ensure that on-task and off-task discussions were recorded online. As soon as the participants accessed a chat room, they were presented with the role-play. The target words were provided on a separate piece of paper (to allow access during the whole activity), and students were asked to use as many of these words as possible. Since this task was designed to find out whether they could use the words in context, it was essential for the students to be able to remember all the target words, hence to have access to the fifteen words. In addition, since the receptive and productive tests already allowed for measuring their ability to remember the meaning and the spelling of the words, and since the role-play itself was meant to measure students' understanding and use of the context at hand, a list of the target words given to the participants to refer to during the task did not compromise the data gathered through the chat task. This procedure ensured that the students could participate in the task and concentrate on creating a context around the actual meanings of the target words, as opposed to remembering the target words they had seen in the readings. In other words, since this activity was concerned with students' use of the target words in context, it was important that they could

concentrate on incorporating the target words within the context of their role-play as opposed to focusing on remembering the spelling of the target words. Similar to the other tests of this study, the time allotted for the contextualized chat task was limited as well and students were asked to leave the chat rooms after 20 minutes. The chat transcripts were analyzed both quantitatively and qualitatively, and the results of both analyses are presented and discussed in chapter 5.

The tests presented so far aimed at assessing the role and the effects that glosses can have on students' immediate retention, recognition and use of new vocabulary items in context. In order to assess the long-term effects of glossed reading, the same procedures took place four weeks later. The students were therefore presented with the same (delayed) tests and chat task in order to compare their retention of the new words and their ability to use the target words in context after a significant amount of time. Even though the topic of the study was chosen to fit into the context of instruction, the study started at the conclusion of the chapter related to vacation and holidays. During the time between the immediate and the delayed tests, this topic was not a focus again during class time. Since this study was conducted with students at an intermediate low level of proficiency, the range of vocabulary that the students knew was rather limited; at this stage of language acquisition, there is a chance that students attempt to use new words in various contexts and that they use the target words of the study during further activities in class. While their attempt to use the new words between the study and the delayed posttest could not be controlled, they were not exposed formally to any of the target words or to this particular context during

that time, which limited their opportunities of practicing and using the words.

A short questionnaire was given to the students after the delayed tests in order to inquire about their perspective on the study. Students have different learning styles and preferences and additional input about their own learning experience with a new type of task is important with regard to pedagogical implications for the present study. The questionnaire (Appendix 8) was customized to correspond to each type of gloss presented to the three different student groups. It was short and was only intended as a space for feedback to the study if the students felt that feedback was needed.

The following section is concerned with the scoring procedures used in each test of the study in order to obtain data and to conduct both the quantitative and the qualitative analyses.

3.4 Scoring procedures and analysis

With regard to scoring procedures, eclass presents advantages and disadvantages. First, it allows all test results to be converted into *Excel*, hence to be organized according to the different questions in each test and to give an overview of the results by group that can be further analyzed quantitatively. However, eclass does not allow students to log in with a pseudonym. Therefore, the converted Excel table presents the results to all tests with each student's name. Before formatting the table, running tests and analyzing the results, the names of students were replaced with coded numbers in order to preserve the anonymity of the participants. In order to identify the six different sections participating in the

study within the two experimental groups and the control group in the data, the numbers assigned to the participants followed a pattern such as “B5-3”, i.e. section B5, student number 3.

In the pretest, points were given both for the recognition of a word and for its definition. Since students who stated that they recognized a word did not necessarily know its meaning and therefore had not necessarily learnt that word in a previous context, the significance of both answers should be reflected in the amount of points assigned for both categories. Each student who clicked the option “I have seen this word but I don’t know its meaning” was assigned one point; each student who clicked the option “I know the meaning of this word” was assigned two points; each accurate translation of the word that is provided in the pretest was scored with one point additionally.

Based on the results of a pretest, some data might have to be excluded from the analysis if students have too much prior knowledge of the target words. Since the pretest aimed to identify the words that students already knew, that is, words that they had already learnt or that they had previously been exposed to, the scores given in the pretest needed to be taken into consideration in the analysis of the data collected in the following tests. Students who could provide at least five translations of the 15 target words would not be included into the data for the statistical analysis or the qualitative analysis, since they would have been exposed to a smaller amount of new words, which means that both their comprehension of the texts as well as their ability to learn the new words would not have been comparable to other students’. In the present study, none of the students were

excluded from the data based on the results of the pretest. Some participants indicated knowing a few of the target words but they were not able to provide an accurate translation of the meaning of these words. Therefore their data remained part of the analyses on further tests. Although students with some recognition of the target words could have had an advantage reading the texts or completing the tests, their data was kept in the dataset, considering that they indicated not remembering the meaning of the words or provided an inaccurate translation of the words. The only data excluded in this study was from students who did not accept to participate on the consent form.

After reading each text, students were asked to complete a comprehension test in which they had to answer five multiple-choice questions about the content of the respective text. Each correct answer was assigned one point. Even though one of the goals of this test was to provide students with additional exposure to the target words, the analysis of these data also provides information with regard to the role of the different glosses for reading comprehension. The target words were not presented in the multiple-choice answers but rather in the questions. The results therefore not only show students' overall comprehension of the texts, but also indicate if students understand the questions with help of the glosses.

The productive test presented students with English explanations and asked them to write the target words accordingly. Since the goal of the readings was to give students a context to understand the meaning of new words, the words were not taught in an explicit manner and students were not given a vocabulary list to review and study. For this reason, the gender of the article – if participants

provided an article – was not taken into account in the scoring procedure. For the same reason and since the time of exposure to the target words was limited, minor spelling mistakes were taken into account in the scoring procedures. A spelling mistake was considered "minor" if the word differed from the accurate spelling with one letter (e.g. "Müke" for "Mücke") or if the student omitted the "Umlaut" (e.g. "Mucke" for "Mücke"). One point was given for each word that was written accurately. One half point was given to words with a minor spelling mistake.

The multiple-choice receptive test presented students with the target vocabulary items. They were asked to click on an explanation in English that was the most accurate for the word. As indicated above, the option "I don't know" was added to avoid that students guessed the answer, for a more accurate assessment of participants' ability to remember the meaning of each word. Students who clicked on the accurate English definition received one point. For any other answer, no point was given.

A quantitative analysis generated with the data obtained through the productive and receptive immediate posttests using an analysis of variance (ANOVA) of the scores (dependent variable) reached by each group (independent variable) allowed for measuring the effects of the different types of glosses with regard to reading comprehension, recognition and retention of new vocabulary. A comparison of results gives insight into the effects of glossed reading as opposed to reading without glosses as was the case for the control group and therefore offers conclusions on the use of contextualized reading tasks for vocabulary learning.

However, the analysis of the productive and receptive tests is only one indicator of the effects of glosses in the context of this research. An extensive analysis of the chat transcripts was conducted both quantitatively and qualitatively in order to gain insight into the accurate use of each of the target words. Students were asked to use the target words in the context of their role-play. A specific scoring procedure was applied to each appearance of each target word, taking the context of use into consideration. One point was assigned to each word used in the proper recognizable context, hence used in combination with semantically connected words. Since the chat is designed for the students to use the new words in context and considering the level of proficiency of the participants, the gender of the target nouns and the conjugation of the target verbs were not taken into account in the quantitative measurement.

In addition to the quantitative analysis, the chat transcripts also provide important information about the abilities of the students to recognize and understand the glosses presented to them. One of the reasons for a chat online was to be able to have access to any problem-solving strategies used by the students to build a context around the vocabulary given to them. Such problem-solving communication strategies could occur during the role-play in the form of direct translation, negotiation of meaning or repairs in both German and English. Since students were sitting apart, any issues with comprehension or with the use of the words themselves had to be addressed online. A certain amount of negotiation was expected to be observed through the analysis of the transcripts, since after a limited exposure to the target words, some students did not understand a word

properly or forgot the meaning of a word used by their chat partner. The qualitative analysis concentrates on students' ability to use or explain the new words appropriately in the context of the task. Any form of negotiation during the contextualized task can help students notice a gap in their retention and their knowledge of the target words and might have an influence on their learning. This analysis of the chat transcripts therefore generates results about the effects of various glosses for students' use of new vocabulary in context, as well as their ability to reproduce a context for explanation. In addition, this analysis shows some strategies that students use to build a context during a communicative task.

In order to analyze the effects of glosses on students' long-term retention of new words and their use of the target words in context, a delayed posttest was administered four weeks after the test. This delayed posttest consisted of the same productive, receptive and contextualized tests as in the immediate posttest. After the collection of data on the delayed posttest, various comparisons were made; first, the performances of the different groups on the delayed posttest (receptive, productive and contextualized) were quantitatively compared with each other through an ANOVA analysis to see if the various types of glosses had different effects on the long-term retention of vocabulary as well as on the production of the vocabulary, both in a structured production task and in a contextualized chat.

Secondly, the differences between the immediate and the delayed tests were analyzed within each group in order to measure whether the different types of glosses trigger beneficial results on long-term retention and production of new vocabulary.

The analysis of the quantitative tests allowed for measuring various aspects of the students' learning process with regard to the meaning and form of new lexical items, as well as the effects of the types of glosses used in this study. However, the quantitative results do not provide enough information to analyze students' use of the target words in context and to accurately assess the chat task conducted at the end of both the immediate and the delayed tests of the study. The next part of this chapter is concerned with the quantitative and the qualitative analysis of the chat transcripts, concentrating on communication strategies and interaction patterns found in the data that indicate students' ability to use the words in context or to create a context that allows using the target words.

3.5 Analysis of communication strategies

Before presenting the methods used to analyze the chat transcripts and how students used the new words in context, a brief overview of research related to the analysis of chat interaction as well as definitions of communication strategies is provided in the following section.

3.5.1 Use of new vocabulary in context

Concerned with communication breakdowns in general, researchers have observed and analyzed communication strategies – beyond negotiation of meaning or repairs – used by students in different types of interactional settings. In order to analyze students' strategies to solve communication problems as well as to identify how students present the meaning of new vocabulary items to their peers,

the present study looks at different types of communication strategies (CS) that can indicate students' understanding of word meanings. Various studies have analyzed learner language focusing on CS such as topic initiation and expansion (Chun, 1994), positive navigation and compensatory strategies (Smith, 2003), repairs (Kost, 2008; Schönfeldt & Golato, 2003), learner uptake (Smith, 2005) or clarification requests and code-switching (Kost, 2008).

Studies on CS (Chun, 1994; Dörnyei & Scott, 1997; Smith, 2003) have categorized these strategies according to the pattern used in students' utterances with the goal of finding out which strategies were more beneficial for students' learning of new vocabulary.

Whereas there is no consensus on one definition and categorization of CS, the article by Dörnyei and Scott (1997) offers a comprehensive review of research on CS by summarizing results from previous taxonomies that offered different approaches to a definition of CS, including interactional concepts (Tarone, 1977), in which CS can only occur in a cooperative manner between the conversation partners, and reduction-achievement strategies (Færch & Kasper, 1983; Paribakht, 1985; Willems, 1987), which consider the use of CS as a problem solving strategy, either by shortening or abandoning the message at hand, or by expressing "the intended message in spite of the linguistic deficiencies by extending or manipulating the available language system" (Dörnyei & Scott, 1997, p. 23). Another approach considers CS from the perspective of a cognitive framework (Bialystok, 1990; The Nijmegen Group, under the supervision of Kellerman and Bongaerts; see Kellerman, 1991), listing two types of CS: conceptual and

linguistic strategies. Conceptual strategies describe the process of manipulating the concept at hand in order to find a way to express an idea, and include strategies such as paraphrasing or semantic word coinage. Linguistic strategies, on the other hand, are used by manipulating one's own linguistic resources and include strategies such as translation or code-switching.

In their review of taxonomies, Dörnyei and Scott (1997) also add their own findings and categorization (based on Dörnyei & Scott, 1995). They propose three main categories of communication strategies: direct strategies, indirect strategies, and interactional strategies. Direct and interactional strategies are, as in the taxonomies they base their research on, meaning-related. Direct strategies are used in order to relate a meaning and avoid communication breakdowns, such as paraphrasing – or circumlocution in Dörnyei and Scott's terminology. Interactional strategies, on the other hand, are meant to enable communication through language exchange, in which both partners of a conversation are involved in problem-solving. An example for such interactional strategies is appealing for and providing clarification or explanations. Indirect strategies involve communication patterns that do not carry meaning but rather are meant to keep the conversation flow in order to avoid a breakdown. Such strategies include the use of fillers or feigning understanding a word or a sentence in order to not interrupt the conversation (p. 198-199).

The definition of CS by Dörnyei and Scott, therefore, addresses on the one hand how students strategize to convey meaning when they are faced with communication problems such as not knowing a word or not understanding their

partner's utterance (direct and interactional strategies). On the other hand, it also considers learners' behavior beyond the concern of delivering meaning, in the form of strategies meant to carry on a conversation in order to avoid a breakdown (indirect strategies). Thus, they offer a broad and comprehensive definition of CS including meaning-related as well as discourse-related tools.

Some research has focused on the use of CS as an indicator of communicative competence, under the premise that the use of CS in learners' speech is meant to compensate for lower proficiency (Lafford, 2004). Karimnia and Zade (2007) focus their research on the communicative competence – and more specifically the strategic competence – of Iranian EFL learners. They define strategic competence, as part of the communicative competence, as "the individual's ability to use communication strategies, e.g., paraphrase, circumlocution, literal translation, lexical approximation, mime, to get their message across and to compensate for a limited or imperfect knowledge or rules or the interference of such factors such as fatigue, distraction or inattention" (p. 288).

According to Llach (2010), both communicative competence and the proficiency level of learners influence the use of specific CS. As students become more proficient in their second language, they are able to relate meaning using more strategies in their second language and rely less on the use of their mother tongue.

In another study, Dobao (2001) identifies three main factors that influence the use of CS, namely the native language of the participants, their level of

proficiency as well as task-related factors, defined in the study as complexity of the task and the role of the participants within the interaction.

In order to answer the fourth research question, this study concentrates on the strategies used by students in online chats to communicate with newly learnt words. As mentioned above, students were randomly assigned to various chat rooms and could not communicate verbally during the activity. Students therefore communicated on-task and off-task through the chat window presented to them, which allows for a more precise analysis of communication strategies (CS) and patterns. The CS considered in these data only concern the use of target words. Other CS can be found throughout the transcripts but are not directly related to the participants' ability to use the target words in context for the task at hand.

Following the literature on communication strategies, the model of analysis used for this study is based on Dörnyei and Scott's (1997) framework. The following table provides an overview of this framework, which has been adapted to the data collected in this study. This table differentiates the CS observed in the data according to direct and interactional strategies. In general, the term CS is used to refer to any types of communication patterns used in order to manage communication problems. However, various types of CS can be differentiated according to the type of problem and the type of solution that they address. As such, direct strategies are CS that are used by a speaker in order to solve one's own communication problem in the context of a conversation; interactional strategies refer to CS that are used in a cooperative manner by a group of interlocutors in order to solve a communication problem. Direct strategies can

include code switching, paraphrasing or translating, whereas interactional strategies include communication patterns such as appeals for help or expressing non-understanding. In addition, one indirect strategy was found in the data ('feigning understanding'). Specific CS indicated in Table 3.2, such as asking for confirmation, were used in the data in both English and German.

Direct strategies

	Strategy	**Description**
1	Message replacement	Substituting the original message with a new one because of not feeling capable of executing it
2	Self-initiated self-repair	Making self-initiated corrections in English in one's own speech
3	Guessing	Guessing is similar to a confirmation request but the latter implies a greater degree of certainty regarding the key word, whereas guessing involved a real indecision
4	Rephrase	Rephrasing the trigger (in the L2)
5	Commenting on insecurity	Explicitly stating that one is not sure about the correctness of their message
6	Providing translation - unasked	Providing the interlocutor with the translation of a L2 word indication that the interlocutor needs help

Indirect Strategies

1	Feigning understanding	Pretending to understand a message in order to carry on a conversation

Interactional Strategies

	Strategy	**Description**
1	Other repair	Correcting something in the interlocutor's speech
2	Other-initiated self-repair	Making corrections in German after someone points out a mistake in one's own speech
3	Asking for clarification	Asking one's interlocutor about the meaning of a word to arrive at an understanding
4	Direct appeal for help	Turning to the interlocutor for assistance by asking an explicit question concerning a gap in one's own L2 knowledge

5	Asking for confirmation	Requesting confirmation that one heard or understood something correctly
6	Expressing non-understanding	Expressing that one did not understand something properly either verbally or non-verbally
7	Translation	Providing the interlocutor with a translation of the L2 word as a response to a clarification request
8	Own accuracy check	Checking that what one said was correct by asking a concrete question or repeating a word with a question intonation (or a question mark)
9	Transfer of knowledge from interlocutor's speech	Repeating a TW and using it in context after the interlocutor has used it or provided an explanation for it
10	Rephrase - confirmation of what was said	Confirming what the interlocutor has said or suggested

Table 3.2: Communication Strategies (Based on Dörnyei & Scott, 1997, pp. 188-194).

The differentiation between the use of L1 and L2 with CS will be shown in chapter 5.

Once the communication strategies present throughout the data were identified and coded, various analyses were conducted. First, the data were quantified in order to observe whether the different groups used specific types of CS more than others. These data were therefore meant to show whether there is a link between the exposure to specific types of glosses and the use of specific CS when the target words are used in context.

In a second part of the analysis, the data were qualitatively analyzed by observing how CS were used throughout the data. This last part of the data analysis was expected to first provide insight into the use of CS in contextualized chats; in addition, since this study is primarily concerned with the use of various target words in context, examining the CS used throughout the chat is a way to

observe how accurately students can communicate in a specific context with newly learnt words. The use of CS such as paraphrasing or repairs can be helpful in finding out whether participants understand the semantic context of a word. Short sentences or utterances that are not answered to and expanded on do not offer such insight into students' contextualization of new words.

The CS identified in these data and outlined in the table above are further explained, especially with regard to differences to Dörnyei and Scott's taxonomy, before the results of this study are presented in the next chapter.

3.5.2 Direct strategies

As mentioned above, direct strategies represent communication patterns used by one of the interlocutors in case of a communication breakdown in order to continue the conversation. The direct strategies found in the current data show that students relied on a wide variety of CS in order to complete the task at hand.

The direct strategies found in the data show how students are dealing with their own communication difficulties concerning the target words specifically. Strategies such as 'guessing' are often followed by a change of context in order to avoid a communication breakdown. Other strategies such as 'rephrasing', 'providing translations' or 'comments on insecurity' offer a direct hint to the interlocutors and can allow the chat partners to continue their conversation after the problem trigger has been clarified.

The first difference that can be made between this list of CS found in the data and Dörnyei and Scott's taxonomy is the distinction between self-initiated

and other-initiated self-repair. Participants in this study used both types of self-repair; some students noticed a mistake in their own speech and corrected it in a second turn in order to clarify their message. This strategy can be seen as a direct CS, since it does not involve any interaction between the participants in order to solve the problem occurring in a student's turn. If a self-repair was other-initiated, it is seen as an interactional strategy, since it requires a cooperative problem-solving effort in order to correct the inaccurate message.

Another strategy that is not present in this form in Dörnyei and Scott's taxonomy is the participants' comments on their own insecurity. As opposed to accuracy checks meant to ask their interlocutor to confirm the meaning or the form of a word or sentence, students throughout these data use signs or phrases indicating that they are unsure about the meaning of the target words. Mostly, students use these phrases to answer a request of their interlocutor to explain the meaning of one of the target words. This type of doubt can be expressed through phrase such as "I think", "I believe", "Maybe", etc. and can occur in both English and German. In addition, some students chose to answer with a translation of one of the target words with a question mark or a sign indicating that they are unsure about their answer.

The last direct strategy presented in the table above describes the communicative behavior used by some participants to use a target word and provide its translation right away. In these cases, their chat partner has not indicated any problems with the message at hand, but rather the student using this strategy gives the translation in the same turn or an immediate second turn. These

direct strategies are therefore a means for participants to deal with their difficulties with the target words in a way that they can convey their message before a communicative exchange happens. Direct strategies are different from indirect strategies, in that the latter are not meant to carry meaning within the interaction.

3.5.3 Indirect strategies

Dörnyei and Scott (1997) present indirect strategies as communication patterns that are not meant to solve a problem occurring through misunderstanding or lack of knowledge. Rather, indirect strategies are used in order to continue the conversation by preventing a communication breakdown (p. 198), and occur in the form of fillers, or feigning understanding. The participants of this study used only the latter type of indirect strategies while dealing with the target words. Whereas other indirect strategies were present throughout the chat transcripts, only 'feigning understanding' was used in order to carry on the conversation after the use of one of the target words.

The following part of this chapter deals with CS that involve both chat partners in order to solve a common communication problem.

3.5.4 Interactional strategies

Interactional strategies describe the use of problem solving strategies involving both chat participants. Similar to the direct strategies observed in the data and described above, a few strategies are the same as in Dörnyei and Scott's taxonomy. Interactional strategies can also occur in either the L1 or the L2 and

can be present in a conversation as a question about what is said or as an answer or a reaction to the use of a target word in the interlocutor's speech.

Other-repairs consist of correcting a mistake that has been identified in the interlocutor's speech in order to make them aware that there is a grammatical or semantic problem in their utterance. The interlocutor initiating an other-repair can either repeat the sentence correctly or initiate the repair by asking for confirmation. Other-initiated self-repair is also present in this category, since it requires a mutual effort between initiating and performing the repair.

In general, interactional strategies involve a more direct statement about a communication problem, and they can be based on one's own speech or difficulty to use a word as well as on the interlocutor's use of a target word. Interactional strategies based on one's own speech do not only involve repair, they can occur by using own accuracy checks as well. While using a target word, participants use own accuracy checks to ensure that they are using the correct semantic or grammatical form of a word and that their interlocutor understands the message provided.

More commonly, interactional strategies are targeted at the interlocutor's speech, which takes place through asking for confirmation or clarification, appealing for help or expressing non-understanding of the message conveyed by one's chat partner. Appealing for help involves a participant's direct statement on a problem with the utterance or the message at hand. A direct appeal for help is used as a reaction to a previous sentence, for example "What does that mean?", and is meant to ask the interlocutor to rephrase or explain the sentence causing a

communication problem. Expressing non-understanding is a similar strategy, although it does not involve a direct question about a specific word or part of a sentence; rather, it is meant to show that the interlocutor's utterance is unclear in its entirety. In a chat task like the one presented in this study, non-understanding is often expressed through signs such as question marks or through fillers such as "um…", imitating a vocal reaction in a face-to-face conversation.

Asking for confirmation or clarification involves addressing a specific part of the sentence or a word used by the chat partner in order to ensure that one has understood the message or a specific target word correctly.

One strategy that needs to be further explained involves a participant using a target word after the interlocutor has explained or translated it. In this case, the participant has shown through a previous interactional strategy – for instance an appeal for help – that they are not familiar with a target word. After the communication problem has been solved by the interlocutor, the participant then proceeds to using this target word in their following turn.

The last strategy – 'confirming what was said' – is used in cases in which a word has been used but the student has expressed insecurity about their understanding of the word. Their partner then confirms either through a direct affirmation or through another use of the word that the message conveyed was correct.

In addition to these CS observed in the data, other interaction patterns have been identified that show how students can convey meaning while using the target words in context. These interactions aim at providing a context of use for the

target words and enhancing their interlocutor's understanding of the conversation. These contextualizing strategies are outlined in the Table 3.3.

3.5.5 Contextualizing strategies

Considering that the task given to the participants in this study aims at discovering their ability to use target words in context, it is important to identify how students were able to show their understanding and their use of context in the chat task. The following strategies are not present in Dörnyei and Scott's taxonomy, but it is important to show that the use of target words in context can be beneficial for the conversations conducted in the data. Contextualizing strategies are different from the CS presented in this chapter and analyzed in the next chapter. Communication strategies are meant to help students deal with communication breakdowns and overcome any type of communication problems occurring during an interaction. The contextualizing strategies presented below, however, are used by students in order to avoid a communication breakdown from occurring when using one of the target words. According to Dörnyei and Scott (1997), the concept of CS, while describing interaction patterns occurring as a reaction to a communication breakdown, can further be extended to "include every potentially intentional attempt to cope with any language-related problem of which the speaker is aware during the course of communication" (p. 179). Furthermore, taking Canale's (1983) definition of strategic competence into account, CS can be defined in this study as any effort *to enhance the effectiveness of communication*, therefore including any type of communication patterns meant

to avoid communication breakdowns, beyond the problem-solving nature of CS found in other definitions.

By providing a context of use for one or more target words, students are able not only to show their ability to use the target words, but also to ensure that their partner understands their utterance. Specifically, while using newly learnt words without explicit instruction, students are aware that specific target words can represent a problem in communication if their partner does not remember their meaning. It is important for students to provide a broader context of use in order to ensure that their partner understands the message of their utterance. This part of the analysis is based on the understanding of context as its verbal elements, as defined by Engelbart and Theuerkauf (1999), and in particular, its semantic properties. Given that the 15 target words include nouns, adjectives and verbs, learning the grammatical properties of the words through reading only is a difficult task. The analysis concentrates, therefore, mainly on the semantic accurateness of the use of the target words. Three types of contextualizing strategies could be identified, as indicated in Table 3.3.

The first category describes how students have used the target words at their disposal for the task at hand and found a way to connect them semantically. Participants were asked in the chat task to use as many of the target words as possible, and by combining the use of target words in one sentence, students could not only perform the task as asked, they could also show that they understood how to use those target words in context. For example, students saw the relationship

Contextualizing strategies

	Strategy	Description
1	Linking two target words in one context	Using common semantic fields of target words to use several target words in one message
2	Using a target word with semantically connected words	Using a target word within connected semantic fields (synonyms, antonyms, etc.) to show understanding of context
3	Topic continuation through reaction or answer	Showing that one has understood the message given by the interlocutor by using affirmations or emotional reactions (e.g. "das ist sehr gut" [*that's great*]; "Schade" [*too bad*])

Table 3.3: Contextualizing Strategies

between the target word "der Schalter" (the counter) and the target word "der Angestellte" (the employee) and have used both words in one sentence. Similarly, the next category describes the correct use of one target word through the use of semantically connected words in the same sentence. Through the use of words revolving around the same semantic category, students are able to show their understanding of the target words. This strategy was used either by using the target words offering an alternative, for example linking the words "die Sonne" (the sun) with the target word "der Schatten" (the shade) using the coordinating particle "oder" (or). In other cases, students choose to use redundancies in order to convey their message more precisely, for instance by using the word "böse" (mad) and the target word "fluchen" (to swear) in the same sentence.

These two contextualizing strategies help students make more complex sentences and ensure that their interlocutor understands the meaning of their message in order to avoid communication problems. The reaction of the

interlocutor to such sentences, therefore, also indicates their understanding of the target words in context. The third category identified in the table above is concerned with students' reactions to their interlocutor's speech. Chat participants give each other feedback with regard to communication difficulties, but they also use communication patterns from face-to-face interaction by agreeing or providing an emotional or emphatic response to their interlocutor's speech. Such responses can occur through words or expressions like "schade!" (too bad!), or "sehr gut!" (very good!) and show that the message has been understood. If a target word was used in the original utterance, such reaction can be an indicator that the chat partner understands the context of the target word by using a negative or positive reaction, especially if the reaction is followed by another sentence or question.

These contextualizing strategies provide the chat partners with more details about the target words or indicate understanding of what was said in a previous utterance. These strategies are therefore important to acknowledge throughout the present data in order to identify to what extent students were able not only to remember or use the words, but rather how they can show that they have learnt to use the target words in a contextualized manner.

The quantitative results of the data analysis are presented in the next chapter and answer the first and second research questions indicated above. The analysis of the use of the target words in context as well as the qualitative analysis of the chat transcripts answer the third and fourth research questions and will be the subject of chapter 5.

4. TEST RESULTS

The data collected during this study were downloaded from eclass and formatted into Excel tables in order to allow statistical analyses for the performances of each group and a comparison between groups. The first part of this chapter will concentrate on the quantitative results from the data collected through the pretest, the productive tests, the receptive tests, and the chat transcripts. The results will be presented with tables and graphs showing the results of the one-way ANOVA analyses and paired samples t-tests; the significance levels of the post-hoc t-tests were adjusted after using Bonferroni alpha levels of .0167 (.05/3).

4.1 The pretest

A study on vocabulary acquisition is only valid if none of the participants were already exposed to some of the target words in previous classes or through personal additional exposure. In order to test the validity, a pretest has to be conducted before the study. The pretest of this study consisted of showing students a list of the target words as well as 6 distractors and asking them to identify these words according to 3 categories: whether the word was familiar, whether they knew the word, and whether they could provide a translation of the word into English. The table extracted from the eclass data showed that none of the participants had any prior knowledge of the target words. A few participants indicated knowing some target words but they could not offer an accurate

translation of the words, which showed that they did not in fact know the words. After an analysis of the pretest data through an ANOVA, it was determined that none of the participants' data should be excluded from the rest of the study. Figure 4.1 below shows the mean scores reached by each group on the pretest. One point was awarded if a student indicated having seen the word before or knowing the meaning of the word. A further point was given if the student could in fact provide an accurate translation of the word. The table indicates that the students participating in the control group felt more familiar with the words presented to them. However, the three groups did not present any outliers and no statistically significant differences were found, $F(2,105)=.34$, $p=.710$.

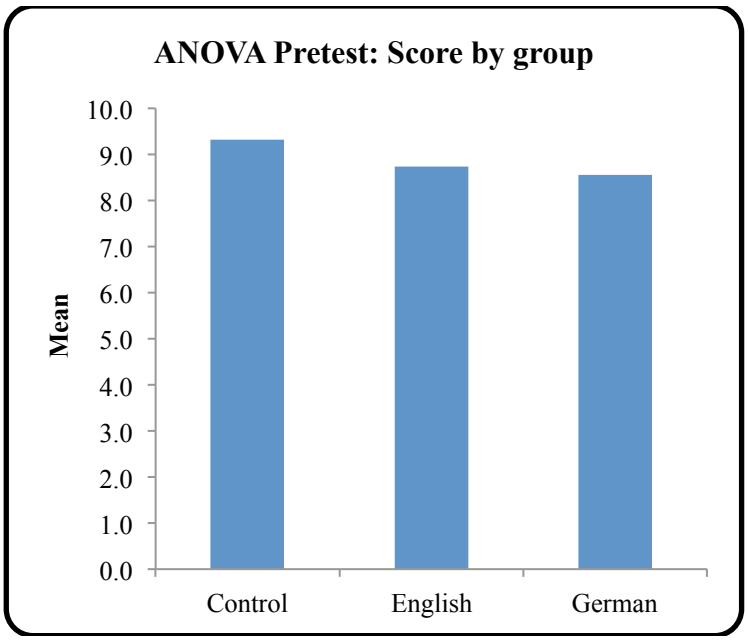

Figure 4.1: Mean scores on the pretest by group

Group	N	Mean	SD	Median
German	38	8.55	4.22	9.0
English	35	8.74	3.75	9.0
Control	35	9.31	4.16	9.0

$F(2,105)=.34$, $p=.710$

4.2 Comprehension questions

After each text, students were to answer 5 comprehension questions, each containing one of the target words. Not only were these questions important for an additional exposure to the target words, but they also offered insight into the participants' ability to understand the texts and the questions with the help of glosses. The data gathered through these questions already show interesting effects of the glosses for students' comprehension of the target words and task performance. For each question answered correctly, one point was allotted. If the question was not answered or answered incorrectly, the participant did not receive a point. The data were analyzed using a single-factor ANOVA of the scores by group.

On the first day of the study, students read the first text and answered the first comprehension questions. Even though the English translation group achieved a higher score than the other groups, there were no statistically significant differences between the groups ($F(2,104)=.15$, $p=.859$) on the first set of questions. Figure 4.2 below shows the mean scores achieved by each group answering the five comprehension questions.

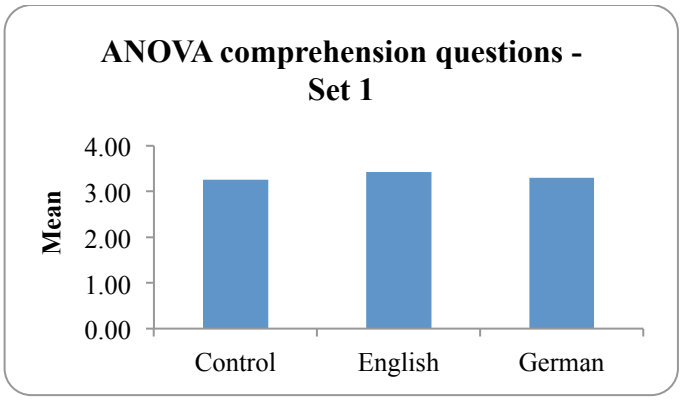

Figure 4.2: Results of the first set of comprehension questions by group

Group	N	Mean	SD	Median
German	40	3.30	1.16	3.0
English	33	3.42	1.25	3.0
Control	34	3.27	1.33	3.5

$F(2,104)=.15$, $p=.859$

The second set of questions was presented to the participants on the second day of the study after the second reading, hence after an additional contextualized exposure to the target words and the respective glosses. The second set of questions contained 5 different target words from the ones used in the comprehension questions on the first day. Although no significant differences were found between the groups, comparing the performances of each group from one day to the other offers interesting results that are discussed further in this section.

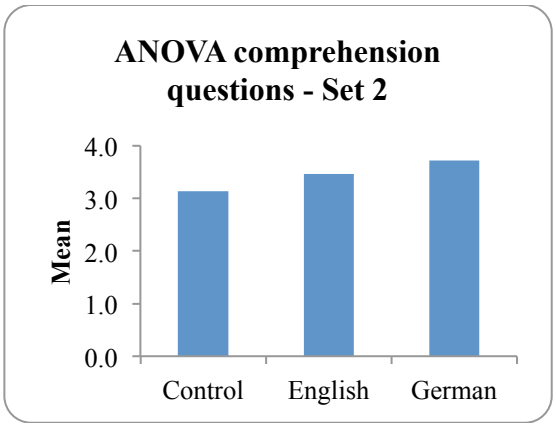

Figure 4.3: Results of the second set of comprehension questions by group

Group	N	Mean	SD	Median
German	28	3.71	1.27	4.0
English	32	3.47	1.02	4.0
Control	30	3.13	1.01	3.0

$F(2,87)=2.05$, $p=.135$

Figure 4.3 shows the mean scores obtained by each group while answering the comprehension questions presented on the second day of the study. Similarly to the mean scores on the first set of comprehension questions, the experimental groups were able to achieve a higher mean score than the control group. However, the results do not show any statistical differences between any of the groups ($F(2,87)=2.05$, $p=.135$).

The same procedure was used on the third day of the study with the last 5 target words. The results from the third set of comprehension questions are different from the first two tests. The single-factor ANOVA conducted on these data showed significant differences between the experimental groups and the control group ($F(2,86)=10.27$, $p=.000$), as shown in Figure 4.4 below. Even though it is premature at this stage of the analysis, these results raise questions

about the effects of glossed readings over time. The results from the experimental groups do not show any statistically significant results between any days of the treatment. However, the control group performed significantly worse than the experimental groups on the third day, which might indicate a loss of interest in the task and of motivation to complete it from the control group. From these results, the conclusion could be made that glosses added to a reading task could be beneficial for students to focus and be motivated to complete the task at hand. In addition, the between-section analysis presented in Appendix 9 shows that the two sections participating in the study in the control group had significantly different results for the third set of comprehension questions, which could be a factor influencing the performance of the control group overall. Another explanation for these results could be that the third text was more difficult to understand and that the control group, since reading without glosses, was not able to infer meanings only from context to the same extent as they did in the first two readings.

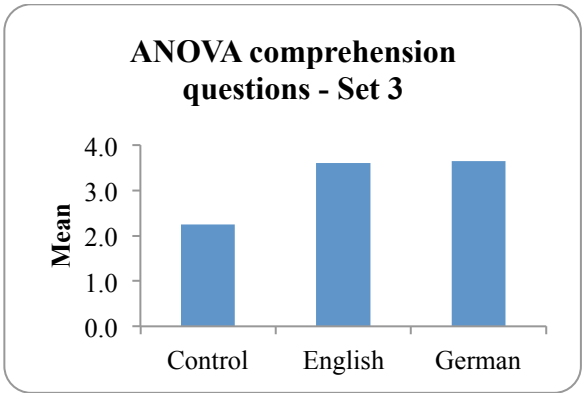

Figure 4.4: Results of the third set of comprehension questions by group

Group	N	Mean	SD	Median
German	31	3.65	1.40	4.0
English	30	3.60	1.30	4.0
Control	28	2.25	1.27	2.0

$F(2,86)=10.27$, $p=.000$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	1.35	**.001**	**.222**
Control and German	1.40	**.001**	**.219**
English and German	.045	.897	.000

In order to understand the effects of the glosses on students' comprehension of the target words and of the context of the readings, further analyses can be conducted with the data from the comprehension questions. Even though no significant results were generated between the experimental groups on any set of comprehension questions, it is possible that a within-group analysis would show significant results between the three days of treatment for either group. In order to quantify the progress made by each group individually, a repeated measures ANOVA was conducted with the scores on all three sets of comprehension questions for each group. The within-group comparisons showed an interesting progression of the results. For all three groups, the data were reorganized by group and set of questions in order to see whether there were any significant differences between the results of each group from one day to the next. Both experimental groups did not show any significantly different results on the three sets of comprehension questions.

However, the control group seems to have performed significantly worse on the third day of the study, after more repeated exposure to the target words

through the texts and the comprehension questions. The results are statistically significant ($F(2,89)=6.09$, $p=.003$) both between the first and the third sets of scores (p=.005) and between the second and the third sets of scores (p=.003), as presented in Figure 4.5.

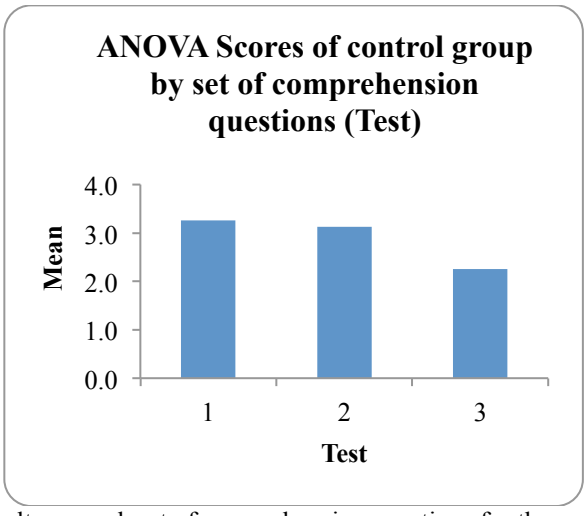

Figure 4.5: Results on each set of comprehension questions for the control group

Set of questions	N	Mean	SD	Median
1	34	3.27	1.33	34
2	30	3.13	1.01	30
3	28	2.25	1.27	28

$F(2,89)=6.09$, $p=.003$

Comparison	Mean Difference	P-adjusted	η^2
1 and 2	.13	1.000	.003
1 and 3	1.02	**.010**	**.134**
2 and 3	.88	**.014**	**.135**

In other words, while the use of glosses in the readings or the type of gloss used for the target words did not seem to influence students' performance on the completion of the comprehension questions, the lack of glosses in both the reading passages and the comprehension questions for the control group seems to have

had a negative effect on their performance on the third test. The results show that the control group was not able to complete the task on the third day as well as on the first two days of the study. Since the three readings featured the same context and the same target words, the performance of the control group on the third day of the study could indicate that the students were not able to infer the meaning of the target words from the texts, leading to confusion and misunderstanding of the readings. Therefore, even though the effects of glossed reading passages were not measurable using the data collected with the experimental groups, it is possible to observe the negative effects of the lack of glosses on the performances of the control group. Figure 4.6 gives an overview of the mean scores progression of each group, showing steady mean scores on each set of comprehension questions for the experimental group and a regression for the control group.

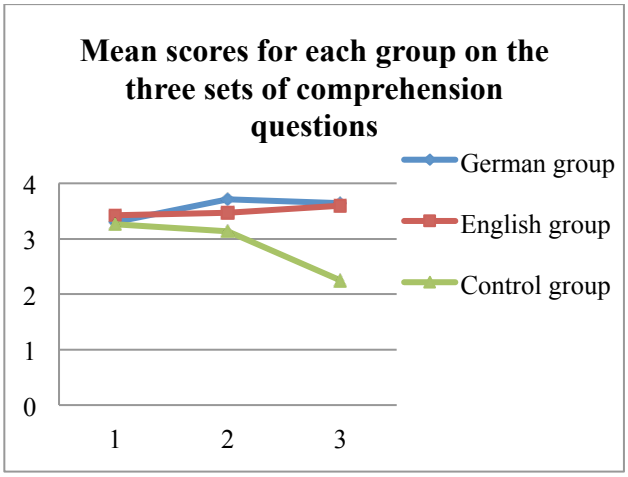

Figure 4.6: Mean Scores of all groups for all comprehension questions

set of questions	German group	English group	Control group
1	3.30	3.42	3.27
2	3.71	3.47	3.13
3	3.65	3.60	2.25

After analyzing the responses to the comprehension questions, the results did not show any differences between the types of glosses used with the experimental groups. The following section will concentrate on the results of the productive and receptive tests as well as on a comparison between the immediate and the delayed tests. The target words were divided into three grammatical categories (5 nouns, 5 adjectives and 5 verbs). Although the amount of words per category is too small to be able to make confident conclusions about the ability of students to learn some word types better than others, analyses of the results of each group according to the grammatical category of the target words is mentioned (and detailed in Appendix 10) in order to gain a comprehensive overview of students' performances on the receptive and productive tests. Quantitative and qualitative results of the analysis of the chat transcripts will be presented in a further chapter.

4.3 The immediate tests: productive and receptive

4.3.1 The productive test

The goal of a productive test is to see whether students can remember the spelling and the meaning of the target words presented throughout the three texts and the three sets of comprehension questions. This test not only gives insight into the ability of students to reproduce the words, but it also allowed a direct comparison of the effects of the different types of glosses concerning the retention of word forms. The productive test consisted of showing students an explanation of the target words in English in a format that none of the groups had seen during

the readings. The productive test was administered at the start of the fourth day of the study. As presented in the methodology section, the answers on the productive test were awarded one point for the correct answer and a half point for a word with a minor spelling mistake when the word was still recognizable. The gender of the word was not taken into account.

The significant results ($F(2,97)=5.67$, $p=.005$) presented in Figure 4.7 below show that the English experimental group performed significantly better than the control group (p=.007); the German experimental group also performed significantly better than the control group on this production test (p=.005). None of the groups had more or less exposure to the written forms of the target words than another. The only difference between the groups was the availability of pictorial cues and German explanation or English translation of the target words. The experimental groups outperformed the control group on this test, showing that both types of glosses were beneficial for students' production of word forms, showing a link between the exposure to glosses and the ability to produce a specific target word and connect it to its meaning.

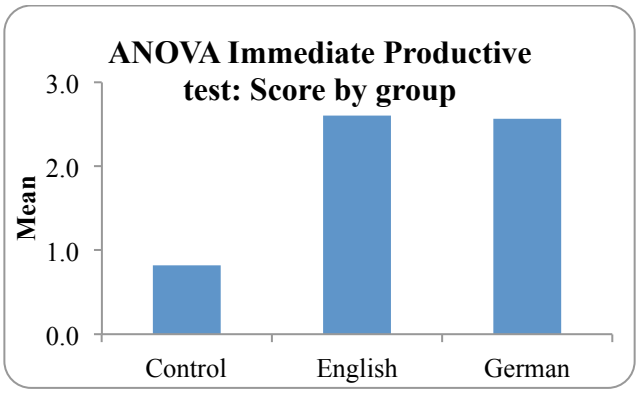

Figure 4.7: Results of the immediate productive test by group

Group	N	Mean	SD	Median
German	36	2.57	2.65	2.0
English	34	2.60	2.85	2.0
Control	30	.82	1.29	0.0

$F(2,97)=5.67$, $p=.005$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	1.79	**.007**	**.138**
Control and German	1.75	**.005**	**.146**
English and German	.033	.960	.000

There were no significant differences between the two experimental groups on this test, indicating that the various glosses did not have any different effects on students' performance on this test. While the use of glosses in a reading passage can therefore be considered helpful for students to remember word forms, the type of gloss (i.e. the language of the gloss in the present study) does not seem to make any significant differences for students' production of new word forms. However, an ANOVA (single factor) administered to find out if the word type made a difference for students' production of the new words and presented in Appendix 10 showed that significant differences occurred only between the experimental groups and the control group for the category of nouns on this test ($F(2.,97)=6.08$, $p=.003$).

4.3.2 The receptive test

After testing the ability of students to produce the target words, a receptive test was administered in order to measure their ability to recognize a specific target word based on a definition. To this end, students were presented with an

explanation of the concepts in English and asked to answer a test in a multiple-choice format. All options for the multiple-choice were the target words. To allow for an accurate measure, the three groups were administered the same test format, hence the glosses were not presented in this test since the control group did not have access to them at any time during the readings. In other words, students were asked to match the target words with an English explanation of their meaning. Once again, the correct answers were awarded one point. In order to eliminate any guesses that could skew the final results, the option "I don't know" was also given to students who did not remember or were unsure about the words that could match the English explanation. Similarly to the productive test, the experimental groups outperformed the control group on this test. The results on the receptive test (Figure 4.8) show that glosses did have a positive effect on students' retention of word meanings. The results between the control group and both experimental groups are statistically significant ($F(2,97)=10.92$, $p=.000$), hence reinforcing the role of glosses for students' retention of new vocabulary items. Since the target words were unknown to the students prior to the study and they were not used during the productive test, it is possible to conclude that the two types of glosses (L1+picture and L2+picture) used during the reading tasks and the comprehension questions to the readings helped students remember both the forms and the meanings of the new words. However, the different types of glosses did not seem to affect students' retention of new vocabulary (both with regard to the forms or the meanings of the words) in any way.

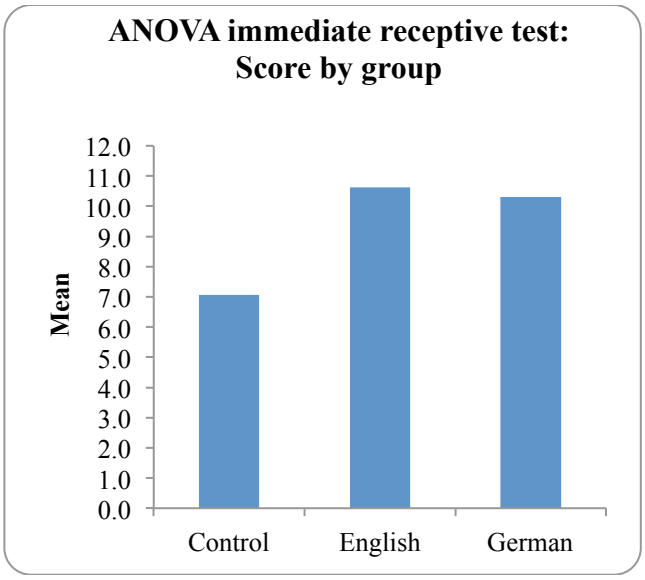

Figure 4.8: Results of the receptive test by group

Group	N	Mean	SD	Median
German	36	10.31	3.81	11.5
English	34	10.61	3.19	10.5
Control	30	7.07	2.85	7.0

$F(2,97)=10.92$, $p=.000$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	3.55	**.000**	**.260**
Control and German	3.24	**.001**	**.188**
English and German	.31	.712	.002

Once again, a one-way ANOVA was conducted in order to gain an overview of students' performances for the receptive test according to the grammatical categories of the target words (Appendix 10). The results indicate that the experimental groups outperformed the control group for the categories 'nouns' ($F(2,97)=11.45$, $p=.000$) and 'adjectives' ($F(2,97)=11.63$, $p=.000$).

After analyzing the immediate posttests, a few conclusions can be drawn. It seems that the experimental groups started outperforming the control group on the

third day of the study after reading the third text. The answers on the set of comprehension questions that day show that the experimental groups could better understand the contexts of the readings by answering content questions more accurately than the control group. While the analyses did not generate any significant differences on the first two tests of this study, a repeated exposure to the target words in context combined with two types of glosses showed that students were not only able to better understand the content of the third text, but also to better retain the target words regarding both form and meaning.

4.4 The delayed tests

The goal of the delayed tests was to measure the effects of the glosses in the readings with regard to the long-term retention of the target words. Once again, students were asked to complete the same – productive, receptive and chat – tests. Similarly to the immediate posttests, these delayed tests were conducted on the same day, four weeks after the immediate tests. Even though the target words were originally chosen to fit into the context of the chapter that students were studying at the time of the study (travel), the delayed tests were conducted a month later and students were studying another chapter of their book. This information is important, since students not only were not exposed to the target words before or after the study in their respective classes, they also worked on different topics throughout the time elapsed between the immediate and the delayed tests. In other words, they were not exposed to any thematic context in

which the target words might have been used or seen during the four weeks between the immediate and the delayed tests.

The following section presents the results from the delayed productive and the delayed receptive tests. In the same way that the results from the immediate tests were presented, this first analysis compares the results of the tests by groups. In addition, a further comparison is made between the performances of each group respectively between both tests. The quantitative results on the chat transcripts as well as the delayed chat will be presented thereafter.

4.4.1 The delayed productive test

The delayed productive test was conducted in order to measure the effects of the glosses on students' long-term retention of word forms. The immediate productive test showed that students participating in the study in the experimental groups performed significantly better than students from the control group on this test. The delayed productive test took place in the same format as the immediate productive test, presenting students with an explanation of the words in English, hence providing students with a meaning of the words in a format that they had been exposed to only through the immediate productive posttest. A single-factor ANOVA was conducted to compare the three groups on the delayed productive test; the results (Figure 4.9) indicate that even after a four-week period without exposure to the words ($F(2,95)=5.06$, $p=.008$), the students from the German experimental group performed significantly better on this test than the students from the control group ($p=.010$). The difference between the scores for the

English experimental group and the control group was statistically significant as well (p=.016).

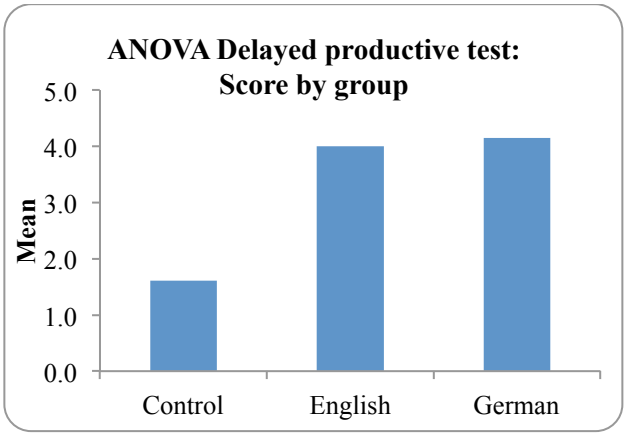

Figure 4.9: Results of the delayed productive test by group

Group	N	Mean	SD	Median
German	37	4.15	4.17	2.0
English	29	4.05	3.94	1.5
Control	32	1.61	2.43	.25

$F(2,95)=5.06$, $p=.008$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	2.39	**.016**	**.124**
Control and German	2.54	**.010**	**.120**
English and German	.15	.883	.000

Considering the grammatical categories of the target words, the results indicate that the German group outperformed the control group on the delayed productive test ($F(2,95)=4.93$, $p=.009$) for the amount of nouns accurately produced. There are no significant differences between the German and the English group or between the English and the control group for this particular

category. No significant differences were found for other grammatical categories between either groups (see Appendix 10).

These results therefore show the positive long-term effects of pictorial glosses combined with textual (L1 and L2) glosses for students' retention of word forms. The results of this test are also similar to the results of the immediate productive test regarding the comparison between the two experimental groups, since no significant differences were found between the results of these two groups on this test.

As shown with the analysis of the results from the comprehension questions, an analysis of students' progression can provide insightful information into the role of glosses for each individual group. Paired t-tests were therefore also conducted to compare the results of each group between the immediate and the delayed tests. None of these tests showed any significant results, showing that students did not perform significantly better or worse between the productive immediate and the productive delayed tests. This is an interesting indication of the positive role that glosses play for students' retention of vocabulary items, since both the immediate and the delayed tests showed similar results, where the experimental groups performed significantly better than the control group, whereas none of the groups showed any significantly different results between the two tests. It also shows that the experimental groups were able to retain the same level of knowledge in the four weeks elapsed between the productive tests. Figure 4.10 shows the progression of each group between the immediate production and the delayed production test:

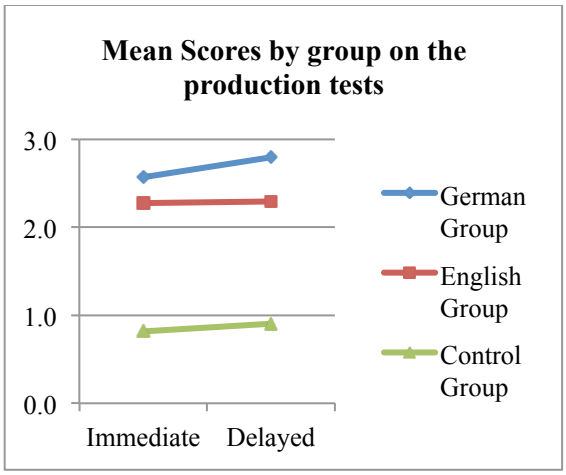

Figure 4.10: Progression of mean scores by group for the production tests

None of the groups show a difference of mean score between the immediate and the delayed tests, which explains the lack of significant results for the t-tests conducted for a within-group comparison.

4.4.2 The delayed receptive test

The immediate receptive test was designed to test students' ability to recognize word meanings after reading the texts with or without glosses. While the data gathered on the immediate receptive test produced significant results in comparing the experimental groups and the control group, the delayed receptive test gives insight about the students' retention of words meanings over an extended period of time. Both tests had the same format, but the delayed receptive test was conducted on the same day as the delayed productive test four weeks after the immediate tests. The format of this test was similar to the format chosen for the immediate receptive test; students were presented with a multiple-choice test giving them four English explanations of words to be matched with the target words. They could also use the fifth option "I don't know" if they did not

remember the meaning of the words. This fifth option was provided in order to eliminate any guesses that could skew the results. Figure 4.11 below shows the results achieved by each group on the delayed receptive test, considering that one point was given for each correct answer for the 15 target words.

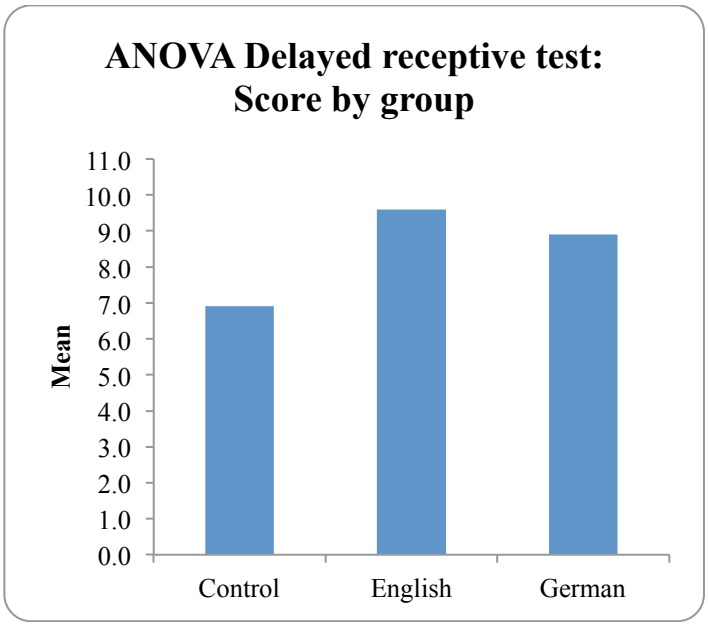

Figure 4.11: Results of the delayed receptive test by group

Group	N	Mean	SD	Median
German	38	8.90	3.76	9.0
English	30	9.60	3.60	9.0
Control	33	6.91	2.61	7.5

$F(2,98)=5.52$, $p=.005$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	2.69	**.003**	**.161**
Control and German	1.99	**.039**	**.086**
English and German	.71	.436	.009

The results are similar to those gathered on the immediate receptive test and the delayed productive test. Significant differences were found ($F(2,98)=5.52$,

p=.005) between the English experimental and the control groups (p=.003) and between the German experimental and the control groups (p=.039). These results show that even after a four week period without any exposure to the target words, both types of glosses helped students remember and recognize the meaning of the words.

An ANOVA was conducted on this test as well in order to discover if the word type had an influence on students' performances. The experimental groups outperformed the control group for the verb category ($F(2,98)=7.14$, $p=.001$), only the English group outperformed the control group for the category of adjectives ($F(2,98)=3.58$, $p=.027$) and there were no significant differences between either groups for the nouns, as presented in Appendix 10.

Even though the glosses seem to have positive effects for students' long-term retention of word meanings, no significant differences were found between the English and the German experimental groups on this test. A within-group comparison of the results on the immediate and the delayed receptive tests was conducted using the same procedures as for the productive tests. Once again, there were no significant differences between the results achieved by students in either group on these tests, hence showing neither positive nor negative progression, as shown in Figure 4.12 below.

In conclusion, the quantitative tests showed that glosses do have positive effects on students' comprehension, recognition and retention of target words. Even though the results on the comprehension questions were not significantly

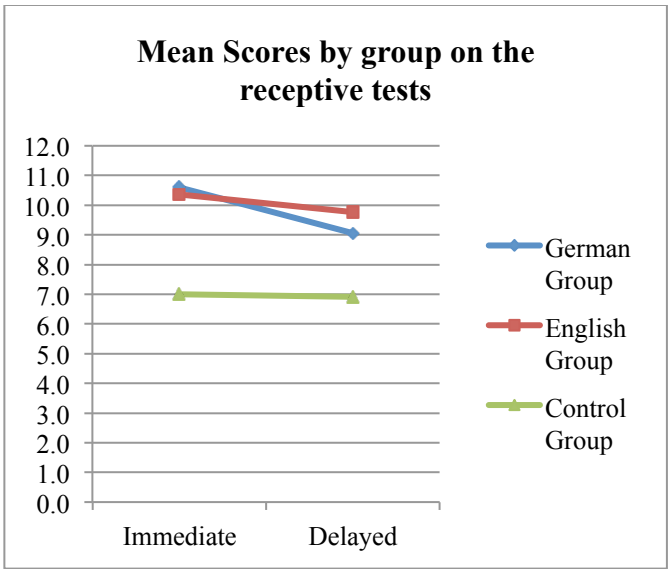

Figure 4.12: Progression of mean scores by group for the receptive tests

different for any of the groups on the first two days of the study, the within-group analysis shows that the control group performed significantly worse on the third day than on the first two days in answering the comprehension questions. With a lack of within-group difference between the three sets of questions for the experimental groups, it is not possible to conclude that the experimental groups outperformed the control group on the third set of comprehension questions. The lack of glosses in this case seems to have negative effects with regard to students' ability and motivation to focus on the task at hand, since the control group without any type of explanation of the target words started performing worse on the third day of the treatment.

The productive and the receptive tests showed similar results. On either test, the experimental groups seemed to be able to remember and recognize the target words significantly better than the control group. Since the delayed tests yielded similar results, it seems reasonable to assume that glosses have positive effects for

both productive and receptive knowledge of new vocabulary, as measured in this study; in addition, their effects are validated over a longer period of time through the delayed tests. Even though the data gathered for the experimental groups did not show any differences between the immediate and the delayed tests, the results still seem to indicate that the glosses are beneficial for students' retention and recognition of word forms and meanings.

Table 4.1 below summarizes the results obtained through the quantitative analyses presented above.

Tests	Quantitative Results
Pretest	• No significant results between any of the groups
Comprehension questions 1	• No significant results between any of the groups
Comprehension questions 2	• No significant results between any of the groups
Comprehension questions 3	• Both experimental groups performed significantly better than the control group • No significant differences between the experimental groups • Control group performs significantly worse than on the first and second sets of questions
Immediate productive test	• Both experimental groups performed significantly better than the control group. • No significant differences between the experimental groups
Immediate receptive test	• Both experimental groups performed significantly better than the control group. • No significant differences between the experimental groups
Delayed productive test	• Both experimental groups performed significantly better than the control group. • No significant differences between the experimental groups
Delayed receptive test	• Both experimental groups performed significantly better than the control group. • No significant differences between the experimental groups

Table 4.1: Overview of test results

The results of the quantitative analyses therefore show that the control group performed significantly worse on the tests starting on the third day of the study with the third set of comprehension questions. Nonetheless, there is a lack of significant differences between the experimental groups, showing that providing an English translation of the target words or giving students an explanation in German does not make a difference in their ability to remember the words on the immediate and delayed tests.

The following section will present the results of the questionnaires administered at the end of the study.

4.5 Questionnaires

The questionnaires were designed to receive some feedback from the students about the study. The questions dealt with students' behaviour with regard to the glosses as well as their general feelings towards the chat task, which is a type of activity that they had never done in German class before.

The first question dealing with the glosses presented in the reading passages asked students if they found the glosses helpful to understand the text. While 91% of the participants in the English group gave a positive answer (3% answered "no", 6% did not answer), 90% of participants in the German group found the glosses helpful (8% answered with "no" and 2% did not answer).

The second question dealt with students' focus while using the glosses. The students from the German experimental group indicated focusing mostly on both the picture and the explanation (45%), but a high number of participants from that

group also indicated concentrating on the picture only (37%). Only 16% of the participants focused only on the explanation provided in German. 2% indicated relying on the context of the text only (answer option "other" with an explanation).

As for the participants in the L1 group, 49% used both the pictures and the translations in English in order to understand the target words, whereas 29% used only the translation. The other 14% indicated only focusing on the pictures presented in the glosses.

Following these questions, students were given open-ended questions regarding their impression of the study, of the glosses and of the chat as a learning tool in general.

While the students participating in the English group did not mention having any difficulties with the glosses, 40% of the students from the L2 group indicated finding the pictures the least helpful tool. Most of these students commented on being confused by the pictures because they either did not find them precise enough to understand the words without the German explanation accompanying the picture, or did not understand the contextual relation between the explanation and the picture in the gloss itself or between the picture and the context of the reading. In addition, students from the German group might have encountered problems with the German explanation itself. It is possible that they had difficulties understanding the explanation provided to them to illustrate the picture, which makes the link between the picture and the German explanation confusing and difficult to achieve. They might also have tried to link the picture

with the context of the reading itself and were not able to find a semantic link between them. The English group, however, was able to rely on their L1 in order to identify the context of the pictures provided in the glosses and to understand the target words in context. Although some links might have been more difficult to make than others, especially for the adjectives, since they do not necessarily represent concrete items, the fact that the English translation was provided in the glosses seemed to help them understanding the semantic connections between the glosses and the target words.

The control group received a different questionnaire aiming at finding out the problems they encountered when reading a text with new vocabulary without any explanations. The first question asked students to rate the difficulty of the readings on a Likert scale from 1 (very difficult) to 7 (very easy). The majority (65%) of students from the control group rated the texts as rather difficult (indicating scale points 1 to 3). 22% of students found the texts' difficulty level to be medium to easy (scale from 4 to 6). None of the students indicated finding the readings "very easy" to read (7). The missing data (13%) come from students not answering the question.

Furthermore, the students all indicated missing explanations or outside help in order to understand the texts and their context. When asked about the type of explanations they would have found helpful, the following answers were given to them to choose from:

- picture that shows the meaning of a word (in-text)
- translation of words (in-text)
- translation of words (as a footnote)
- explanation of words in German (in-text)
- explanation of words in German (as a footnote)
- other

Most students (40%) indicated missing a translation in the footnote (alone or in combination with an explanation in German or a picture). Many students (37%) also suggested that a picture (in combination with an explanation in English or German) would have made the readings easier to understand. The in-text explanation of the words in German was the least popular option and was selected by only 3% of the students belonging to the control group.

The results presented in this chapter indicate that reading in glossed conditions seems to help students understand and learn new words, since the quantitative data showed that the experimental groups outperformed the control group on the immediate and delayed receptive and productive tests. In addition, the data offer a great amount of communicative strategies used by students that show that it was possible for them to learn the form as well as the contextualized meaning of target words.

The following chapter is concerned with the results from the chat data. The first part of the next chapter will present results from a quantitative analysis of the chat transcripts, which allow for measuring the amount of target words that students were able to use in context on both the immediate and the delayed chat tasks. The last section will be concerned with the qualitative analysis of the chat transcripts.

5. CHAT TRANSCRIPTS

5.1 Perspectives from quantitative data

The chat task was the last test of this study and it was designed to have students use the target words in a contextualized manner. As such, the chat task constitutes the main test of this study in that it shows how students could use the knowledge that they acquired through exposure to the target words in the readings and the comprehension questions. The chat task was a contextualized task for which students were given the target words, but did not have access to the glosses or any explanation of the words in any language. Since this test was not designed to yield results on students' ability to remember the form of the target words, but rather their context of use, it was important to provide them with a list of the target words to use during the task.

The content of the task was to perform a role-play that was set in a similar context as the texts that students read during the treatment phase of the study. Each student was assigned a role and was asked to write a dialogue with a partner using as many of the target words as they could.

It was expected from the role-play task that students could not use all the target words in the context of their interaction. Rather, the role-play was designed for students to use the target words as accurately as possible in the most appropriate context. For this reason, students did have the option of not using every target word, since it is likely that some of the words would not fit into the context they chose for their role-play.

Using eclass to complete the chat allowed students to sit apart in the classroom and to discuss any issue with the vocabulary or the completion of the task online. This tool was therefore helpful in giving insight into students' difficulties and their planning of the role-play.

Since the analysis of the chat transcripts concentrates on the ability of students to use the target words in context, quantitative data were extracted from the transcripts in order to give a first overview of students' use of the target words in their role-play.

Each occurrence of each target word was counted to gain an overview of the frequency with which the words were used. These occurrences were further looked at with regard to their use in context. For each word used in the proper context, one point was awarded.

These data were only looked at as an indication of patterns between the groups. It would not be appropriate to look at the chat transcripts only with quantitative methods. Since the goal of this exercise was the use of the words in context, a qualitative analysis of the transcripts was conducted in order to yield further information and results. However, the results generated through this first quantitative analysis provide first insight into the effects of the different glosses on the students' ability to use the target words in context. It is, of course, sometimes difficult to quantify use in context, since some sentences are short or the interlocutor changes the topic after the first occurrence of the word. These difficulties in assessing the use of the target words in the "right" context mean that quantitative data on the chat transcripts cannot lead to definitive conclusions

without considering the qualitative results. With every occurrence of a target word in the immediate chat transcript, the context of use was considered. If the words were used in an unclear context (e.g. the chat partner did not take up the situation to pursue the conversation or the sentence in which the word was used was too short to make up an identifiable context) or if the words were used in the wrong context (e.g. the sentence did not make sense in the particular context of use), no point was given to the use of that word. In other words, the quantification of the use of target words in context needs to be looked at with caution, since only instances that were evidently contextualized were assigned one point, whereas other instances were not considered for the quantitative analysis.

A nonparametric Jonckheere Terpstra test comparing the medians of each group for the number of target words used in context in the immediate chat shows significant differences between the three groups (p=.037), which gives important results regarding the role of the glosses in vocabulary learning during the reading tasks. The pairwise comparison of groups shows that the English group performed significantly better than the control group (p=.000) with regard to the amount of target words used in context. In addition, the German group also performed significantly better than the control group (p=.020) on the same test. However, the results remain consistent with the findings from the posttests presented above, since there were no significant differences between the experimental groups. Table 5.1 shows how many target words each group used during their immediate chat task and how many of these words were considered accurately

contextualized. In addition, Figure 5.1 shows the distribution of the use of each target word in context by group.

	Immediate chat		
	N of target words used	N of target words used in context	%
German group (N=31)	94	83	88%
English group (N=34)	156	135	87%
Control group (N=31)	76	45	59%

Table 5.1: Immediate chat results: % of target words used in context

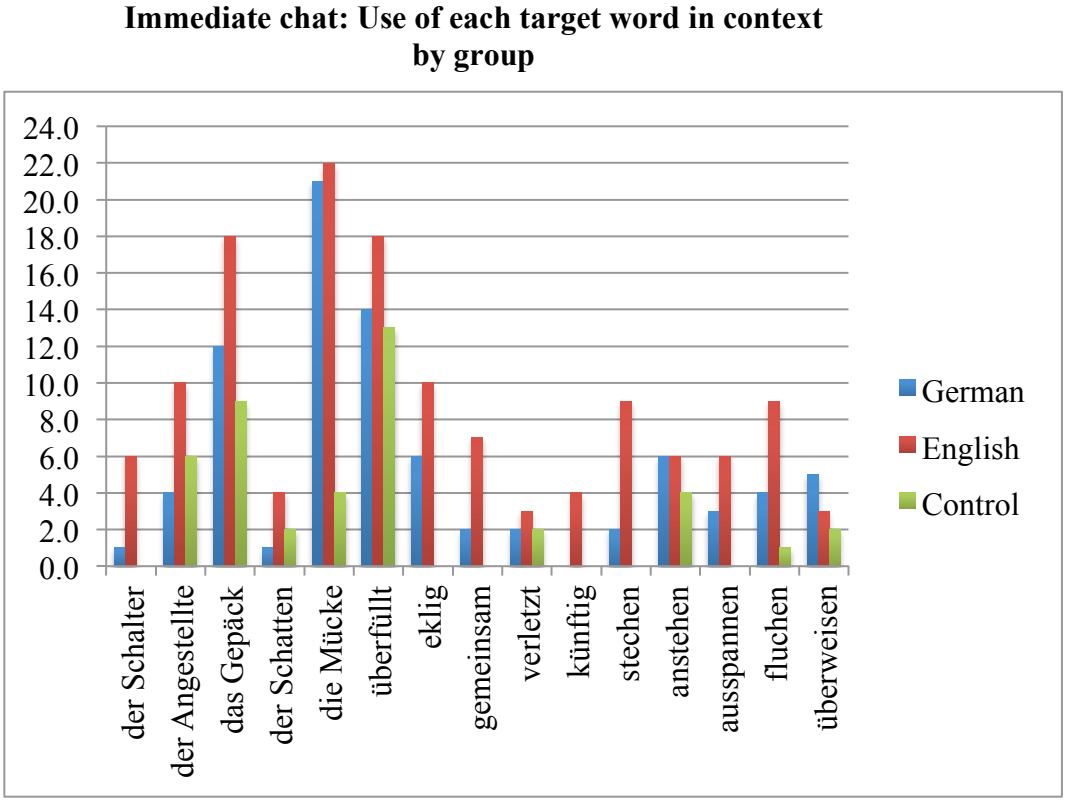

Figure 5.1: Results of the use of each target word in context in the immediate chat by group

Group	N	Mean	Median
German	31	2.68	3.0
English	34	3.97	4.0
Control	31	1.45	1.0

These results described in Figure 5.1 therefore indicate that using glosses in a reading task in order to learn vocabulary seems to have a positive effect towards the immediate use of these words in a contextualized manner. Students who had access to glosses during the readings and during the comprehension questions on the first three days of the study were able to use significantly more words in an accurate context on the fourth day of the study. It is interesting to point out that none of the quantitative tests have indicated any significant differences between the two experimental groups so far. Whereas glossed reading conditions seem to lead to significantly better results on retention, production, and use of vocabulary in context, it seems that the language used in the glosses does not produce any significant effect for students' performance on these criteria.

The analysis conducted on the delayed chat aimed at comparing the results of the three groups, trying to find out whether the glosses had any positive effects on students' long-term memory of word contexts and whether the differences between the two experimental groups persist on the delayed test (Table 5.2 and Figure 5.2). The tests reveal that no significant differences were found on the delayed chat task with regard to the use of the target words in context, suggesting that the positive effects observed for the use of glosses on the immediate test disappear over time.

	Delayed chat		
	N of target words used	N of target words used in context	%
German group (N=20)	63	47	75%
English group (N=30)	123	104	85%
Control group (N=34)	105	71	68%

Table 5.2: Delayed chat results: % of target words used in context

Delayed chat: Use of each target word in context by group

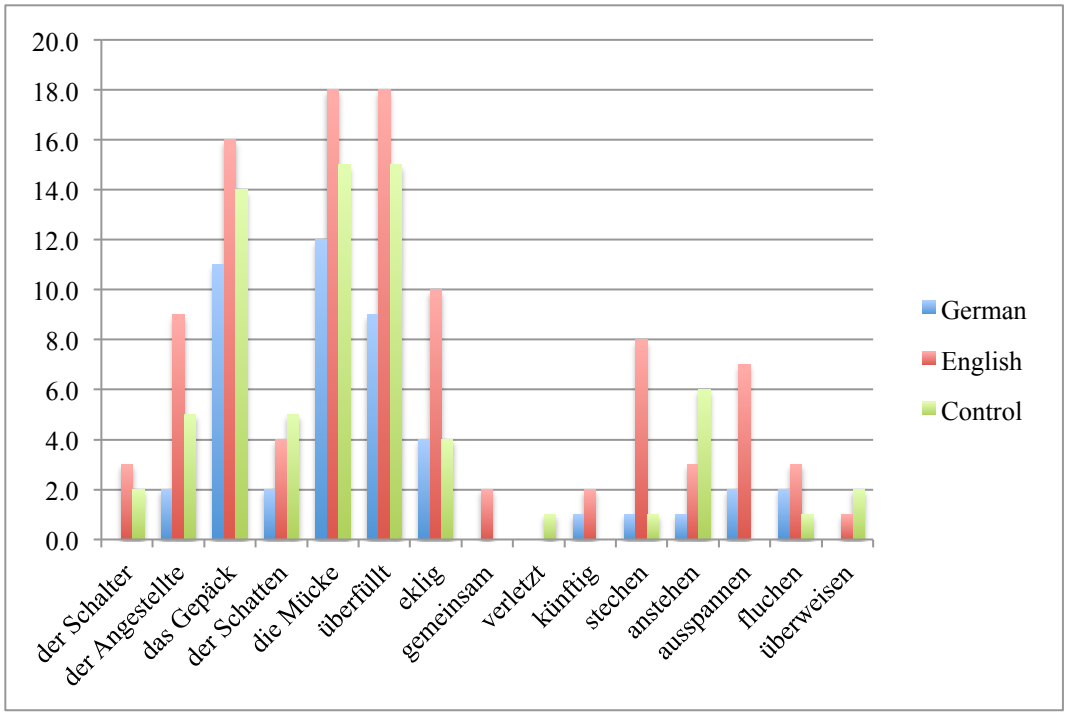

Figure 5.2: Results of the use of target words in context in the delayed chat by group

Group	N	Mean	Median
German	20	2.35	2.0
English	30	3.47	3.0
Control	34	2.08	2.0

A within-group median comparison with paired samples t-tests was conducted in order to see if any of the groups showed significant differences between the immediate and the delayed chat tasks. The comparison made between the use of target words in a contextualized manner between the immediate and the

delayed tests for each group separately showed significant differences, as presented in Figure 5.3 and 5.4 below. Both within-group comparisons for the experimental groups show that students reading with glossed conditions performed significantly worse on the delayed chat for the use of target words in context.

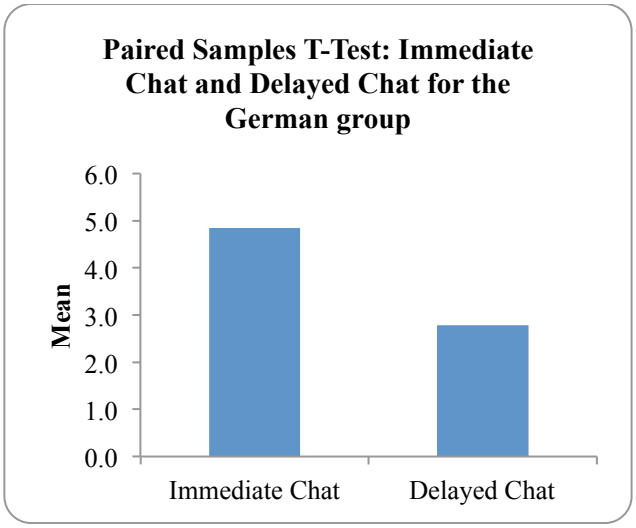

Figure 5.3: Paired samples t-test of the use of target words in context between the immediate and the delayed chat for the German group

Test German group	N	Mean	SD	Median
Immediate Chat	32	4.84	3.95	5.0
Delayed Chat	19	2.79	2.23	2.0

$t(50)=4.78$, $p=.000$

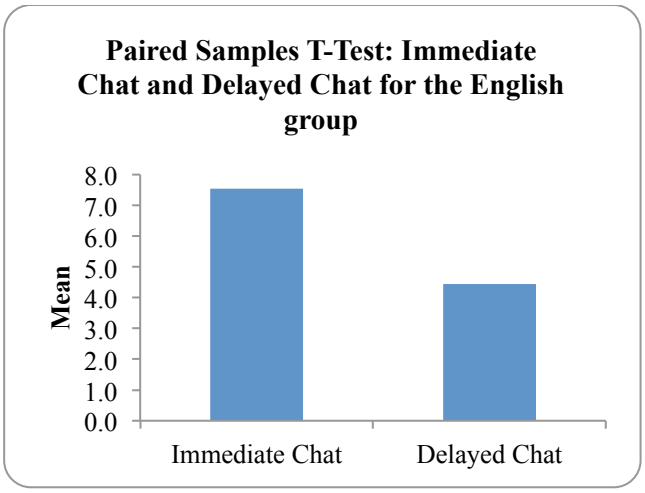

Figure 5.4: Paired samples t-test of the use of target words in context between the immediate and the delayed chat for the English group

Test English group	N	Mean	SD	Median
Immediate Chat	34	7.53	4.98	8.0
Delayed Chat	30	4.43	2.74	4.5

$t(63)=6.36$, $p=.000$

However, the results from the control group did not show any significant differences ($t(64)=2.08$, $p=.138$) as represented in Figure 5.5.

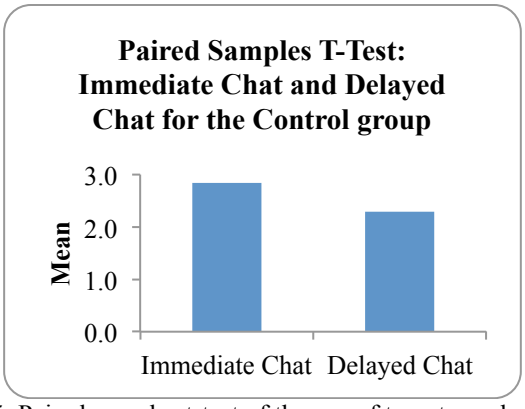

Figure 5.5: Paired samples t-test of the use of target words in context between the immediate and the delayed chat for the control group

Test Control group	N	Mean	SD	Median
Immediate Chat	31	2.84	2.66	2.0
Delayed Chat	34	2.29	1.98	2.0

$t(64)=2.08$, $p=.138$

The within-group analysis therefore explains why no significant differences were found between the groups on the delayed chat, whereas the immediate chat showed that students who read with glossed conditions were able to perform significantly better than the control group. Since the experimental groups performed significantly worse on the delayed chats, the differences found for the immediate chat with the control group disappear, indicating that the experimental groups were not able to keep their knowledge over the four weeks allotted between the tests.

As stated above, these results are not meant to be the only analysis of the chat transcripts, but are seen rather as an indication of the role that glosses play on students' performance during these tasks. The other aspect to be considered with these results is the role that interaction plays in influencing students' performances on the tasks. The next section of this chapter offers a different perspective on the chat transcripts. Qualitative assessments of the students' exchanges on both the immediate and the delayed chats are looked at and analyzed according to various perspectives.

5.2 Communication Strategies

This section focuses on finding out whether the students were able to use the target words they were exposed to during the readings in an accurate context. The excerpts presented in this section were taken from both the immediate and the delayed chat transcripts from all three groups. They are presented according to patterns that can be found in all transcripts, not by a particular chat task or a

particular group. The qualitative analysis of target word use in context is not bound to the specific groups, but rather to the communication strategies used by the students. A representation of the differences of strategy use between the groups will be offered at a later time in the chapter.

In addition, it is important to consider the context of communication for the analysis at hand. Chats offer specific turn-taking patterns; chat communication is a synchronous communication form similar to face-to-face interaction; however, it lacks the nonverbal elements of face-to-face communication. Some excerpts presented in this section will show strategies used by students to overcome the lack of non-verbal communication ability. Furthermore, turns cannot be interrupted in a chat situation, since the student writing can always finish his turn before submitting it and therefore sharing it with his interaction partner. A reaction to a turn can only occur once the chat partner can read it. For this reason, some reactions can happen within a few turns, as opposed to oral face-to-face interaction that is characterized by direct reactions and can feature turn interruptions. One last important element to consider in the transcripts presented below is that eclass does not show chat participants if and when their partner is writing. Most chat interfaces use this feature in order to make the communication situation more similar to face-to-face interaction. Some reactions and turn-taking patterns are therefore influenced by the fact that students did not know that their partner was writing or reacting to their previous utterance at the same time.

Some instances of target word use show that students did understand the context of the new words, but that they were not able to use them in a

grammatically accurate way. The following excerpt shows that the readings gave participants a context of use without providing enough syntactic information for the students to be able to recognize the grammatical categories.

EXCERPT 1 (CONTROL, IMMEDIATE CHAT)
OLIVER: Ja? Was **Gapaeckst** du?
*Really? What do you **luggage**?*
OLIVER: Fuer der Reise.
For the trip
JAYME: ich **Gepackt** meine kamera, der Laptop, und kleidung
*I **luggage** my camera, the laptop, and clothes*

This passage comes from the transcripts gathered with the control group on the immediate chat task. These students were not exposed to any form of gloss; they were only given the texts to read without any explanations of the target words. The except shows that the students have both understood the context of the word '*Gepäck*' as connected to travel and packing, but they have not recognized that this specific target word is a noun and not a verb. Whereas this affects the accurate syntactic use of the word, it seems that these students could elicit a context of use for this specific target word.

Nonetheless, knowing the meaning of a word does not mean that one is able to use it in an appropriate context. The following excerpt shows that a student can use one of the target words in the right grammatical category as well as be able to provide an accurate translation of the word without being able to construct an appropriate context around this particular target word.

EXCERPT 2 (CONTROL, DELAYED CHAT)
BECKY: In Deutschland, hast du einen **Angestellter** oder eine **Angestellterin** kennengelernt?

*In Germany, did you get to know an **employee** [male] or an **employee** [female]?*

JAYME: frack....was ist **'Angestellter'**? (I cant remember most of this vocab)

BECKY: Staff member

JAYME: danke....Umm, Nein.
Thank you…. Umm, no.

Becky asks Jayme whether she was acquainted with an "employee" in Germany, without any context of specific work places. Instead of referring to "people" or "Germans", Becky chooses to use the target word for "employee", even though the verb that she uses in her sentence does not correspond to the semantic field of this particular target word. She knows that the word '*Angestellter*' refers to a person and she also tries to incorporate a grammatical alteration with the inaccurate feminine form of the word ('*Angestellterin*' as opposed to '*Angestellte*'). She also provides a correct translation of the word to her chat partner in order to be able to continue the conversation and obtain an answer to her question. However, her sentence shows that in spite of knowing the accurate translation of the word, she cannot incorporate the word into a semantically accurate sentence. One could argue that it is due to a lack of understanding of the phrase '*kennen lernen*' – to become acquainted with; however, this phrase is very common in first-year German books and students are introduced to it at the beginning of their German studies. Considering the proficiency level of the students participating in this study and the previous exposure to the phrase '*kennen lernen*' in the book used in their classes, one can conclude that the semantic gap in Becky's sentence occurs because of the wrong

contextual use of the word '*Angestellter*' rather than the inaccurate use of '*kennen lernen*'.

This excerpt shows why it is critical to analyze the co-text of the conversation in order to recognize whether students are able to use the target words in the appropriate context. At their level of proficiency, however, students are not always able to construct a complex context or to build a long sentence that would allow for a more accurate analysis of the context at hand. It is through the reactions of their chat partner or through the students' own comments on their sentences that a context can be recognized more accurately. In order to analyze students' use of the target words in context, their use of various problem-solving communication strategies was examined. Communication strategies are used by students in order to overcome or avoid a communication breakdown and can occur in various ways, such as negotiation of meaning, translation, repairs etc. The way that students react to a previous utterance containing one of the target words can give important information about their ability to understand and construct a context around these new words as well as the problems they encounter understanding their partner's utterances. It will be shown later in this chapter that comprehension issues can result from students using lexical items that their partner does not understand. In many instances, the problem at hand is not the target word itself; it is the grammatical construction or the semantic context of another word that causes comprehension problems.

In a situation in which students are asked to build a role-play scenario, it is expected to find instances of negotiation between the participants of the role-play,

either with regard to the story line or the language used in the role-play. Since the students participating in this study were conducting their role-play online in a chat room and could not interact verbally, every off-topic discussion happened through the chat platform and could be recorded. These discussions can help us analyze how students were able to use the target words in their role-play as well as see the reactions of their chat partners when target words were used.

An interesting framework for analyzing learner language in computer-mediated communication is to consider the data from an interactionist perspective. It aims at observing interactional patterns and their effect in raising "attention to and noticing […] linguistic forms" (Smith, 2005, p. 36). To this end, several particular forms of communication can be observed and analyzed in order to gain more insight into the role of interaction for students' learning.

This following section deals with various communication strategies, how students construct their context and show their knowledge of the new words, and which language they choose to use. The excerpts shown and discussed in this section are drawn from both the immediate and the delayed chats. The group (English, German or Control) and the chat sequence (immediate or delayed) of each excerpt are indicated before each passage. In addition, the codes used for each student participating in the study are replaced by random names in order to facilitate the discussion of the observations made about these chat passages.

In each excerpt, the target words are bolded in order to make the interaction around the use of these words easier to follow. An English translation of each sentence is also provided after each turn.

This part of the chapter will show various communication strategies used by students in the course of their role-play according to the categories laid out in chapter 3. As a reminder of the CS found in the present data, the summary tables showing direct, interactional and contextualizing strategies are laid out again before each section, with the amount of strategies found in the data per group.

5.2.1 Direct strategies

Direct strategies are used to overcome communication problems by one of the participants. If one of the chat partners encounters problems in expressing a specific idea or word, they can use direct strategies that will allow them to continue the conversation. Direct strategies are characterized by the fact that the participant having the communication problem does not use interaction to fix the communication breakdown, but rather tries to find a solution through their own speech.

In the following, the direct strategies identified in the chat transcripts are summarized in Table 5.3 and further discussed using examples from the data.

a) Message replacement

Replacing a message occurs when one of the interlocutors does not feel comfortable or capable to carry a conversation on a specific topic. They then choose to change the topic, as the following excerpt shows:

Direct strategies		German immediate	German delayed	Total German	English immediate	English delayed	Total English	Control immediate	Control delayed	Total control	Total
Message replacement	Substituting the original message with a new one because of not feeling capable of executing it	1		**1**	1		**1**		1	**1**	**3**
Self-initiated self-repair	Making self-initiated corrections in English in one's own speech	1	1	**2**	2		**2**	2		**2**	**6**
Guessing	Guessing is similar to a confirmation request but the latter implies a greater degree of certainty regarding the key word, whereas guessing involves a real indecision		5	**5**	1	1	**2**	2	1	**3**	**10**
Rephrase	Rephrasing the trigger			**0**	1	1	**2**	1		**1**	**3**
Commenting on insecurity	Explicitly stating that one is not sure about the correctness of their message		1	**1**	8	3	**11**	5	4	**9**	**21**
Providing translation - unasked	Providing the interlocutor with the translation of a L2 word indication that the interlocutor needs help	1		**1**	4	1	**5**	6	3	**9**	**15**
Total		3	7	**10**	17	6	**23**	16	9	**25**	**58**

Table 5.3: Use of direct strategies by group

EXCERPT 3: (L2, IMMEDIATE CHAT)
STEPHEN: Dann ich musste mein Geld **ueberweisen** weil ich kein Banknoten hatte
*Then I had to **transfer** money because I didn't have cash*
SHELBY: Hast du über das **geflucht**?
*Did you **swear** about that?*
STEPHEN: Ich verstande nicht...
I don't understand...
STEPHEN: Ins hotel, habe ich **ausgespannen**
*In the hotel, I **relaxed***

Stephen starts the conversation explaining the problem he encountered while on holidays, using the target word '*überweisen*', leading to Shelby's question whether he was bothered by the situation, giving her an opportunity to use the target word "fluchen". Stephen however does not understand the target word used by Shelby and therefore the question and indicates with the German sentence '*Ich verstande nicht'* (I don't understand) followed by the signs "..." that he does not understand and therefore cannot answer the question. Instead of giving the next turn to his chat partner, he then decides to move on to another topic stating that he could relax in the hotel, hence using another target word, '*ausspannen*'. By using the next turn to utter another idea, Stephen chooses to change the topic of the conversation with words he feels more familiar with and to leave Shelby's question unanswered.

b) Self-initiated self-repair

A self-repair will occur if one of the conversation partners realizes that they have made a mistake (e.g. word choice, grammar, etc.) in a previous statement.

EXCERPT 4: (CONTROL, IMMEDIATE CHAT)

ALLAN: nein, ich gehe mit meinen Familie. kalter wetter? du nicht gern **gemeinsam**?
*No, I went with my family. Cold weather? Do you not like **together?***

ALLAN: I think it means mosquito
[…]

ALLAN: by **gemeinsam** i ment **Die mueke**
*By '**together**' I meant '**mosquitos**'*

ALLAN: **muecke***

WILLIAM: ja, ich nicht gern die **mueke**. und ich nicht gern lange **anstehen**
*Yes, I don't like **mosquitos**. And I don't like **waiting in line** too long*

Allan is using the word '*gemeinsam*' and translates it for his partner, while using an expression of doubt ("I think"). After a few turns focusing on another aspect of the conversation, Allan returns to this topic and replaces the target word used in his original utterance with '*Mücke*' in order to match the intended meaning "mosquito". At this point, William then continues the conversation with the corrected target word, without commenting on the new meaning offered by his partner. This is therefore an example of a direct strategy since there is no interaction between the chat partners to find the correct word to use in context. William's lack of reaction to the incorrect use of the first target word could be interpreted as lack of understanding of that particular word. As soon as Allan provides the correct word, William reacts to the statement uttered a few turns before.

c) Guessing

Another direct strategy found in these data is called "guessing", which can be quite similar to the CS presented above. However, while a chat participant who feigns understanding the meaning of a word or a sentence will continue the conversation without addressing the communication problem, "guessing" occurs when an interlocutor specifically tries to allocate a meaning to a specific word. The following excerpt shows such an occurrence from the data gathered on the delayed chat with the German group:

EXCERPT 5: (L2, DELAYED CHAT)
MELANIE: **angestellte**?
employees?
MELANIE: ist das ein queue line?
Is that a queue line?
HANNAH: lol :) nein, ich denke **anstehen** (?)
*lol :) no, I think that's **anstehen** (?)*

This excerpt shows another type of out-of-context negotiation. The communication breakdown situation in this instance occurs from Melanie's lack of knowledge of the target words to finish the sentence that she started. She shows that she wants to use one of the target words, since she remembers that one of them had the meaning of "queue line" – which is also the exact translation used in the previous, quantitative tests of the study – but she is not able to remember which word is accurate for her sentence. Instead of asking her partner directly for the right target word to use in the context at hand, she decides to guess and connect one of the target words to the meaning intended to finish the sentence. This type of interaction shows that students whose attention has been drawn to specific lexical items might remember one aspect of the words they have been

exposed to (e.g. meaning), but not necessarily the word as a whole and be able to connect the meaning to the accurate form of the word. This situation also shows that Hannah was able to remember both meaning and form of this specific word and solve the problem in order to carry on the conversation, since she provides the right target word for her chat partner.

d) Rephrase

EXCERPT 6: (L1, IMMEDIATE CHAT)
BEN: Viele **Mücke**?
Lots of mosquito?
BEN: ***Mücken**, rather
****mosquitos, rather***
LISA: Ich veiss nicht was **Muecke** ist.
I don't know what mosquito is
BEN: **Mücke** isst blud
Mosquito eats blood

This short passage illustrates how participants can use their L2 to explain a concept to their chat partner without using their L1. Ben and Lisa are participants from the L1 experimental group, therefore they saw the target words linked to their English translation and to a pictorial clue. Lisa takes on the role of the student coming back from holidays and explaining her experiences to a friend. Ben is the friend who is asking questions about the holidays. He chooses to ask Lisa if she saw many mosquitoes during her holiday, which gives him the possibility of using one of the target words, '*Mücke*'. Unfortunately, Lisa does not understand Ben's question and formulates a German sentence to explain exactly where the comprehension problem originated. She states that she does not know

what the target word '*Mücke*' means. Ben does not translate the word, but rather offers an explanation of the concept in German, which is similar to the German explanation that the other experimental group (L2) was exposed to.

Rephrasing concepts is an important feature found in the transcripts of this study, which coincides with the type of task that students were asked to perform. Passages in which students use this strategy show their understanding of the meaning of the target words and their accurate use in context.

e) Commenting on insecurity

EXCERPT 7: (L1, IMMEDIATE CHAT)

DAN: Gut! Kostet das Zimmer viel Geld?
Good! Was the room expensive?

MARK: Ja, aber die **Angestellte** (I think that was employees?) war sehr angenehm (pleasant)
*Yes, but the **employee** [...] was very pleasant [...]*

MARK: Und das Zimmer war sehr huepsch
And the room was very pretty

This excerpt shows how students can make their chat partner aware that they are unsure of the words they are using without breaking the communication flow completely, which differentiates this strategy from others such as 'guessing' or 'direct appeal for help'. Mark describes his vacation hotel and wants to convey the impression that he spent pleasant holidays. Similarly to excerpt 5 shown above, Mark seems to know that he is able to use one of the target words in order to talk about the employees of the hotel, but he does not seem to be certain of his word choice. While in excerpt 5, Melanie asked directly about the word she needed to complete her sentence, here Mark uses the word in a sentence and adds a

comment in brackets to show to his partner that he might not have chosen the accurate word for the intended meaning. This type of CS is found throughout the data, especially among the students from the L1 group. Comments on insecurity with regard to the semantic or syntactic use of specific words occur in German and in English.

Insecurity can be addressed through different types of CS, such as the next type presented in this chapter. Providing the translation of what was said to one's partner can be seen as a sign of insecurity or as a sign that one assumes that their partner does not know a word or a form.

f) Providing translation – unasked

EXCERPT 8: (CONTROL, DELAYED CHAT)

KELLY: Hast du im Restaurant gegessen und viel Beer getrunken?
Did you eat in the restaurant and drink a lot of beer?

NICOLE: Im banff viele viele **Mucke** war auf mir. Ya wir essen im der Keg und haben Grosse Bier
*In Banff, a lot of **mosquitos** were on me, and yes, we ate at The Keg and had big beers*

KELLY: Interresant. Hast du im Berg gewandert?
Interesting. Did you go hiking in the mountains?

KELLY: Was deine Urlaub **uberfullt** jeden Tag? (packed with people; busy)
*Was your holiday **busy** every day? ([translation])*

NICOLE: Es war sehr kalt, ya wir gewandert im Berg, wir gegehen aus der See
It was very cold, yes we went hiking in the mountains, we went to a lake.

This excerpt shows an example of a participant using one of the target words and providing a translation at the same time. Throughout the exchange between Kelly and Nicole, the translated word '*überfüllt*' is used only twice. The excerpt shows the first use of the word, and Nicole repeats it at a later time using it with

the meaning provided by Kelly. Kelly is asking her partner about her vacation and whether she saw many people and had many things to do. It is difficult to interpret exactly why she feels the need to translate this specific word, since she has not used translations in the previous part of the dialogue without Nicole asking for help. However, Nicole asks for the translation of the word "mosquito" before this exchange. As mentioned above, one explanation could be that Kelly doubts that her partner knows the meaning of further target words after being asked for the translation of "mosquito". As Table 5.3 shows, this CS is used mostly by the control group, which seems to show that it is in fact used in order to avoid eventual communication breakdowns or in order to get confirmation from one's partner that a word is used in the right context. Instead of using the L2 in order to explain a specific meaning or context, students from the control group seem to prefer using translations in order to be able to carry on their interaction with fewer communication problems.

In addition to the direct strategies found in the dataset and presented above, one specific indirect strategy ('feigning understanding') was used by students throughout their interactions, as presented below.

5.2.2 Indirect strategies

As mentioned in chapter 3, indirect strategies are characterized by the fact that they do not carry meaning for the interaction at hand. Rather, they are meant to allow for a continuation of the conversation without addressing the problem

trigger. Students participating in the present study used this strategy repeatedly, as presented in Table 5.4.

	German group	English group	Control group	Total
Immediate chat task	3	2	0	5
Delayed chat task	1	0	6	7
Total	4	2	6	12

Table 5.4: Use of Indirect strategies by group

a) Feigning understanding

By ignoring a problem trigger and feigning to understand a message, a chat partner tries to carry on a conversation without having to interrupt the flow of the interaction with questions or requests for explanations or translations. The following excerpt shows how such a strategy can become evident. It is, however, always possible that interlocutors pretend to understand their partner's utterance, but that their non-understanding of the topic at hand is not apparent throughout the conversation.

EXCERPT 9: (L2, IMMEDIATE CHAT)

DREW: Nein. Ich mit meine Freund gebleibt. Er hat groß (apartment)
No. I stayed with my friend. He has a big apartment.

JOHN: Sind dein Zimmer **eklig** oder ausgeziechnet?
*Was your room **disgusting** or excellent?*

JOHN: Was tun sie **gemeinsam**?
*What did you do **together**?*

DREW: Dein Zimmer (danke) war sehr ausgezeichnet!
'Your' room (thanks) was very excellent!

DREW: Für meine **gemeinsam** ich geschlafen.
*For my **together**, I slept.*

JOHN: das ist gut lol
that's good lol

In this conversation, Drew is the student who went on holidays and he explains to his chat partner that he accompanied a friend. John asks him what types of activities they did together, while using the target word '*gemeinsam*'. Drew does not seem to understand the meaning of this word but does not ask his partner for clarification, rather he tries to answer the question using the target word as well; the context of Drew's answer is unclear as he uses the word '*gemeinsam*' in an incorrect manner. A self-initiated repair situation would lead to either Drew correcting this mistake by making another sentence or by showing to his chat partner that he is unsure about the meaning of the target word. Further, John could initiate a repair situation in which he would ask his partner for clarification about the meaning of his sentence, which would lead to Drew recognizing his mistake and giving him an opportunity to revise his utterance. None of these scenarios apply here and John reacts by not addressing the mistake but rather with further questions about Drew's holiday, continuing the context of "sleep" that Drew started in the previous, inaccurate turn.

This excerpt shows a situation in which a repair could and should have occurred, as John was able to use the target word in the right context and shows through his reaction that he understands that Drew did not remember the meaning of that word. Rather, the gap between Drew's use of the word and the correct context of use is not subject to a reaction from John who chooses to continue the conversation. This passive reaction to 'let' the communication problem 'pass' (Firth, 1996), can be interpreted as an expectation that the information at hand will become clearer at a later time, or that it is unimportant for the continuation of the

conversation. This strategy is used in order to carry on a conversation by preventing metalinguistic discourse. Drew feigns understanding the meaning of the word used by his partner, which John acknowledges in the last turn shown in this excerpt. The conversation carries on later without taking up this target word again.

The experimental groups tend to use more interactional CS, which seems to show that exposure to the glosses helps students to use interaction and communicative settings to explain words as opposed to relying on translation only. In addition, students show more awareness to the context surrounding the target words by using interactional strategies as opposed to direct strategies. Several types of interactional strategies were found in the data and are presented in the next section of this chapter.

5.2.3 Interactional strategies

Contrasting with direct strategies, interactional strategies are characterized by the communicative effort of all chat participants to convey a meaning and carry on a conversation in spite of communication problems they may encounter. Interactional strategies are important for the context of this study because they show students' abilities to explain and work within a given context. Table 5.5 shows the various interactional strategies found in the dataset as well as their distribution per group.

Interactional strategies		German immediate	German delayed	Total German	English immediate	English delayed	Total English	Control immediate	Control delayed	Total Control	Total
Other repair	Correcting something in the interlocutor's speech			**0**	1	1	**2**			**0**	**2**
Other-initiated self-repair	Making self-initiated corrections in German in one's own speech			**0**	1		**1**			**0**	**1**
Asking for clarification	Asking one's interlocutor about the meaning of a word to confirm understanding	2	1	**3**	3	4	**7**	8	2	**10**	**20**
Direct appeal for help	Turning to the interlocutor for assistance by asking an explicit question (in the L2) concerning a gap in one's own L2 knowledge	1		**1**	1	4	**5**		1	**1**	**7**
Transfer of knowledge from interlocutor's speech	Using a TW in context after the interlocutor has used it or provided an explanation for it	2	3	**5**	3	3	**6**	1	2	**3**	**14**

Interactional strategies		German immediate	German delayed	Total German	English immediate	English delayed	Total English	Control immediate	Control delayed	Total control	Total
Asking for confirmation	Requesting confirmation that one heard or understood something correctly	5		**5**	2	2	**4**		2	**2**	**11**
Expressing non-understanding	Expressing that one did not understand something properly either verbally or non-verbally	2		**2**	2	2	**4**	2		**2**	**8**
Translation	Providing the interlocutor with a translation of the L2 word as a response to a clarification request	2		**2**	1	6	**7**	3	6	**9**	**18**
Own accuracy check	Checking that what one said was correct by asking a concrete question or repeating a word with a question intonation (or a question mark)	1		**1**		2	**2**	1	4	**5**	**8**
Rephrase - confirmation of what was said	Confirming what the interlocutor has said or suggested	1	3	**4**			**0**			**0**	**4**
Total		16	7	**23**	14	24	**38**	15	17	**32**	**93**

Table 5.5: Use of interactional strategies by group

a) Other repair

EXCERPT 10: (L1, DELAYED CHAT)
AMBER: Ja, die **Mucke** ist mich viele **gestecken**.
*Yes, the **mosquitos** bit me a lot.*
SAM: ah, das ist **ausspannen**...
*ah, that is **relaxing**...*
KAREN: **auspannen** ist in der Sonne legen.
*„**Relax**“ means to lay in the sun.*
AMBER: Ich leibe in der Sonne legen.
I love laying in the sun.

This except shows an interesting reaction to the use of the target word '*ausspannen*' that seems to be taken out of context. Three students participated in this interaction, and Amber is the student sharing her previous experiences on holidays, stating that she had problems with the mosquitoes. Sam then seems to find an opportunity to use the target word '*ausspannen*' in order to offer an ironical reaction to the problem. Sam's use of this target word shows his understanding not only of the concept but also that it can be used in a comical way. Even though his answer is short and one could argue that he does not in fact understand the correct meaning of the word, the use of the punctuation "..." indicates that this comment is meant to be ironic. The third participant, however, does not seem to pick up on the irony of the comment and decides to 'repair' a comment that she considers incorrect by explaining the meaning of the word in the L2. Whether Amber understands this irony or not, she decides to continue the conversation by taking up the explanation provided by Karen. This excerpt shows that Karen understands the target word '*ausspannen*' in the sense of '*to lay in the sun*', but also illustrates the many possibilities that students have to use new

vocabulary. It is possible to oversee the irony of Sam's comment and conclude that Sam was not able to understand this target word from the readings. However, the use of punctuation helps us notice that Sam found an opportunity not only to use this specific target word, but also to bring humour into the conversation. The other repair made by Karen in this case is not wrong, since she provides an accurate explanation of the target word, but rather it shows that she did not understand the specific context in which Sam used the word, thus that she is not able to transfer her understanding of the word into other communicative situations.

b) Other-initiated self-repair

EXCERPT 11: (L1, IMMEDIATE CHAT)

JASON: Nein, aber ich wonhne aus Mexico am Sommer.
No, I live in Mexico during the summer
RYAN: Im Sommer! Sehr heiss!!
During the summer! very hot!!
RYAN: Findet der **Schalter**, aber du bist Kochen!
*Find the **counter**, or you'll burn!*
JASON: Ich will habe der **Schalter**...?
*I want to have the **counter**...?*
RYAN: Oh nein, der **Schatten**!
*Oh no, the **shade**!*
RYAN: Sorry!
JASON: Das ist gut.
That's ok.

In this example, Jason talks about his summer in Mexico and Ryan reacts by commenting on the weather in Mexico in the summer. He takes this opportunity to continue talking about the weather, which gives him a chance to use the target word for "the shade" ('*Schatten*'), but he does not use the correct target word.

Instead, he uses the target word '*Schalter*', which means "the counter". Jason answers using the same target word and indicates that he does not understand his partner's utterance by not finishing his sentence and using punctuation showing insecurity about the meaning of the previous turn ("…?") and drawing Ryan's attention to the problem in his utterance. In this turn, Jason therefore makes Ryan aware that there is a problem with his sentence, which interferes with Jason's ability to continue the conversation. In other words, Jason initiates a repair situation on a sentence uttered by Ryan in order for Ryan to notice and correct his mistake. Ryan uses his next turn to repair his own mistake and changes the target word that caused the problem.

In this repair situation, Jason chooses to keep the conversation in the L2 and to indicate that there is a problem with his partner's sentence that hinders comprehension. However, Jason chooses punctuation in order to make his partner aware of the problem rather than commenting directly on the problem. Ryan's reaction shows that he confused both words but that he is aware of the meaning of the word '*Schatten*'.

The next example of repair is quite different from the former in that the clarification request, although also performed in the L2 by using punctuation, is a more direct way to inquire about the communication problem at hand.

c) Asking for clarification

EXCERPT 12: (L2, IMMEDIATE CHAT)
KIM: Wir sein zu Meer Gegangen. Dort wir haben viele geschwimmen. Aber es war **uberfullt** dort....

*We went to the sea. We swam a lot. But it was **crowded** there*

MIKE: Das Meer was **ueberfuellt**?!
*The sea was **crowded**?!*

MIKE: Was habt ihr gesehen?
What did you see?

KIM: Ja. Vielleicht es war Reading week. Wir haben dolphins und whales gesieht.
Yes. It was perhaps Reading Week. We saw dolphins and whales.

MIKE: super
Awesome

MIKE: seid ihr ein Flugzeug gefaehrt?
Did you take a plane?

KIM: Nien, mit Auto. Ja, wir haben ins Hotel geblieben.
No, the car. We stayed at a hotel.

MIKE: Wie findet du das Hotel?
What did you think of the hotel?

MIKE: War es shoen?
Was it good?

MIKE: schoen*

MIKE: Und war dort viele **Muecke** an das Meer?
*Were there many **mosquitos** at the sea?*

KIM: Ja. Aber das hotel auch **uberfullt**. Wenn wir haben dort angekommen, war es viele Leute **angestehen**.
*Yes. But the hotel was also **crowded**. There were many people **in line** when we arrived.*

When she uses the target word '*überfüllt*' – crowded – for the first time, Kim says that the sea was *crowded*, leading to a reaction of surprise from Mike asking for clarification that it is in fact what she meant, reinforced by punctuation ("?!"). But Kim does not provide clarification after Mike's reaction, and Mike continues asking questions about the trip in order to carry on the conversation. Kim then finally finds an opportunity to use the target word '*überfüllt*' again in another context, hence reinforcing that she is aware of the meaning of the word. In addition, she shows that she knows how to use the word by adding that there were many people in line at check in.

In this situation, Mike asks for clarification to ensure that his partner has understood the word she is using and that she did not mean to use another word. Although Kim does not react directly to Mike's concern, she is able to show that she is aware of the meaning and the context of this specific target word. Unlike the next communication situation, in which one student directly expresses a lack of knowledge, a clarification request can therefore indicate comprehension for both participants.

d) Direct appeal for help

EXCERPT 13: (L1, IMMEDIATE CHAT)

DAN: Hast du viel Zeit fuer **ausspannen**?
*Did you have a lot of time to **relax**?*
DAN: ue for the umlaut hahaha..
MARK: I do not remember that one, uh oh!
DAN: no worries, it means to relax, i think
MARK: Okay. Ja wir hat Zeit fuer **ausspannen** aber die **Muecke** war sehr geaegert (which is to annoy)
*Okay. Yes, we have time to **relax** but the **mosquitos** were very annoying ([...])*

While asking his chat partner about his vacation, Dan inquires whether it was a relaxing holiday, hence using the target word '*ausspannen*'. Mark cannot answer the question, and decides to tell his partner directly that he is not able to provide an answer because he does not remember what this particular word means. Dan then answers by providing a translation and a hint of insecurity by using the addition "I think" at the end of his turn.

Mark answers taking up the word '*ausspannen*' in his utterance and continues with problems he encountered during his vacation, using the next target

word (‘*Mücke*’). In the same sentence, he also offers the translation of a non-target word (‘*geärgert*’).

There are, therefore, a few communication strategies happening within this short passage, in that Mark decides to directly translate words into English as opposed to explaining them to his partner, probably because Dan indicates insecurity in his answer. Both these strategies have been discussed above. Dan’s translation as an answer to a direct appeal for help from his partner is another interactive strategy that is discussed in the following part of this chapter.

This particular excerpt shows a situation in which one of the chat partners uses a word that is unknown to their partner, which leads to one of the participants indicating that he needs help understanding the sentence. This can happen through a direct question or, as in this case, by showing that an explanation is needed. The reaction to such an appeal for help can occur in the form of a translation (as in the present passage) or explanation in either language. Excerpt 16 also shows an example for appeal for help, combined with other CS.

e) Transfer of knowledge from interlocutor’s speech

This particular CS was already present in excerpt 13 in the conversation between Dan and Mark. In order to refer to this specific passage, it is repeated in the following:

EXCERPT 14: (L1, IMMEDIATE CHAT)

DAN: Hast du viel Zeit fuer **ausspannen**?
*Did you have a lot of time to **relax**?*
DAN: ue for the umlaut hahaha..
MARK: I do not remember that one, uh oh!

DAN: no worries, it means to relax, i think
MARK: Okay. Ja wir hat Zeit fuer **ausspannen** aber die **Muecke** war sehr geaegert (which is to annoy)
*Okay. Yes, we have time to **relax** bit the **mosquitos** were very annoyed ([...])*

This excerpt showed Mark's direct appeal for help and leads to Dan's direct translation of the target word '*ausspannen*'. Furthermore, Mark decides to continue the conversation by repeating the target word that created the communication breakdown, which allows him to take up the conversation and answer his partner's original question. While this CS does not show that participants understand a specific context, it is used in order to provide a meaning that allows continuing a conversation that was interrupted by a communication breakdown.

f) Asking for confirmation

EXCERPT 15: (CONTROL, DELAYED CHAT)
TOM: Auch, Deutschland war **uberweisen** mit Leute
Also, Germany was transfer with people
LINDSAY: Es tut mir leid! Warst du oft draußen?
I'm sorry! were you often outside?
LINDSAY: (=outside)
LINDSAY: (oh, side note, do you mean **uberweisen** or **uberfullt**?)
LINDSAY: (I don't remember the former, but I think the latter is crowded)
TOM: Ja, sie sind spazieren gegangen und haben in der Wald gezeltet.
Yes, they went for a walk and camped in the forest
TOM: (yes, **uberfullt**)
LINDSAY: (kay :))

In this passage, Tom talks about a trip to Germany while trying to use the target words to describe what he saw. Since Tom does not use the right word to

tell Lindsay how crowded everything was in Germany ('*überweisen*' – to transfer money – as opposed to '*überfüllt*'), his sentence does not make sense to Lindsay who chooses to ask him in English whether he meant another one of the target words. Even though she claims to not remember the meaning of the word that Tom used in his utterance, she recognizes that Tom might have chosen the wrong word in the context of his story. As a consequence, she offers an alternative in order to repair a communication breakdown and to be able to carry on the conversation. Tom then answers acknowledging that he made a mistake and repeating the word.

Once again, this specific CS can indicate understanding of context by one or both chat participants. In this case, Lindsay clearly shows that she understands the word '*überfüllt*', and that she would expect that word in this particular context. However, Tom's reaction shows that he was not able to learn this word through the activities and tests completed before the chat.

g) Expressing non-understanding

EXCERPT 16: (L1, DELAYED CHAT)

ANNE: hast du im **schatten** gut **ausgespannt**?
*Did you relax in the **shade**?*
MARY: um...
MARY: ???
ANNE: hat jemand etwas **geflucht** ueber die wetter?
*Did someone **complain** about the weather?*
MARY: okay i'm sorry. i don't know what that means.
ANNE: oder **geflucht** ueber die **angesteellte**? i hoere das das **angestellte** im **schalter** ist sehr schlimm. sie **ueberwiest** falsch geld von mein freund
*Or **complain** about the **employee**? I hear the **employee** at the **counter** is very bad. She **transferred** the wrong money for my*

friend
ANNE: **fluchen**: curse
ANNE: did anybody cursed about something in the hotel?
MARY: nein das **angestellte** war sehr gut
*No, the **employee** was very good.*

This excerpt shows a few CS used by both partners. After Mary expresses incomprehension with her partner's utterance by using punctuation ('um…', '???') rather than asking for help as shown in excerpt 13 above, Anne continues asking questions about Mary's trip using another target word ('*fluchen*') but leaving the conversation within the same context in order for Mary to be able to answer without switching into English. Mary then decides to show her partner that she does not understand her questions by using English to clarify that she is not able to answer the questions. Anne then tries to use the target word '*fluchen*' in another context and to expand on the reason why she asks the questions, but Mary does not answer and Anne decides to translate the last part of her utterance for her chat partner.

This situation shows the kind of problems that students can encounter while working with new vocabulary. In this case, Mary chooses to express the problem by directly showing that she does not understand in order for her partner to resolve this problem. Expressing non-understanding seems to be less efficient for communicative problem resolutions than other CS described in this chapter. It does not allow for the other chat participant to identify the problem right away. Since Anne uses two target words in her first utterance that lead to Mary's lack of comprehension, she chooses to carry on the conversation instead of focusing on

the problem, which creates more communication problems. Only after Mary directly indicates what the exact problem is can Anne choose to explain or translate the problem-initiating target word. She does not, however, provide help concerning her first utterance, which shows that Mary's expression of non-understanding using punctuation did not lead to clarification, whereas explicitly expressing the concerns helped Anne understand what the source of the problem is. After the translation of '*fluchen*' provided by Anne, Mary is finally able to answer and uses the target word '*Angestellte*' without being provided with its translation, showing that while she does not understand most target words used by Anne in this passage, the source of the problem in this particular utterance was directly connected to not understanding '*fluchen*'. Clarifications of the other words used in Anne's utterance in this excerpt do not occur throughout the interaction.

h) Translation

EXCERPT 17: (L1, DELAYED CHAT)

DAN: Nein, ich bin mit meinen besten frenden gegangen fur eine Woche. Ich habe viele Zeit fur **ausspannen**.
no, I went for a week with my best friends. I had lots of time to ***relax***

SHANNON: Was ist **ausspannen**?
What is "ausspannen"?

DAN: **ausspannen** is to relax

DAN: So basically i had lots of time to relax :)

In this passage, Dan tells Shannon about his trip and uses the target word '*ausspannen*', which Shannon does not understand. She asks for clarification in

German, but Dan answers in English and adds the full translation of his utterance to ensure that Shannon understands the whole sentence.

This CS is quite common especially at this level of proficiency, but similar to the previous CS described above, it does not allow for a communication problem-solving passage and does not indicate whether participants understand the context of a specific word. However, Dan can show with the translation that he does understand the meaning of the word; by providing a full translation of his sentence, he is also able to indicate that he is aware of the context in which he used this specific target word.

Both strategies described above do not necessarily lead to an extensive interaction between chat partners; however, these CS can still indicate whether participants were able to learn both the meaning and the context of the target words.

The following CS is similar to a direct appeal for help, since a participant chooses to ask their partner directly whether they are using the proper word in the context of the conversation.

i) Own accuracy check

EXCERPT 18 (L1, DELAYED CHAT)
OLIVER: Ich bin auf die U-bahn gefahren.
I rode the subway
OLIVER: Die U-bahn hat eine gross **anstehen** (line?).
*The subway had a big **line up**.*
[...]
AARON: Ich mag die U-Bahn fahren!
I love taking the subway!

Oliver talks about his travel in Berlin and about riding the subway, when he uses the target word '*anstehen*' for "to stand in line" in the wrong grammatical category. In order to make sure he is using the target word in the proper context, he decides to check with his partner if he used the accurate word. This CS might help students check their own understanding of target words without interrupting the flow of the interaction. Unfortunately, Aaron does not comment on the target word but rather continues the conversation. It is not possible from this passage to conclude whether Aaron's lack of response indicates that the translation is correct or whether he does not know the answer and chooses to ignore his partner's own accuracy check.

j) Rephrase – Confirmation of what was said

EXCERPT 20: (L2, IMMEDIATE CHAT)
THOMAS: Ja, aber Deutschland habt Massen
Yes, but Germany has crowds
CAITLIN: Was ist Massen?
What is 'crowds'?
THOMAS: Crowds haha
THOMAS: Der Zug habt viel massen
The train has many crowds
CAITLIN: Bist du sagen, dass es war **ueberfuellt**?
*Do you mean it was **crowded**?*
THOMAS: Ja, und schmutziger
Yes, and dirty

Finally, the last interactional CS found in the data consists of repeating an idea expressed earlier in order to confirm one's own understanding. In the context of this study, it also allows students to use target words and show that they understand their meaning and use in context. Thomas indicates that German cities

are quite crowded, but he does not use the target word '*überfüllt*' (crowded), but rather the noun '*Massen*'. Even though this word is a cognate, his partner Caitlin does not understand what is meant and asks for clarification in German. Thomas then translates the word with 'crowds', which leads Caitlin to confirm that Thomas meant that Germany is crowded, using the target word presented in the readings. This is an interesting reaction from Caitlin, because it seems that the noun 'crowds' reminds her that she saw an adjective expressing the same idea in the readings of the study. Since both students participated in the L1 group, they were able to see the translation of '*überfüllt*' as 'crowded', accompanied with a picture of a crowded bus, which seems to fit the context of this conversation.

Interactional CS are insightful because they offer an understanding of the competence of both chat partners regarding the use of specific target words in context. This section has shown that students use a variety of strategies in order to avoid or deal with unknown target words and communication breakdowns. The next chapter will draw conclusions with regard to students' progress and learning of the words as can be seen through the use of these interactional CS.

The next part of this chapter concentrates on the last type of communication patterns that occurred frequently throughout the data. By using contextualizing strategies, students can also show that they have learnt and are able to use the target words in specific contexts. As mentioned in the previous chapter, communication strategies are defined by Dörnyei and Scott (1997) as interactional patterns used in order to overcome communication breakdowns. The CS presented so far in this chapter show how students react when the flow of communication is

broken or hesitant in order to pursue the interaction. The following patterns do not occur as a reaction to a communication breakdown, but rather are used to avoid such breakdowns from happening. In accordance with Canale's (1983) view of CS in the context of communicative and strategic competence, CS can be seen as any effort to improve on the "effectiveness of communication" (p.11). Based on the premise that the contextualizing strategies presented below are used by students to enhance their partner's understanding of utterances, including newly learnt target words, and to avoid any potential communication breakdown, it seems that these interactional patterns correspond to this extended definition of the concept of CS.

5.2.4 Contextualizing strategies

Table 5.6 shows how the use of three contextualizing strategies found throughout the dataset was distributed by group and test (immediate and delayed). An analysis of a few examples for these strategies is provided thereafter. Contextualizing strategies allow students to work around a specific context without referring to their L1. By connecting semantic fields with the target words, they are able to stay focussed on the task and avoid switching into English. Only the third and last contextualizing strategy offers room for reactions in English; however, most occurrences still happen in the L2.

a) Linking two target words in one context

This specific communication pattern consists of using two target words within one sentence or one idea. It shows students' ability to link the target

Strategy	Description	German immediate	German delayed	Total German	English immediate	English delayed	Total English	Control immediate	Control delayed	Total Control	Total
Linking two target words in one context	Using common semantic fields of target words to use several target words in one message	12	7	**19**	21	19	**40**	2	3	**5**	**64**
Using a target word with semantically connected words	Using a target word within connected semantic fields (synonyms, antonyms, etc.) to show understanding of context	26	21	**47**	48	24	**72**	20	22	**42**	**161**
Topic continuation through reaction or answer	Confirming that one has understood the message given by the interlocutor	15	8	**23**	14	11	**25**	9	3	**12**	**60**
Total		53	36	**89**	83	54	**137**	31	28	**59**	**285**

Table 5.6: Use of contextualizing strategies by group

words to each other in order to build a context for their role-play and as such reinforces the context of the dialogue. It represents, therefore, a 'stronger' contextualizing strategy, since students are able to show that they can link two words into one accurate context. The following excerpt shows an example of this CS and is discussed thereafter.

EXCERPT 21: (L1, IMMEDIATE CHAT)

MARIA: Wie war deine Hotel? War die **Angestellten** nett?
*How was your hotel? Were the **employees** nice?*
JORDAN: Meine Hotel hat gewessen am Strand. Er hat zwei **Angestellten** am der **Schalter** im Hotel.
*My hotel was on the beach. There were two **employees** at the **counter** [reception].*
JORDAN: **Gemeinsam** wir haben mein **Gepaeck** bringen in mein Zimmer im Hotel
***Together**, we brought my **luggage** into my room.*
MARIA: Warst du **anstehen** laengsamer?
*Did you have to **wait** 'slower'?*

In this excerpt, Maria and Jordan are talking about his vacation and concentrate at this stage on the hotel where he spent his stay. To this end, Maria uses the context of the hotel to use the target word '*Angestellter*' (employee) and asks about the service in the hotel. Jordan then takes this opportunity to repeat the target word used by Maria and to connect it to the other target word '*Schalter*' (counter, reception).

With the lack of answer from Maria, Jordan then continues talking about his hotel experience, but Maria finally answers Jordan's statement about the employees by asking if there was a long line up ('*anstehen*' in the wrong grammatical category), since there were only two employees working according to Jordan's description of

the situation. In this passage, both chat partners show that they can combine target words with each other in order to make their utterances more precise and to use these words in proper contexts. Jordan contextualizes the words at hand with the situation in question, therefore completing the task to use as many words as possible while showing his ability to link the newly learnt words into a same semantic field. Furthermore, Maria is able to work with Jordan's answer in order to add a question about the waiting time,which also shows that she has understood how to connect these words into one context.

This strategy is used widely throughout the chat transcripts, especially by the participants in the English (L1) group. Beyond students' success in using target words throughout their role-plays, this CS shows their ability to understand and use these newly learnt words in context. The same conclusion can be drawn for the next CS that describes students' ability to link semantic contexts of target words within this specific task.

b) Using a target word with semantically connected words

This second contextualizing strategy is more general and therefore the most commonly used by the participants in this study. It is interesting to observe that this CS is also widely used by the control group, whereas both other contextualizing strategies are used more commonly by the experimental groups. This CS is similar to the first contextualizing strategy presented above, since it demonstrates the correct use of a target word in context by describing its semantic link to another word. In this case, however, the connection is not limited to

another target word, but rather to an idea expressed in the sentence at hand or another word from the same semantic field. In other words, it describes students' ability to associate a target word (e.g. '*gemeinsam*' [together]) with people present on their vacation (e.g. '*gemeinsam mit meiner Familie*' [together with my family]).

The following passage shows this CS used during the delayed chat with the German (L2) group:

EXCERPT 22: (L2, DELAYED CHAT)

KRISTEN: OK. Meine Urlaub war schlecht. Ich bin glucklich weil ich zu hause bin.
OK. My vacation was horrible. I am glad to be home.

JAMES: Das ist nicht gut. Wo bist du gegangen?
That's not good. Where did you go?

KRISTEN: Ich bin zu New Brunswick gegangen. Es hat geregnet und die **Muecke** sind ins alles gewesen
*I was in New Brunswick. It rains and there were **mosquitoes** everywhere.*

JAMES: Ich will zu New Brunswich [sic] im Juli gehen! Aber die Ku:ste was schoen, ja?
I want to go to New Brunswick in July! But the coast was beautiful, right?

KRISTEN: Ja, es war OK. Ich leibe The Bay of Fundy. Es war sher shoen! Aber in Juli, wenn die sonne ist aus, es ist sehr, sehr heiss und ich funde keine **Schatten**.
*Yes, it was OK. I love The Bay of Fundy. It was beautiful! But in July, when the sun is out, it is very, very hot and I found no **shade**.*

In this chat conversation, the students exchange their impression of a holiday vacation on the Canadian East Coast and use context opportunities to use the target words from the study. Kristen starts with explaining to her chat partner why she did not have a good time on her vacation. In order to do so, she describes the weather conditions, which gives her the possibility of using the target word

'*Mücke*' (mosquito), hence showing that she understands this word and knows in which context she can use it. Not only does she link it to the rainy weather, but she also uses it in a broader, more general context of a bad vacation. Comparing this experience with another time on holidays in the same region, she then proceeds by describing the weather when it is not raining, and uses this opportunity to use the target word '*Schatten*' (the shade). In both utterances, Kristen therefore manages to use words and create a context of use around them that shows that she understands not only their meaning, but also the context in which they can occur. Even though these target words are not connected to other target words, they are still used for their semantic connotation and linked to words and ideas from the same semantic fields, complementing their use in context.

The two contextualizing strategies described above deal with productive knowledge of the semantic context of the target words. In both instances, students showed their understanding of the context by using words or ideas that showed a semantic relation to the target words, while providing their chat partners with opportunities for extended exposure to the target words in context, ensuring that the conversation can be carried out without any communication breakdowns.

c) Topic continuation through reaction or answer

The last contextualizing strategy is different from the first two communication patterns presented in this section, since it describes a receptive understanding of the context at hand as opposed to the ability to use target words productively. The two excerpts presented below display students' reactions to the

use of target words, hence showing their understanding of the positive or negative connotation of the words and expressing their understanding of the context for the conversation at hand. The data gathered through the chat task in this study offer two different types of reaction to the use of a target word, falling into this specific category. The first type of reaction is short, marking a positive or negative reaction, without topic expansion provided by the student reacting. However, given the occurrence of a reaction, the student uttering the sentence with the target word is able to continue the conversation, since their partner has expressed their understanding of the context, as presented in the following excerpt:

EXCERPT 23: (L2, IMMEDIATE CHAT)
DREW: Und es ist sehr grun
And it is very green.
DREW: In Kanada es ist sehr weiß
Canada is very white.
[...]
DREW: die leute sind sehr nett
the people are very nice.
JOHN: und Kanada ist sehr sehr weiss...und kalt
Canada is very, very white… and cold.
JOHN: Nett leute, das is sehr gut
Nice people, that's good.
DREW: sehr kalt. Und mit viel **Mücke**
*Very cold, and lots of **mosquitoes**.*
JOHN: aber nicht in Februar ha...
But not in February…
DREW: Ja. Aber in Wein, keine **Mücke** alles Jahre
*Yes. But in Vienna, there aren't any **mosquitoes** all year.*

This excerpt shows the continuation of excerpt 9 presented earlier in this chapter. Drew describes his vacation in Vienna and compares Austria and Canada, telling John that Canada is colder and has more mosquitoes than Austria, which leads to John's reaction pointing out that there are no mosquitoes in Canada in February. John does not use a target word in his utterance to react to Drew's

comparison of the two countries; however, it is clear that he does understand the context at hand and that he is able to continue the conversation started by his chat partner. This reaction therefore does not show any uptake but shows to Drew that his utterance was understood, allowing him to continue the interaction.

The second type of reaction is presented through the two chat excerpts below. One chat partner uses a target word and their interlocutor reacts to it before explaining their reaction or continuing with the conversation, taking the floor for their own questions or contribution to the dialogue.

In the first excerpt, the student reacts and expands on her partner's utterance, trying to show that she is not only able to answer the question, but that she understands how to explain her answer.

EXCERPT 24: (CONTROL, IMMEDIATE CHAT)

CINDY: War die Strand **uebergefuellt**?
*Was the beach **crowded** with people?*
ANNA: nein ich habe viel "space"
No I had a lot of space.
ANNA: Es ist sonnig und heiss
It was sunny and hot.

By not only providing the negative answer 'nein' to her partner, but rather explaining that she had a lot of space on the beach, hence expressing the opposite of the idea of '*überfüllt*' (crowded), Anna shows that she understands the meaning of the target word and its context of use, since she is able to address the connotation of 'having space'. Her understanding of context is therefore not shown in a productive use of the word, but rather through a receptive, accurate and contextualized reaction, once again allowing the interaction to continue without interruption, confirming for her partner that she does not need further

explanations to understand her utterance. The same type of reaction is shown in the last excerpt presented below, where Sandra expands on Alex's negative experiences with mosquitoes.

EXCERPT 25: (L1, DELAYED CHAT)
ALEX: hahah Ja. Ist war sehr schlect.
hahah yes. It [the vacation] was really bad.
[...]
SANDRA: Ja? warum was es so schlecht?
Really? Why was it so bad?
ALEX: Es ist geregnet. Viele **Mucke**
*It rained. Lots of **mosquitoes***
SANDRA: Ah das ist nicht gut ich hasse die **Muecken**.
*Ah that's too bad, I hate **mosquitoes**.*

In this case, Alex expresses not enjoying her holidays, and explains that there were too many mosquitoes due to the rain. Sandra then reacts with a negative utterance '*das ist nicht gut*' (that's too bad), which could be understood as a direct reaction to the rain, therefore not showing that she understands what the word '*Mücke*' means and being unable to address this problem. Rather, she continues her sentence using the target word again and saying that she dislikes the mosquitoes, putting this target word into her own sentence and showing that she is familiar with the meaning of the target word.

This last communication pattern which occurs more as a receptive expression of context understanding therefore allows for drawing conclusions on students' ability to learn context from readings and use context in a productive task, since students, by interacting throughout the chat tasks, were able to give feedback to their partners with regard to their understanding of communication situations. This pattern is widely used in the chat data, especially among the experimental groups, and gives insight into students' opportunities to create a

contextualized conversation around the target words presented through the readings at the beginning of the study.

By using the target words in specific contexts, or by providing their chat partner with feedback, students can therefore show their understanding of the meaning and the contextual information of new words, as well as their ability to provide their interaction partners with tools in order to avoid communication breakdowns that are more likely to occur while dealing with new vocabulary.

Table 5.7 shows the distribution of the CS used by each group on both the immediate and the delayed chat task.

Group/ Chat task	**Direct Strategies**	**Interactional Strategies**	**Contextualizing Strategies**	**Total per chat task for each group**	**Total per group**
German Immediate	6	16	53	75	126
German Delayed	8	7	36	51	
Total German	14	23	89		
English Immediate	19	14	83	116	200
English Delayed	6	24	54	84	
Total English	25	38	137		
Control Immediate	16	15	31	62	112
Control Delayed	15	17	28	60	
Total Control	31	32	59		

Table 5.7: Use of communication strategies per group and chat task

This table shows that the English group used more CS than the German and the control group. However, various CS are used by each group and reveal their

ability to deal with the new vocabulary in different ways. Whereas the German group used proportionally more contextualizing strategies, the control group tended to use more direct strategies in their role-plays.

The following chapter concentrates on discussing the results from the statistical analyses as well as the findings from the chat tasks in the context of previous research as well as on drawing conclusions for the use of glosses in readings in second language classrooms.

6. DISCUSSION

The goal of this chapter is to interpret the results presented above in order to gain a more comprehensive overview of students' learning through the texts and glosses. This chapter aims at discussing and answering the research questions presented previously, which were as follows:

1. Does the type of gloss (L1 text and picture, L2 text and picture) influence students' comprehension of glossed readings?
2. Do different types of glosses (L1 text and picture, L2 text and picture) have different effects on students' retention and production of new vocabulary items?
3. Do glosses in a reading task help students to use the targeted words in a productive, contextualized post-reading task?
4. Do various types of glosses (L1 text and picture, L2 text and picture) have different effects on students' contextualized understanding and use of the target words in a contextualized post-reading task and their ability to negotiate the meaning of the target words through communication strategies?

This chapter is divided into four parts dealing with the results relevant for answering each of the four research questions. The first research question deals specifically with the quantitative data from the comprehension questions, and the second research question can be answered through the results from the receptive and productive tests, whereas the contextualized chat task given to the participants at the end of the study process will be helpful to find answers to the third and

fourth research questions.

6.1 Students' comprehension of glossed readings

The results from the comprehension questions given to students after each reading offer insight into both students' understanding of the texts and their comprehension of the target words. While the experimental groups were able to retain the same level of text comprehension throughout the three sets of comprehension questions, the control group performed worse on the third day of the study. A few factors can provide explanations for these results. First, giving students meaning-enhancing glosses in readings seems to help them deal with new words and infer the meaning of words in reading passages more successfully. Since the students from the experimental groups could refer to the glosses to test and confirm their hypotheses about the meaning of the target words, they were able to better concentrate on the contexts of the readings and gain a better understanding of the texts overall. Without the help of the glosses, the control group had to solely rely on the readings themselves and could have not received enough contextualized information to understand the texts. In addition, it is possible that the third text given to students during the treatment included forms, words, or sentences that were more difficult to understand than the first and the second texts, which could explain that students from the control group were not able to answer the comprehension questions as successfully as on the first two days of the study. Finally, the factor of motivation and concentration on the task had to play a role for the performances of the three groups. Reading a third text

including unknown words could have led to a lack of motivation for the control group to continue their efforts to answer the questions in an accurate manner.

The first research question, therefore, cannot be answered positively, since the results from the experimental groups did not show any differences in text and word comprehension. The language used in the glosses did not influence their ability to answer the comprehension in a different manner from the first to the third day of the study. However, the lack of glosses for the control group showed negative effects for students' understanding of the texts and their motivation to stay on task.

6.2 Students' retention and production of new vocabulary based on the quantitative data

In order to address students' learning of the new vocabulary items, the results from the statistical analyses presented in the previous chapter need to be considered more closely. This first part of the chapter concentrates solely on the immediate and delayed posttests, whereas any results yielded from the chat transcripts – both quantitative and qualitative – will be addressed thereafter. The quantitative results from the productive and receptive tests indicate that the second research question cannot be answered positively, since whereas the use of glosses in the reading passages did make a difference for students' retention and production of the new vocabulary as compared to the control group without any glosses, no differences could be found according to the use of specific glosses (L1 text and picture; L2 text and picture). The tests have shown that significant

differences could be found on most tests between the experimental groups and the control group, from the third set of comprehension questions on to the delayed tests. All quantitative tests administered throughout the time of the study therefore show that the glosses were beneficial for the experimental groups to learn and produce the target words.

With regard to the question whether different types of glosses influence students' performances on a productive test, the results indicate that whereas the presence of glosses in the readings helped students on both the immediate and the delayed productive tests, the type of gloss did not make a difference on these particular tests. As for the immediate and the delayed receptive tests, they yielded similar results. The experimental groups outperformed the control group; however, no significant differences were found between the L1 and the L2 group on either test. This study confirms previous findings with regard to the positive effects of glosses for comprehension, retention, and production of new vocabulary. Although the number of target words is not sufficient to be able to draw conclusions regarding the grammatical categories of the target words used in the texts, it seems that the experimental groups were able to achieve better results learning nouns and adjectives in general than verbs, which confirms that more concrete items are easier for students to learn through glosses, as mentioned by Xu (2010). This could be explained through various factors. First, more concrete items are more easily recognizable on the pictures provided to students through glosses. Abstract ideas or actions (such as indicated by verbs) can often not be represented through a static picture and could be better exemplified through

videos or sounds. To the same extent, a concrete item is more easily defined or included in a sentence in which its meaning can be inferred accurately. In addition, form-meaning connections of verbal and non-verbal representations seem to be more active with concrete items (Fliessbach, Weis, Klaver, Elger, & Weber, 2006), and, with regard to the learning of adjectives in particular, when the target word involves an emotional association to the word or the sentence it is connected to. More research is needed in this area in order to understand the potential effects of glosses for students to learn more abstract concepts.

The positive results on the productive and the receptive tests support Paivio's (1986) dual coding theory affirming that the combination of non-verbal and verbal signs help students process and remember new information. In an article on the relationship between instruction and cognitive theories, Mayer (2002) summarizes the three components of learning in a multimedia environment identified in earlier work (Mayer, 2001). Active processing is presented as a combination of three separate mechanisms, namely selecting relevant information, organizing that information into verbal and non-verbal models, and integrating the new information with previous knowledge. According to Mayer (2002), "these active learning processes are more likely to occur when corresponding verbal and pictorial representations are in working memory at the same time" (p. 60). In other words, the various ways in which word forms and meanings are presented to students influence their success in retaining the information and being able to use it in context at a later time. Having access to glosses allows students to achieve a deeper processing of the lexical information at hand, since they can rely on

explanations and pictures in order to test their hypothesis of the word meanings inferred from context. By having various forms of input on the semantic information of a word (context from the text, picture, and text from the gloss), students are then able to process this information in various ways and to anchor it into their own knowledge more deeply. The students from the control group, however, were only able to rely on their exposure to the context of the texts – and of the comprehension questions to a lesser extent, since the questions were shorter and did not provide them with a broad context from which to infer meaning – and could therefore neither test nor confirm their hypotheses about the meaning of the target words. This lack of information did not allow for an accurate processing of semantic information and hindered their learning of the target words.

The results from the productive and the receptive tests show that students participating in groups with access to both a verbal gloss and a pictorial cue were able to retain more information in the long term than students who were exposed to specific new words without access to glosses. Based on the vast amount of research conducted with regard to the advantages of multimedia glosses in comparison to single glosses (Akbulut , 2007; Chun & Plass, 1996; Kost et al., 1999; Nagata, 1999; Shahrokni, 2009; Yanguas, 2009; Yoshii & Flaitz, 2002), the present study did not introduce students to single glosses at any point. The goal of the second research question was rather to evaluate the effects of the language (L1 vs. L2) used in multimedia glosses for students' incidental learning process. A comparison of the multimedia glosses used in the two experimental groups does not indicate that the language used in the glosses had

any effect on the students' performances, neither on the immediate nor the delayed receptive and productive tests. Once again, the results are consistent with most studies focusing on language choice in glosses (Bell & LeBlanc, 2000; Jacobs et al., 1994; Yoshii, 2006). One aspect of this study differs from findings by Ko (2005), in that no significant differences could be found between the experimental groups on the comprehension questions. Whereas Ko's study concentrated on students' understanding of the text and gloss preference and showed that L2 glosses were more beneficial for students' comprehension of L2 readings, the present study used the comprehension questions as a means to further expose students to the target words in context. The use of target words within the comprehension questions could explain the different results found in Ko's and the present study regarding the role played by the language used in glosses, since students had more access to the glosses through three readings and three sets of comprehension questions. The amount of exposure to the glosses could have been one factor influencing the performance of the experimental groups in the present study. In addition, Ko's participants had a higher level of proficiency than the students participating in the present study. Ko indicated that the students reading with glosses were able to decode the L2 (English) glosses and connect their meaning to the English context of the readings more efficiently. The proficiency level of the participants could therefore be an important factor for the efficiency of specific types of glosses.

The results obtained in the present study seem to support Mayer's active processing assumption, in that the language used in the glosses did not influence

students' performance on either test, since no significant differences could be found on either productive or receptive test. It seems that while it is important to present students with multimedia glosses, these glosses can be designed in the L1 or the L2 without changing the effects of the glosses. This issue is also addressed in Xu (2010) based on two studies that did not show any differences between L1 and L2 glosses (Jacobs et al., 1994; Yoshii, 2006) and one that shows positive effects of L2 glosses on immediate vocabulary comprehension (Miyasako, 2002). Whereas the results of the present study concur with most previous research on this topic and did not lead to conclusive results with regard to the language used in glosses, a few aspects of this type of research can explain the contradictory results found to Miyasako's research. First, the lack of differences between the use of the L1 and the L2 in glosses has been attributed to the nature of incidental learning itself. Yoshii (2006) explains the lack of significant results between the L1 and the L2 groups in his study with the fact that students process new information as soon as they are exposed to it. Especially in a study in which students are given pictures to reinforce the meaning input of the text in the glosses and in which the L2 explanation is simple and adapted to students' proficiency level, processing information becomes more focused on the meaning of a word than on the language used in a particular gloss, which could explain that no differences were found between the groups using L1 and L2 glosses. However, it is possible that the way that students processed the new lexical information differed for both groups. While the German group had to process L2 information,

which accounted for a deeper processing level, the English group was able to see L1 information and benefitted from a faster processing of the lexical information.

The level of proficiency of the students participating in his study is therefore a criterion and also addressed by Yoshii (2006) to explain the lack of significance between the L1 and the L2 gloss. The assumption is that students with higher proficiency are able to process information in the L2 more efficiently than beginners, which would explain that a study on L1 and L2 glosses in a given time frame would not show significant results with advanced learners. In other words, L1 glosses should be more beneficial for beginner learners, whereas advanced learners could process explanations in both languages more easily. However, this assumption that results could vary according to the language used in the glosses for beginner learners was not confirmed in the present study. The participants of this study were in their second semester of German at the university (low-intermediate level of proficiency) and differences could not be found between the experimental groups on any of the immediate or delayed posttests. However, the reaction time needed to process the information contained in the glosses was not measured in this study and might have been different for both experimental groups.

Furthermore, other criteria are addressed in the literature to explain the lack of differences between L1 and L2 groups on receptive and productive tests. Jacobs et al. (1994), Xu (2010), and Yoshii (2006) take up the issue of the time of exposure to the glosses as well as the time given to the students between the immediate and the delayed tests. Given the level of proficiency of the participants

of the study, the amount and the time of exposure might be too low to yield any differences between the L1 and the L2. Moreover, as Jacobs et al. (1994) point out, it is difficult to reliably measure students' exposure to the target words between the immediate and the delayed tests. The participants of this study were given words semantically related to the topic that they were studying at the time, but these words were not present in their textbook. However, it is possible that students used some of the words in specific tasks in class or as homework, which could reinforce the learning process and the understanding of the words in context. Taking the time of exposure into consideration, it seems therefore that glosses facilitate vocabulary acquisition, but that their effect needs to be reinforced through other activities and further exposure. Xu (2010) recommends conducting more delayed tests at a later time in order to assess the effects of each type of gloss over a longer period of time.

The quantitative results on the immediate and delayed posttests hence coincide with previous research and with Mayer's cognitive theory that multimedia glosses are beneficial for incidental vocabulary learning, independently from the language used in the glosses.

The question remains, however, whether this lack of significant differences is due to the instruments and time frames used in those studies. More importantly, although these results reveal important findings for the design and the use of glosses for reading comprehension and vocabulary learning, they do not give any indication of students' ability to produce this specific vocabulary in a given context. The next section of this chapter is concerned with students' use of the

target words in context and focuses on the quantitative data gathered throughout the immediate and the contextualized chat task, as addressed in the third research question.

6.3 Students' use of vocabulary in context

Analyzing the chat data is a twofold task. On the one hand, the analysis aims at evaluating the effects of gloss exposure in a reading task for the use of new vocabulary in context and concentrates on the quantitative data yielded from students' chat transcripts in order to answer the third research question stated above. On the other hand, the fourth research question concentrates on the effects of the different glosses for students' use of the target words in context, as well as on strategies used by students to use target words in a specific writing task. The following section will concentrate on the first aspect addressed through the third research question.

The results gathered on the amount of target words used in a contextualized manner in the immediate chat task indicate that both the English and the German experimental groups reading with glosses including text and picture outperformed the control group. These results therefore seem to confirm that glosses do facilitate the acquisition of new vocabulary and its use in context through reading. Various explanations can be found to explain the performances of the experimental groups on the immediate contextualized chat.

L1 glosses seem to be more beneficial to infer meaning from context. From previous research in contextualized vocabulary learning and vocabulary inferring

(de Bot, Paribakht & Wesche, 1997; Dubin & Olshtain, 1993; Huckin & Bloch, 1993), it seems that students' success in understanding and retaining word meanings depends largely – among other criteria – on the degree of information surrounding the words to be learnt within the text as well as on the ability of students to use extratextual cues. In a more recent study, Nassaji (2003) identified various strategies used by students in order to infer word meanings while reading, based on the cognitive model of vocabulary learning from context developed by Huckin and Bloch (1993). This model represents processes of inferring word meaning according to two separate steps. First, word meanings are generated and evaluated based on prior linguistic knowledge and textual cues. The second step applies this knowledge to the context at hand in order to test the hypotheses generated about the meaning of the words encountered in the text.

According to this model, students exposed to new vocabulary in a reading passage will evaluate hypotheses about the meanings of the new words and test whether their hypotheses fit the context of the texts. Based on students' previous knowledge and other components represented in a generator/evaluator module, students are able to test their own hypotheses while inferring word meanings as well as test these hypotheses and evaluate their (un)successful outcome. If a hypothesis tests negatively, students can then go back to finding another hypothesis according to the context of the readings. Should the hypothesis receive a positive evaluation, the information is then updated according to the components from the generator/evaluator module. According to Huckin and Bloch, this model is not meant to be a fixed but rather a dynamic process, since

students will differ in the way that hypotheses are generated (depending on the various components of the generator/evaluator module, students might focus on syntactic structures before they use their own world knowledge to start their hypotheses, for example). The way and the extent to which students access these components therefore varies on a personal basis.

Nassaji (2003) shows the validity of this model for his own study. While students' previous knowledge of the language in general was an important criterion for students to analyze the text and make sense of unknown words (morphological knowledge and discourse knowledge, although the grammatical knowledge and syntactic representations of a word did not seem to lead to successful semantic inferring), he also found out that L1 knowledge is one of the sources that students use in order to understand meanings and context. While reading a text, students encounter unknown words and start generating hypotheses about the meaning of these words from the context of their reading. Glosses providing semantic explanations thus help the inferring of the word meanings more successfully. Students inferring meaning from context only, without relying on any further strategies, seemed to have the least amount of success in this particular study. The role of the L1 for meaning inferring in an L2 context is also the subject of the Revised Hierarchical Model proposed by Kroll and Stewart (1994), according to which L2 learners – especially with low proficiency – rely on their L1 in order to translate the meaning of new words and process lexical information. Considering the level of proficiency of the students participating in the present study, it would have therefore been likely that the L1 group benefitted

more from the glosses because they represented the meaning of the words more exactly through the translation associated with the picture. In this case, students from the L1 group would have had fewer difficulties testing the semantic hypotheses generated through reading. However, the results show that both experimental groups performed equally on all receptive, productive and contextualized posttests.

Kroll, Van Hell, Tokowicz and Green (2010) address issues related to this model, showing that research has also "demonstrated that it was possible for even less proficient learners to understand the meaning of L2 words directly in a categorization task" (p. 375). Although their analysis is based on recognition tasks only, it seems through the results from the present study that L2 learners can, even at a lower level of proficiency, benefit from direct L2 explanations and exposure in order to understand and process lexical concepts. Although the L1 group could translate the target words and therefore process their meaning more directly and the L2 group had to rely on more indirect links in order to understand the texts and the new words, it is possible that glosses in German generate further hypothesis-testing mechanisms that students then needed to test within the context at hand. This process, although requiring more effort, could explain why no significant differences were found in this particular study between the experimental groups on the posttests in which students were to identify, produce and contextualize new words. An analysis of processing times could offer further explanations and highlight differences in reading with glosses including the L1 or the L2.

Even though Nassaji's results with regard to the role played by the L1 for students' ability to infer meaning from context, as well as the conclusions drawn from Huckin and Bloch's model showing various criteria (such as L1 or L2 knowledge) influencing meaning inferring, would seem to indicate that the English group could have benefitted from L1 glosses, the results did not show any differences between the experimental groups. The repeated exposure to the target words with glosses seems to help students recognize, produce and contextualize new words equally, independently from the language used in the glosses.

Whereas the results of the experimental groups are positive with regard to the immediate posttests, the lack of significant differences on the delayed chat task suggest that the treatment used in this study does not lead to the long-term ability to use new words in context.

While the results of the present study coincide with most previous research on vocabulary learning through glossed readings, as presented above, students' learning of context and their ability to produce new words in context remains an aspect that shows some limitations to targeted productive and receptive tests. While students can link a new vocabulary item to an image or a definition, their ability to use these in full sentences and in personally meaningful contexts is thus not certain. Much more research is needed in this area in order to find a way to separate the aspects of form, meaning and context of words and to be able to apply these findings to targeted and reliable instruments.

Taking these considerations into account, the third research question can be answered in a positive manner, since the use of glosses in the reading passages did

help students use the target words in context. However, the results also indicate that glosses do not seem to have long-term positive effects for students' use of new vocabulary in context. In addition, students seem to retain the semantic properties rather than the syntactic aspects of new words more successfully.

The last section of this chapter concentrates on students' use of communication strategies (CS) in order to deal with the target words within a contextualized task, which gives insight into students' understanding of the words, but also into their level of information-processing ability. Whereas some CS show non-understanding of context, other CS provide insight into the interaction type that students use in order to find or understand a specific explanation for a target word. To the same extent, some CS also allow for observing not only how students deal with a problem trigger (i.e. a word that they do not understand), but rather how their chat partner deals with giving them hints and explanations in order to pursue the conversation at hand and avoid a communication breakdown. The CS described in the previous chapter are discussed below with regard to their role in highlighting students' learning and understanding of contextualized lexical information.

6.4 Students' understanding of context and use of communication strategies

The fourth research question is concerned with the effects of glosses on students' use of the target words in context as well as their use of CS around the target words. Whereas the analysis of the quantitative data from the chat

transcripts, in answering the third research question, generated interesting results and raised questions regarding the learning of context information, the analysis of the use of CS shows that the use of target words in context can be interpreted beyond the mere presence of words, but rather through the environment in which the words are used and discussed. As stated in Webb (2007) in an article on learning vocabulary from context, "all of the previous studies had defined vocabulary learning by a subject's ability to demonstrate knowledge of meaning and form" (p. 76). While Webb (2007) concentrated on the learning environment rather than on the ability of students to use new words, the question still remains whether learning the form and meaning of a word is sufficient to learn how to use the word accurately in context. All previous research on contextualized vocabulary learning focuses on exposing students to context through reading and testing their ability to learn the vocabulary from these contexts, rather than testing students' ability to create a context and use the target words. The qualitative analysis of the chat transcripts gives us important insight into contextualized vocabulary use through communication strategies.

Direct and interactional communication strategies reflect problems in interaction and vocabulary use or understanding, whether it is initiated by a participant in their turn or by their interlocutors. However, it is important to remember that these CS are not usually used by students who do not encounter any communication problems throughout their role-plays. Only contextualizing strategies are meant to gather specific data from the chat transcripts that can help

analyze students' use of the target words in context when negotiation of meaning is not taking place.

Considering the large amount of CS used throughout the data, it is clear that students participating in this study found the task challenging. However, the distribution of specific CS also shows differences in information processing and vocabulary learning between the three groups. For a better overview and a more accurate interpretation of these strategies, this part of the chapter is divided into three parts, each dealing with one type of CS.

6.4.1 Direct and Indirect Strategies

As shown in the previous chapter, direct strategies are used when interlocutors are experiencing difficulties with a concept and try to solve this problem on their own. Direct strategies are as such a non-communicative way to deal with communication breakdowns. Some direct strategies are also not meant to solve a problem in the sense that the interlocutor finally understands the word or concept missing for a successful communicative situation or to avoid miscommunication. On the contrary, most direct strategies lead to pursuing a conversation without addressing the problem at hand. As such, direct strategies are not based on negotiating the meaning of a word but on one participant's specific behaviour regarding non-understanding of a concept. Nevertheless, the use of direct strategies does not necessarily lead to a lack of communicative situation about a specific concept, but can lead to various reactions from the chat

partner and a negotiation around the meaning of a word could take place, even if it was not intended by the first interlocutor.

With regard to the amount of direct strategies found in the dataset, it is interesting to observe that the group that used direct strategies the most was the control group, which reinforces the observations made above that participants from the control group were not able to process meaning and context-related information as successfully as the experimental groups. The group using the least direct strategies was the German group, indicating that they were able to use more interactional strategies to overcome communication issues, or contextualizing strategies to deepen the context of their interaction. Overall, however, direct strategies were less used throughout the chat transcripts than interactional or contextualizing strategies. It is interesting to note that Alwi and Adams (2009) found a similar behaviour when testing students in SCMC environments and comparing their results with face-to-face studies such as Lafford's (2004). In a SCMC environment, students seem to use interactional strategies more than direct strategies, which seems to be contrary to students' behaviour in a face-to-face communicative environment.

In addition, interesting conclusions can be drawn from observing each direct CS individually. The direct strategy most commonly used by the control group was to provide a translation for their chat partner without being prompted to, which as a preemptive strategy shows that chat partners anticipate a lack of knowledge from their interlocutors (Smith, 2003). Although the English experimental group had the highest number of occurrences of commenting on

their own insecurity using a specific word, this CS was also widely used by the control group throughout their role-play. As mentioned above, the use of direct strategies does not hinder the occurrence of a communicative situation in order to deal with the problem raised by the use of the CS. Especially by commenting on their own insecurity using a target word, students can trigger a reaction from their partner that would confirm or dismiss the use of a word within a specific context. Whereas this type of reaction did not occur in the data from the control group, a few instances did happen with the English experimental group, showing that students were able to clarify the use of a target word for their interlocutor showing insecurity.

Therefore, direct strategies used by the control group did not lead to any communicative situations, showing that the level of information processing with regard to the context of word use was not sufficient to negotiate communication problems occurring during the contextualized task. These findings are confirmed by the number of occurrences of the indirect strategy 'feigning understanding' used by the control group. The control group used this CS the most. In this case, this CS did not lead to any further explanation by the chat partner; instead of starting a negotiation or an explanation of the concept, the topic at hand was replaced within a few turns.

Another interesting finding from the analysis of direct strategies concerns the amount of occurrences of 'guessing' in the data from the German experimental group. It seems that even though the German group used the least direct strategies, 'guessing' was used more frequently by this group in order to

carry on the conversation. It seems that the L2 group participants remembered meanings of words but could not necessarily link these meanings to the accurate word form and by way of 'guessing' were able to address this issue with their partner. As shown through excerpt 5 in the previous chapter, students often knew which meaning and context they were able to use within their role-plays, but confused the forms of several words in a few instances. 'Guessing' in this case was therefore close to a confirmation request and did not refer to the meaning of a specific word but rather to the form belonging to a specific meaning. It is particularly interesting to observe that 'guessing' was only used by the L2 experimental group during the delayed session of the chat.

Therefore, whereas each group had a different way of using various direct or indirect strategies, it seems that the experimental groups made use of these strategies in a more communicative way, i.e. by means of negotiation or confirmation, while the control group used direct strategies merely in order to continue the task at hand. Conclusions drawn from the use of direct and indirect strategies, therefore, already show that the experimental groups were able to not only retain word forms or meaning but also were more easily able to connect these concepts to specific contexts. The next part of this chapter deals with interactional strategies and confirms these hypotheses.

6.4.2 Interactional strategies

Interactional strategies occur through the negotiation of a concept by both chat partners. These strategies are meant to involve one's interlocutor in the

problem-solving process taking place through a specific communicative situation. Similar to the direct strategies, the amount of interactional strategies used throughout the data already gives strong indications on the different groups' abilities to deal with the context of new words. Considering the results from the direct strategies discussed above, a stronger focus on communication and contextualized negotiation can be expected from the experimental groups, since these participants had access to contextualized information through the glosses presented in the readings.

The control group used three interactional strategies more frequently than the experimental groups. The control group used the most clarification requests, most commonly leading to the second most used strategy by that group, translations into the L1. The third strategy concerned accuracy checks during the conversations. It is apparent that the control group dealt differently with the target words than the experimental groups. Other clarification requests in the chat transcripts written by the experimental groups often lead to an explanation in the L2 or to rephrasing the problem trigger. In the case of the control group, clarification requests lead mostly to direct translations. In addition, translating a word into the L1, although showing a certain knowledge of a word's meaning, indicates that participants' understanding of the contexts of the target words was not sufficient to pursue their interaction in the L2; they were therefore not able to explain a concept or build a context around it in German, but rather they had to switch into English in order to solve the communication problem at hand. While this behavior seems to be typical for the control group in these particular chat

transcripts and shows that the students participating in the study as a control group are less comfortable with the task and the communication patterns revolving around the target words, these observations also show a certain lack of motivation with regard to students' involvement in that particular task. It seems that students who were not exposed to glosses and therefore did not receive any type of explanations of the target words tend to deal with this task in a more direct manner, by providing translations or using CS that require less elaborate interaction.

The group using the most interactional strategies was the English experimental group, transferring knowledge from their interlocutor's speech most frequently by taking up target word information and rephrasing it in their own utterances. This strategy shows, similar to the conclusions drawn on the use of direct strategies by the German experimental group in the previous section, that students participating in the English experimental group were more frequently lacking knowledge of the form of the word than its meaning. By transferring the use of a target word into their own speech through uptake and expanding on the use of this particular target word, participants from the English experimental group demonstrated being able to recognize a meaning and a context from their interlocutor's speech, hence reinforcing the processes of inferring meaning from context started through the readings during the first phase of the study. In the case that students recognized the form of a word but were not able to remember its meaning, they could not make this transfer and use the target word in their own sentence without first using another strategy such as requesting clarification.

The German experimental group also used this strategy more frequently than other interactional strategies, along with 'asking for confirmation' and 'rephrasing'. While the control group therefore used strategies showing their doubts about their use of the new target words, the experimental groups seemed to be able to use CS in order to confirm their knowledge of word meanings or to reinforce their retention of word forms.

These findings are consistent with conclusions from Nassaji's study (2003), based on Huckin and Bloch's (1993) cognitive model of inferring word meanings, referring to knowledge sources and strategies of repeating concepts in contexts as useful tools for vocabulary learning. While Nassaji's study concentrated on lexical inferencing from contextualized sources as opposed to inferring meanings to produce contexts as in the present study, Huckin and Bloch's model seems to apply to the data at hand, in that strategies used by the learners from the experimental groups seem to help participants in testing their own word-meaning hypotheses. As mentioned in Nassaji (2003), some CS [used in think-aloud protocols] "can be seen as examples of cognitive decision-making processes learners use while interacting with the text" (p. 662). While Nassaji's participants were asked to produce think-aloud protocols, the participants of the present study were able to interact with their partner through the chat task, which allowed them to process meaning-finding hypotheses and the contextualization of word meanings through their own conversation.

While no claims can be made, based on the present findings, that students have fully acquired the new vocabulary items, there are, however, strong

indications that the glosses have had a positive influence on students' ability to use the words in context or to negotiate the meaning of these words, as compared to the control group. Following Smith (2004), observing students' behaviour with unknown words and their learning process through CMC jigsaw and decision-making tasks, negotiation of meaning and CS use with new words seems to help students acquiring new lexical items.

Glosses therefore seem to help students process meaning and context information deeper than a mere exposure to words in contextualized readings. By using specific CS, students were able to show that the knowledge gaps and communication problems they experienced during their interaction could be addressed through extended negotiation, mostly in the L2. The participants from the control group, however, were not always able to negotiate meanings or understand the context of words and had to rely more on direct strategies or interactional strategies leading to translations.

The last type of CS has been referred to as contextualizing strategies, since they consist of using semantic information in order to link the target words to specific contexts, or to confirm one's understanding of a context introduced through a target word. Conclusions drawn from the use of these strategies by the various groups are presented and discussed in the last part of this chapter.

6.4.3 Contextualizing strategies

These communication strategies were presented in the methodology section and examples were given in the previous chapter. They are meant to show how

students can demonstrate knowledge of the use of target words in context throughout their role-play. Furthermore, they allow students to use more complex sentence structures around the target words, showing a deeper knowledge of word meanings and context. Once again starting by drawing conclusions from the amount of contextualizing strategies used by each group, the difference between the control group and the experimental groups becomes even more evident in this section. Contextualizing strategies aim at describing the semantic connections that students were able to make between a target word and its context of use, either by linking it to another target word or by using words related to the same semantic field. While the English group used 137 and the German group used 89 contextualizing strategies, the control group only used 59, mainly by connecting a target word with semantically connected words.

According to Mayer's cognitive theory (2001), the findings from the analysis of the contextualizing strategies show the various levels of vocabulary learning through multimedia tools, i.e. transfer and retention. While retention refers to the ability of participants to remember important information from the vocabulary presentation (the three readings and comprehension questions in the present study), transfer describes the ability of students to use this information in order to solve communication problems. Whereas the control group could show some retention of the new vocabulary, the ability to transfer this new knowledge into a specific context and to use this knowledge to explain the context at hand or to react to it to further the conversation was more present in the data from the experimental groups. In other words, the experimental groups were able to

generate hypotheses about the new words and their meaning and context more successfully than the control group. These processes can be further explained through Huckin and Bloch's cognitive model (1993) presented above.

In the case of the present study, this model can be used to explain the differences between the experimental groups and the control group as well as to conclude on the usefulness of the glosses presented to students in the readings for their abilities to infer meanings and contexts. It seems that glosses can enhance the performance of the generator/evaluator module in order to create a more successful process of inferring the meaning of glossed words. Whereas it is difficult to conclude that the meaning-inferring process cannot be successful without the use of glosses in readings, it seems that much more exposure to target words in various contexts would be necessary in order to achieve the same results without glosses.

The first contextualizing strategy consists of linking two target words from semantically similar contexts in order to reinforce the ideas presented in one's utterance. To this end, students were able to connect words like 'Schalter' (*counter*) and 'Angestellter' (*employee*) or 'Mücke' (*mosquito*) and 'stechen' (*to bite – for insects*). By connecting these words, students were able not only to show their own understanding of the words and their semantic context, but also to create a deeper context of information for their chat partners. It is interesting to observe that the experimental groups were able to use approximately the same proportions of target words connections (29% – 40 out of 137 contextualizing strategies for the English group and 21% – 19 out of 89 contextualizing strategies

for the German experimental group), even though the German group was exposed to more contextualized information through the explanations from the glosses. It seems that the language of the gloss did not influence students' performances neither on the productive and receptive tests, nor towards the ability to link two word contexts in full sentences.

These similarities remain when looking at the numbers for the second contextualizing strategy, where the German group created 47 links between a target word and other semantically relevant words, whereas the English group was able to make these connections 72 times throughout their role-plays, which for both groups represents 52% of the contextualizing strategies used. Looking at the use of specific target words indicates a deeper understanding and processing from the participants from the English experimental group. The word 'Schatten' (translated as *shadow* in the English gloss with a picture reinforcing this meaning) was used by the English group in both meanings '*shadow'* and '*shade'*, which shows that they were able to process both information from the glosses and the contexts of the reading passages.

The control group was able to link some target words to a specific context, which could be explained through the exposure to the readings. The students who were able to understand the contexts of the target words were then able to use these words accurately during their role-play; however, as shown above, they were not necessarily able to negotiate the meaning of these words or use further CS in order to explain or expand on their conversations with the target words.

The third contextualizing strategy consisting of reacting to a partner's utterance and reinforcing one's own understanding of the interaction was also less used by the control group, giving evidence that the use of target words, however accurate in one interlocutor's utterance, did not lead to further communication. The experimental groups did use this strategy more throughout their role-plays (23 times for the German experimental group and 25 times for the English experimental group), demonstrating at least passive knowledge of the contexts of the target words at hand, since they were able to comment or react to a target word being used in their interlocutor's speech.

These three contextualizing strategies therefore show various steps and processes for students' understanding, learning and application of new vocabulary in context.

The fourth research question aimed at finding out whether the various types of glosses had different effects for learners' ability to use target words in context. After considering the use of CS in the chat data, showing students' knowledge gaps as well as understanding of new words, no conclusions can be drawn as to the variance between the use of the L1 or the L2 in glosses. Whereas it seems important to design multimedia glosses for a deeper understanding of new words, nothing indicates that the language used in the glosses has a particular effect on students' ability to use new words in context. While a few differences were pointed out in the amount of CS used by each group, it has also been shown that some CS display a better knowledge of the meaning and the context of specific words than others. The control group was able to use CS in their role-play and

achieve a certain amount of problem-solving negotiation, but they mostly used CS that did not by nature lead to further interaction. On the contrary, most problem-solving interactions from the control group were based on direct appeals for help and translations. The CS used by the experimental groups, however, showed more knowledge of meaning and context, whereas there were some difficulties remembering certain forms of words. These results therefore show that the experimental groups – although not all of its participants were able to learn the target words – performed generally better on the use of target words in context, independently from the language they were exposed to in the glossed readings.

7. CONCLUSION

This study aimed to determine to what extent students are able to understand and learn new vocabulary beyond the form-meaning paradigm as well as to use newly learnt contextualized information within a contextualized task. This study is anchored in a stream of research on reading comprehension and incidental vocabulary learning through reading tasks and used level-appropriate texts in order to introduce students to new vocabulary, which was integrated into their regular curricular content. In addition, a series of tests was conducted to measure whether pedagogical instruments featuring reading passages with glosses can be used successfully in second language vocabulary learning. While contextualized information was addressed in previous studies, only the comprehension of contextualized input was considered, and analyses were solely conducted on students' comprehension of context. This study offers a new approach to context learning in vocabulary acquisition as well as context processing. Studies on vocabulary learning through reading to date have concentrated on students' ability to recognize and produce words that they were exposed to. The present study aims at filling a gap between the abilities of students to learn and recognize form and meaning on the one hand and use vocabulary in context on the other.

Considering the number of participants (n=108) and the various aspects of research addressed by this study, results were analyzed both quantitatively and qualitatively, allowing for a better understanding of the processes of vocabulary acquisition as well as more precise insight into pedagogical tools that can be used

to expose students to more contextualized information through classroom materials.

Before evaluating this study within the field of research and drawing conclusions on pedagogical benefits, the results are once again summarized below for a clearer overview of the findings.

7.1 Summary of findings

7.1.1 First research question: text comprehension through glosses

This study has shown that the glosses used in the reading passages to explain new concepts to students were beneficial for their learning of new vocabulary. In accordance with previous studies analyzing incidental vocabulary learning through readings (Hulstijn, 2005; Hulstijn et al., 1996; Peters et al., 2009; Rott, 2007; Zahar et al., 2001), it has been shown that glosses not only enable students to understand second language texts better, but also to infer meaning of new words from the given contexts. Attention-raising enhancement techniques such as glosses help students understand the context of reading passages. Regarding reading comprehension, significant differences occurred on the third day of the study already, since the control group performed significantly worse on that day than on the first two days of the study, which has been attributed to various factors, i.e. to a lack of motivation to complete the task at hand. The answers from the experimental groups on the comprehension questions did not yield any significant differences between the three days of the treatment. Students reading with glosses therefore seem to be able to keep their level of

comprehension over time as well as their motivation and focus to complete the tasks.

7.1.2 Second research question: understanding and learning through glosses

This section is meant to summarize the results firstly with regard to the differences found between the experimental groups and the control group, and secondly considering the language used in the specific glosses, hence between the two experimental groups.

The immediate and delayed productive and receptive posttests yielded significant differences between the experimental groups and the control group, showing the ability of the experimental groups to outperform the control group on receptive and productive knowledge of the target words. These results therefore show that glosses allow for a deeper level of input processing, involving both the recognition of word meanings as well as the retention of word forms. As shown in previous studies (Chun & Plass, 1996; Kost et al., 1999; Nagata, 1999; Rott et al., 2002; Yanguas, 2009; Yoshii & Flaitz, 2002), input enhancement in the form of multimedia glosses (in this case text – L1 translation or L2 explanation – and picture) has positive long-term effects for students' performance in vocabulary learning.

These results help answer the second research question of this study concerning the ability of students to retain and recognize forms and meanings of target words while exposed to glosses in a positive manner and confirm previous studies in this field. However, differences could not be found between the two

experimental groups on the various tests (comprehension questions, immediate and delayed productive and receptive tests), which indicates that the language used in glosses (L1 or L2) does not seem to make a difference for students to learn meaning and form of new vocabulary.

7.1.3 Third research question: Use of target words in context

The third research question addresses a new aspect of research, in that it is concerned with the ability of students to use input enhancement such as multimedia glosses to process context information of specific target words. To date, research has focused on students' recognition of words in context as well as understanding of context through reading (de Bot et al., 1997; Dubin & Olshtain, 1993; Huckin & Bloch, 1993; Nassaji, 2003), but so far, no attempt has been made to measure students' ability to use words in specific contexts after reading with glosses and being exposed to new vocabulary. The goal of the third research question was therefore to quantify the use of target words in students' interactions recorded as role-plays in online synchronous chats. Whereas the control group was once again outperformed by the experimental groups on the immediate chat test, the delayed chat test did not lead to any differences between the three groups. In addition, no differences could be found between the two experimental groups on either the immediate or the delayed chat task, which leads to the conclusion that the language used in the glosses did not have any effects with regard to students' ability to use the target words in a contextualized manner. It has been shown in previous chapters that these results are congruent with other studies

using similar tools to measure students' learning of vocabulary through reading tasks. Analyzing students' contextualization of target words through a chat task confirms these findings and validates the use of either language as a means of explaining new concepts in glosses.

Furthermore, the results indicate that the glosses used in this study do not allow students to retain context information over a longer period of time, since the participants from the experimental groups did not achieve significantly different results from the control group – reading without glosses – on the delayed contextualized test. Beyond the mere nature of the tools used to expose students to new vocabulary and expect learning of context information, it is possible that students processing lexical information through glosses would have needed more exposure to the glosses and the target words in order to achieve a long-term retention of those new concepts. Pedagogical implications for these findings as well as the need for further research in this specific area of study are addressed in later sections of this chapter.

7.1.4 Fourth research question: contextualization through communicative strategies

The fourth research question posed for this study was also concerned with the analysis of the chat transcripts, but aimed at discovering the various ways that students use to negotiate meaning and context of the target words and explain context information to their chat partner, hence showing their own understanding of the words' context information.

Once again, this analysis showed interesting behavior patterns for the three groups, each giving insight into students' abilities to learn and exchange context information. Students from all three groups used a wide array of communication strategies in order to be able to carry out their role-plays without communication breakdowns. These communication strategies are used to explain concepts (in the case of this study, the new vocabulary items) or to express non-understanding of the interlocutor's utterance. It has been shown that students in this study have used various types of communication strategies, ranging from direct, indirect, and interactional strategies to contextualizing strategies. While direct strategies are used in order to solve one's own communication problem without requiring an interaction with a partner, indirect strategies are used to carry on a conversation and do not carry meaning information. Interactional strategies, on the other hand, involve one's chat partner in the problem-solving process, either by way of asking for clarification – which would lead the interlocutor to explain the new concept – or by giving a hint of non-understanding, in which case the interlocutor could rephrase the sentence or the concept. As for the contextualizing strategies presented above, they were developed after observing the chat data in this study showing how students deal with using new vocabulary in a contextualized manner. Even though they do not appear in Dörnyei and Scott's (1997) taxonomy of communication strategies, they are used specifically for the analysis of the chat transcripts in this study, since they focus on the use of the target words in semantic context. Participants were able to use the four types of contextualizing strategies, hence showing that they can either place the target words into context

or understand the context information from a specific word. Some participants were able to link two or more target words into the same sentence and the same context, therefore showing that they are aware of the context of use of these specific words. Another strategy involved using a target word with semantically related words in order to show one's understanding of semantic information as well as to give one's interlocutor more information to understand the context of the conversation at hand. The third contextualizing strategy used in the transcripts consisted of showing a reaction to the use of a specific word that shows understanding of that word in context.

The analysis shows a gap between the communication strategies used by the control group and the experimental groups. While participants from the control group used more direct strategies in general, hence demonstrating a lack of strategic competence when trying to use the newly learnt target words, the experimental groups were able to use more interactional and contextualizing strategies, showing higher information processing and communicative abilities around the meaning and the context of the target words.

This study showed the impact of glosses on reading for learning new vocabulary with regard to meaning, form and context, since the experimental groups outperformed the control group on all immediate quantitative posttests, as well as on the productive and receptive posttests, and seemed to have also used more complex structures and communicative strategies throughout the chat. However, the results are not conclusive regarding the effects of the language used in the glosses for a more efficient language learning process, and further research

is needed to confirm these findings. The main aspect that this research aimed at – the learning of vocabulary with the goal of using the target words in context – seems successful, since participants from the experimental groups were able to retain meanings and use target words in a contextualized manner more successfully than the control group, as well as use more complex communication strategies to show their understanding of the words.

While research with glosses has been conducted to find out criteria – such as the types of glosses (internal vs. external, single vs. multimedia, L1 vs. L2) – that are more beneficial for students to process the information more successfully, learning of context information is a new area of research within the field of incidental vocabulary learning through readings. Whereas some research has been conducted regarding the way that students infer and understand context information through readings, more research needs to be done with regard to their ability to learn and use target words in context and actually communicate with newly learnt words.

The next section of this chapter is concerned with the pedagogical implications of this type of research as well as further research that can be conducted in order to gain more data and draw more precise conclusions about learning the context information of new words through readings. In addition, the limitations found with the research design of this study are addressed.

7.2 Pedagogical implications

This stream of research aims at finding a way for students to be able not only to learn the form and meaning of new lexical items, but also to be able to communicate using new knowledge and enhance their communicative competence. This study has shown that glosses seem to be an important pedagogical tool that can be used in classroom reading activities to expose students to vocabulary in context and help them learn to recognize and understand the words and contexts from the readings, as well as to use these new words in contextualized situations.

The various results yielded from the different tests conducted throughout this study show that vocabulary learning is a complex mechanism in which various aspects need to be considered and implemented for successful acquisition. While the language used in the glosses did not seem to make any difference in participants' abilities to retain and produce word forms and meanings, the results show that glosses are critical for the information processing of new words presented in reading. Whereas students were able to show long-term retention and production of newly learnt lexical items in the delayed tests, they could not use these new words in context after four weeks during the delayed chat task.

Since the students participating in the experimental groups were able to use more words in context in the immediate chat task and used more communication strategies overall, it seems that conclusions can be drawn from this study for the design of glosses in second language readings. The results from this research show that specific combinations of information – such as a verbal and a non-

verbal representation, as proposed in this study – are necessary for students' understanding and processing of vocabulary forms, meanings and contexts. The results indicate that combining a verbal representation of a word (in the L1 or L2) with another glossing method (multimedia glosses, combining language with a pictorial, audio or video cue) can be beneficial for students' learning. While the results were not conclusive as to the effect of the language used for lexical explanations in glosses, and it seems that students seem to be able to process word meanings and context information from glosses and reading contexts independently from the language used in the glosses presented to them, factors influencing students' performances have been addressed, such as the type of processing that various formats of glosses trigger. Exposure to lexical information and additional input in the L2 requires learners to identify, understand, and process this additional input, which leads to deeper levels of processing of the information at hand. Students reading with glosses in the L1, however, will be able to process the content of the gloss faster, since they do not have to analyze the L2 information of the new word. The present study did not measure differences in depth and speed of processing in these specific activities, but further research in the area could lead to insightful findings.

In addition, while it is important that the vocabulary is presented in context, glosses should not be overwhelmingly present throughout the readings. Students need to be able to process the content and the contexts presented to them in order to appreciate the use of target words in context as well as to process the information provided through the glosses. For this reason, CMC-based readings

allow for giving access to vocabulary information while separating the glosses from the text itself and keeping the textual entity intact. In addition, referring to external glosses, such as an extra sheet of paper or a search through a dictionary (online or paper), would take up too much time away from the text itself for students to keep track of the context. Glosses in a CMC environment in the form of hyperlinks therefore seem to be an optimal way to give fast access to vocabulary information without changing the text itself.

The lack of differences found with regard to the quantitative analysis of the delayed chat transcripts seem to indicate that the amount and time of exposure from the present study seemed to be insufficient for students to retain contextualized information over time. Classroom reading activities presenting students with new vocabulary should therefore be designed towards a higher amount of exposure to the key words, repeated reading sessions, as well as more communicative activities allowing students to practice the new words using their own interlanguage for a deeper processing of form-meaning connections and vocabulary context information. It seems that while glosses yielded successful results on the immediate chat task, students would have needed more exposure and more occasions for hypothesis testing of the meaning and context of the new words. In addition, students need to practice newly learnt vocabulary in order to ensure processing this new information into their long-term memory. Activities such as the chat task in this study help students process new information more deeply and better retain this information.

The use of a chat as a means to use new vocabulary in context seems to be a successful way for students to engage with a specific topic and to process context information. Meaning-oriented activities are needed in the classroom for students to create a context around the new forms and lexical items that they encounter. This research shows that asking students to process contextualized information helps them use these new lexical items in context more easily. In addition, students enjoyed using a common tool such as a chat in order to communicate in a foreign language. This type of communication is used on a regular basis and being able to communicate online in a foreign language helps students connect to the language learning process and make it more relevant to their daily communicative habits. Chats also offer the advantage of giving students time to think before writing, which helps them formulate their sentences and reflect on the context at hand before participating in the interaction. While oral communication is crucial for second language learning, chat tasks seem to gain relevance for students and present pedagogical advantages in certain learning situations.

According to the questionnaires and students' feedback gathered at the end of the study, students seemed to find the glosses very helpful for comprehension of the texts and the context of the target words. Comments indicate that students from the English experimental group found the glosses very helpful, whereas the students from the German experimental group thought that the combination of an L2 explanation with a picture was somewhat misleading for specific words, especially adjectives. While the description of verbs through the glosses did not lead to any comprehension problems, some students indicated misunderstanding

some adjectives (such as ‘eklig’) at first, until they could infer this particular word’s meaning from the readings. While students from the German experimental group therefore stated having more problems understanding the meaning and the contexts of the target words than their peers in the English experimental group, it seems that the repeated exposure to the target words through three texts and comprehension questions helped them infer meaning and context of the words. Multimedia glosses therefore seem to be helpful for vocabulary learning and context understanding.

Although this study demonstrates that glosses in readings are helpful to understand, learn, and retain lexical context information, it is however difficult to draw pedagogical implications from a new direction of research and further studies are needed to confirm the role of glosses in contextualized vocabulary use. In addition, it is important to note that the present study had some limitations that could hinder findings and more precise results are needed regarding the effects of glossed texts for vocabulary acquisition.

The last part of this chapter presents these limitations and concludes with ideas for future research in this particular field.

7.3 Limitations and further research

The contextualized productive chat task was a role-play presented to the participants of the study through eclass. After reading three texts on the topic of vacation and travel, answering comprehension questions and completing the quantitative receptive and productive tests, students were asked to participate in

pairs in a role-play online on the same topic, in which students were asked to incorporate as many of the target words as possible.

Students in this study were exposed to the target words in their respective treatment (L1 gloss, L2 gloss, or no gloss) four times in total, once per reading task and once through the five comprehension questions at the end of each reading. Whereas the time allotted for each reading was limited to 20 minutes, and the time allotted for the comprehension questions was 10 minutes every day, the question remains whether students had enough exposure to the target words and the glosses in order to efficiently learn from the reading tasks. According to a study conducted by Saragi et. al (1978), the optimal frequency of exposure to new lexical items for learning vocabulary is eight to ten times. The students participating in the present study saw the target words four times in total, which could account for the lack of differences between the experimental groups. In addition, the amount of time that each student spent looking at the glosses, which would reduce the time spent reading the words in context, was not measured. Students were also able to click on each hyperlink in the text more than once, and even though the pop-up window reloaded and they were not able to see several glosses at once, they could have clicked on each word several times, once again reducing the time spent reading the texts. The behavior of students with regard to the glosses provided in the experimental conditions was therefore not recorded and could have given more insight into the role played by specific glosses. Further research could compare students' behavior with L1 and L2 glosses while reading – through think-aloud

protocols or extended post-study interviews – in order to investigate eventual differences between these experimental conditions.

Using eclass offers both advantages and disadvantages that influence the analysis of the data collected. On the one hand, eclass allows for keeping the transcripts online and recording any communication happening between participants and gives the time of each entry, which can be interesting in order to see if the online conversation was interrupted at any point. On the other hand, recording the time of entry can also show whether students were writing and submitting their sentences at the same time, which could explain specific interactions, reactions, and questions uttered by the participants. Unfortunately, eclass only provides the time of entry by indicating the minutes, not the seconds, which can be quite imprecise in the context of this study. Even if two sentences are submitted within the same minute, it is possible that a significant amount of time has passed between two entries.

While the use of a chat format presents evident pedagogical advantages, the fact that students are used to interacting with chat tools in daily life can be detrimental to the flow of a study such as this present research. Students tend to be used to a certain chat tool based on software preferences or access to specific people. The chat rooms in eclass, however, are presented differently from other tools that students might use every day, which means that participants needed some time to get used to the chat format in eclass. Some students indicated in their post-study questionnaires that they were not able to see whether or when their chat partner was writing, which sometimes led to utterances being posted at the same

time, disrupting the flow of the conversation. Students are used to communicating with chat tools and being aware of their partner's writing activity is an important part of the organization of their discourse. The chat task in which the participants took part for this study was therefore different from the usual online conversation forms known to students and influenced their turn-taking strategies throughout the interactions.

The design of the eclass chat tool therefore influenced the quality of the data gathered during the contextualized chat task of this study. The lack of precise information about the duration between responses and the few 'errors' in turn-taking occurring because students were unaware that their partner was answering the previous utterance had to be considered and evaluated in the qualitative analysis of communicative strategies. Using a more precise chat tool that presents features known to students would be more beneficial for their own interaction and use of the vocabulary, as well as for the analysis of the dataset as a whole.

In addition, although students were not exposed to the target words at any point during the time elapsed between the immediate and delayed posttests, some instructors for the experimental groups reported seeing some of the target words in students' work during that time. While this shows that the glosses were beneficial for students' learning of vocabulary, no measurement of exposure or use of target words was taken during that time. By using some of the target words and receiving positive feedback from their instructors, students deepened their knowledge of form, meaning, and context of the target words, which certainly influenced their performance on the delayed posttests. The problem in this case is

not that students were able to use the vocabulary, but rather that the different classes could have been given various types of tasks, more or less inclined to the use of the target words and to contextualized communication. In this case, some specific groups of students were able to use the words outside of the measured tasks of the study. While it is not possible to analyze this additional exposure, the fact that some students might have been given opportunities to use the target words more than other students needs to be considered in the interpretation of the results.

Furthermore, as Smith (2008) points out, even though chat data give a comprehensive overview of students' interaction and allows for recording both the actual conversation as well as peripheral interaction on word meanings or comments about the tasks, other important information cannot be recorded through chat interaction alone. Students' reactions to their interlocutor's utterance or their writing behavior (deleting parts of sentences before submitting the utterance) are not recorded on the chat transcripts. Video recordings of the students and the screen could also allow for capturing oral and gestural reactions as well as self-repair situations, which could give further insight into students' understanding and behavior towards the target words.

Finally, the treatment and the immediate posttests took place during a limited amount of time (four days) during the semester with the delayed tests being conducted four weeks later, and some students were not able to attend every class. Some data were therefore missing for a few participants and had to be eliminated from the final dataset so as not to skew the findings. In order to avoid

this situation, future studies could be designed to have measurements of students' learning more frequently over a longer period of time, which would allow a more linear detection of students' progress and effects of the glossed readings for students' learning.

In general, further research is needed in order to recognize the impact of classroom activities on students' understanding of contextualized information as well as to design activities leading to more successful learning of context. The goal of this type of research is to find out how to turn input into intake and to allow for context understanding to become part of students' interlanguage. Some limitations for this specific study have already been mentioned and should be considered for developing further studies in this field. In addition, researchers could be interested in further investigating research designs leading to better understanding of the cognitive and pedagogical processes involved in context inferring and learning. To what extent can the concreteness vs. abstractness of words be accounted for in vocabulary learning using input-output cycles? Various research designs should be tested, including various grammatical categories, since the way that vocabulary meanings and context is presented to students is crucial to their success in processing this type of information. Hypermedia glosses can be designed using a variety of input forms, including authentic audio and video exposure in order to further anchor the data into cultural materials. Whereas the frequency of exposure and ratio of familiar words necessary for reading comprehension have already been examined, studies comparing these factors with various types of glossed input could lead to insightful information for the design

of treatment conditions and tests. To what extent does the ratio of familiar words needed in a text decrease with the application of multimodal glosses and what is an optimal amount and time of exposure for students' retention of glossed words? In addition, as Yun (2011) reports, the impact of instructional effects has been rarely analyzed and discussed, since most studies concentrate on classroom quasi-experiment designs in which the role of the instructor is not considered. Furthermore, studying the types of words that students are able to learn more efficiently through readings and gaining a better understanding about the potential of such activities for the acquisition of specific word categories could enhance the development of classroom activities and improve students' language acquisition.

With the growing needs to use multimedia technologies in the classroom in order to create a more 'real-life' experience for students, the use of chats and online readings with hypertext glosses need to be developed in a setting that corresponds more to students' communication habits, for example including chat activities with a peer during the reading process, during which students would be able to address their difficulties with regard to comprehension as well as understanding of text information. While the chat task in the present study was used as a test for learning, future research could use such a task as additional treatment after reading activities in order to identify not only the effects of multimedia glosses, but rather the effects of the use of new words in context for vocabulary learning.

In terms of students' proficiency, the present study was conducted solely with low-intermediate students; while the use of glosses did seem beneficial for

students to learn the given information with regard to form, meaning, and context, further studies should be designed to include more proficient learners and to adapt and develop materials for students at various levels of proficiency.

In addition, as Xu (2010) mentions, it is recommended to conduct more frequent delayed tests, both during the period between the immediate and the delayed posttests (four weeks in the present study), as well as at a later time. These repeated measures of students' progress could help assess the effects of each type of gloss over a longer period of time, which in turn would generate important information for material development.

Finally, it has been mentioned that the quantitative results from the immediate and delayed chat tasks did not show any differences between the English and the German experimental groups with regard to the use of target words in context during chat interaction. Evidently, more research is needed in this area, comparing L1 and L2 input, in order to understand this pattern and find a way to design materials allowing students to be exposed to their L2 only to reach a higher level of contextual processing. Analyzing the various processes and effects of depth and speed of processing could be indicative of how students read and comprehend texts and learn new vocabulary. Which resources do students focus on when reading in a foreign language with input enhancement techniques such as glosses? What is the role of the language used in the gloss for understanding of texts and vocabulary learning?

These research areas are essential in developing classroom reading materials, tasks and textbooks that address the way that learners efficiently

comprehend and learn new vocabulary from context and transfer this information into their own discourse.

7.4 Conclusion

This study was conducted based on the need to find ways to teach contextualized information to language learners. The mere understanding of word meanings and the retention of word forms does not always lead to an accurate use of a concept; students, while able to form correct sentences and use new vocabulary, seem to sometimes struggle with words that can be used in different contexts in their L2. Learning how to use a word correctly and raising students' awareness to lexical context is crucial for their success and proficiency. Especially considering the enhanced exposure to authentic second language materials through the use of web-based searches, it seems that classroom activities need to further adapt and use these opportunities to expose students to meaningful activities and contextualized information.

The research questions proposed in this study aimed at discovering ways to enhance students' learning opportunities and experiences by providing them with explanations and glosses for new vocabulary while allowing for the use of contextualized materials online. The first research question was concerned with the influence that glosses have on students' ability to comprehend glossed reading passages. While the language used in the glosses did not seem to make a difference for the performance of the experimental groups in answering the comprehension questions, the control group performed significantly worse on the

third day of the study, showing that glosses can affect students' motivation and on-task concentration. One of the main foci of this research was to investigate the role played by the language used in glosses for students' retention and production of new lexical items (second research question) as well their ability to use these new words in a contextualized task (third research question). While the glosses provided to the experimental groups in the L1 and the L2 did not lead to any significant differences, it has become evident that they did allow for a better understanding of the texts as well as the target words used in this study. Students in the experimental groups were able to outperform the control group on all immediate tests, including the contextualized chat task (third research question). As for the delayed tests, the experimental groups performed better than the control group regarding retention and production of the target words. Although no differences have been found with regard to the amount of CS used in the delayed chat task, students reading with glossed conditions were able to use more contextualized and interactional strategies, hence allowing them to create a broader communication context. Even though the use of the L1 or the L2 in the multimedia glosses has not proven to make a difference for students' understanding of reading passages or learning of new vocabulary, using glosses seems to help deeper lexical processing and long-term retention of new words. While more research is needed in order to understand the processes involved in reading with glosses in a particular language and learning the context information of new lexical items, this study has shown the importance of meaningful tasks for reading comprehension, word retention, and the construction of context.

Using chats in order to measure participants' abilities to create a context in which they can use new vocabulary is one possibility of providing students with activities to which they can relate. Most students participating in the present study indicated that they were able to use a chatroom in German for the first time, and responses were positive towards introducing a communication situation into their German classroom experience that seems so 'natural' to them. Online synchronous chats, as mentioned above, offer a mixed interaction situation between oral and written communication, which allows for a multitude of possibilities for second language learning, both inside and outside the classroom. While it is important to offer meaningful material to students, adapting to their 'natural' communication situations could lead to higher motivation and learning awareness. By finding relevant vocabulary and engaging students in activities using daily tools, students are more able to realize the advantages of learning and are more motivated to learn. In addition, online materials offer a wide array of resources, hence engaging students with different levels of proficiency, aptitudes and learning preferences.

Evidently, more studies are needed in order to assess the advantages of contextualized learning through online tools as well as to design meaningful activities using these findings. However, it seems that the combination of reading and chat interaction offer many opportunities for curriculum development towards motivational, contextualized and meaningful learning.

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APPENDIX 1: CONSENT FORM

Thank you for your participation in this research project. I am a graduate student in Applied Linguistics and I am interested in comparing and analyzing methods of contextualized learning. In order to take part in this study, you will be asked to read three texts, participate in tests and a role-play with a classmate. The study will take place on 5 different days during German class time.

Please be assured that your participation is *voluntary and you do not have to participate in this study. Your grades in the course will NOT be affected in any way by your decision to participate or not to participate in the study*. If you decide that you do not want to participate at any time during the study, you may stop without any negative consequences.

Your name will be replaced by an assigned number and your identity will *remain anonymous* in all reports of the study. Your results will NOT be shown to your instructor at any time. Your choice to participate and your answers in the study will NOT have any consequences on your grade in this class.

The collected language data (questionnaires, transcripts of online discussions) become
the property of Catherine Serrand, the principal investigator of this study. The research
shall be kept confidential, except for the purposes of inclusion in a paper or papers and
the publication of that paper or papers.
The researcher will maintain records of the study in a secure location accessible only by the researcher and the records shall be preserved until publication and a reasonable time thereafter, in accordance with scholarly practice and University regulations.

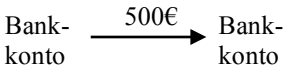
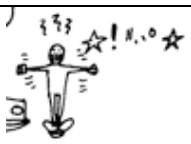
If you have any questions concerning this research project, please contact Catherine Serrand, Department of Modern Languages and Cultural Studies, 450-B Arts Building, telephone (780) 492-8543, email serrand@ualberta.ca.

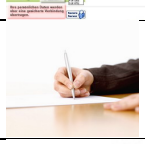
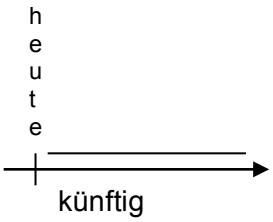
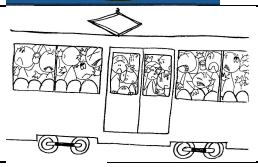
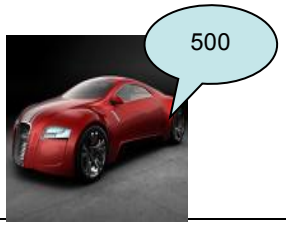
I have read and understood the consent form and I agree to its terms, and I [i.e., the
participant] will receive a copy of this consent form.

☐ I do NOT agree to participate in this study.
☐ I AGREE to participate in this study.

_____	_____	_____
Signature	Name (please print)	Date

APPENDIX 2: 21 TARGET WORDS IN THE PRETEST

German word	German explanation	English translation	English paraphrase	Picture
der Schalter	Langer Schreibtisch an der Bank	the counter	A large desk with tellers	
der Angestellte	Diese Person arbeitet	the employee	Staff member	
das Gepäck	Die Koffer	the luggage	Baggage	
die Mücke	Ein Insekt, das oft im Sommer kommt	the mosquito	A bug that eats blood	
der Schatten	Es kommt, wenn die Sonne scheint	the shadow	Dark outline made by the sunlight	
der Sonnenschirm	Ein Regeschirm gegen die Sonne	the sunshade		
die Führung	Eine Person erklärt die Geschichte der Stadt und der Monumente	the guided tour		
überweisen	Geld von einem Konto zum anderen senden	to transfer	To put money from one account to another	
fluchen	Böse sein	to swear	To curse	
stechen	So isst ein Insekt	to bite	That is how a mosquito eats	

anstehen	Lange warten	to wait in line	People are standing in a row	
ausspannen	Nichts machen	to relax	to rest	
buchen	reservieren	to book		
eintragen	ausfüllen	to sign in		
verletzt	Nicht gesund	injured	wounded	
gemeinsam	zusammen	together	In somebody's company	
künftig	später	in the future	later	
eklig	Nicht appetitlich	disgusting	Repulsive	
überfüllt	Sehr voll	crowded	Packed with people	
leise	Nicht laut	quiet		
günstig	Nicht teuer	Cheap		

APPENDIX 3: PRETEST

der Schalter
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "der Schalter":

überweisen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "überweisen":

günstig
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "günstig":

der Angestellte
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "der Angestellte":

fluchen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "fluchen":

verletzt
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "verletzt":

das Gepäck
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "das Gepäck":

stechen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "stechen":

leise
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "leise":

die Mücke
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "die Mücke":

anstehen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "anstehen"

gemeinsam
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "gemeinsam":

der Schatten

1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "der Schatten":

ausspannen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "ausspannen":

künftig
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "künftig":

der Sonnenschirm
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "der Sonnenschirm":

buchen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "buchen":

eklig
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "eklig":

die Führung
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word

Meaning of "die Führung":

eintragen
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "eintragen":

überfüllt
1. I have never seen this word
2. I have seen this word but I don't know its meaning
3. I know the meaning of this word
Meaning of "überfüllt":

APPENDIX 4: TEXTS AND COMPREHENSION QUESTIONS:

Drei Reiseberichte

1. Urlaub an der Nordsee

Letztes Jahr bin ich mit meinen Eltern in den Urlaub gegangen. Wir haben zwei Wochen im Sommer an der Nordsee verbracht. Meine Eltern wollten unbedingt ins Hotel gehen, weil sie es sauberer und einfacher finden. Unsere Ferien waren aber ganz schrecklich... Der erste Tag war so anstrengend! Wir hatten viel **Gepäck** aber nur ein kleines Auto und die Fahrt hat wirklich keinen Spaß gemacht. Mein Vater hat die ganze Zeit **geflucht**, weil der Verkehr auf der Autobahn chaotisch war. Die **gemeinsame** Fahrt dauerte einfach zu lange... Endlich sind wir im Hotel angekommen, aber am **Schalter** mussten wir Stunden lang **anstehen**, bis der **Angestellte** uns gesagt hat, dass unser Zimmer nicht gebucht war. Es gab ein Problem mit dem Computersystem und unser Name war nicht eingetragen. Meine Eltern mussten noch das Geld für das Hotel **überweisen**, weil die Kreditkartenmaschine nicht funktioniert hat. Endlich haben wir unseren Zimmerschlüssel bekommen und haben uns schon gefreut, weil wir **ausspannen** konnten. Aber als wir ins Zimmer gekommen sind, war es **eklig** und wir haben zuerst das Bad geputzt.

Nach diesen Problemen war das Hotel eigentlich ganz gut und unser Zimmer hatte eine Terrasse mit einem Tisch, Stühlen und einem Sonnenschirm. So konnten wir an heißen Tagen im **Schatten** sitzen oder liegen. Das Problem war, dass das Hotel direkt am Strand war. Tagsüber war es nie leise, weil der Strand **überfüllt** war und abends gab es viele **Mücken**! Jeden Abend beim Essen auf der Terrasse haben sie mich **gestochen** und so war dieser Urlaub nicht wirklich schön. Ich habe auch keine Leute kennen gelernt, weil meine Eltern organisierte Führungen zu Sehenswürdigkeiten in der Region gemacht haben, und ich musste mit ihnen mitkommen. Unsere Ferien waren also sehr interessant, aber nicht wirklich lustig. Eines Tages habe ich aber beschlossen, keine Monumente und Städte zu besichtigen, sondern einen ruhigen Tag am Strand zu machen. Da habe ich ein paar Leute gesehen, die mit dem Ball gespielt haben und ich bin zu ihnen gegangen. Leider habe ich mich an diesem Tag am Fuß **verletzt** und musste gleich ins Krankenhaus!

Künftig suche ich einen günstigeren Urlaubsort weit weg vom Strand und von meiner Familie....

Fragen:
1. Warum flucht der Vater?
Er ist krank
Es gibt zu viele Autos auf der Straße
Er will nicht in den Urlaub gehen
Er streitet sich mit seiner Frau

2. Was sagt der Angestellte im Hotel?
Das Zimmer ist noch nicht frei
Das Hotel ist am Wochenende geschlossen
Die Familie soll in ein anderes Hotel gehen
Das Hotelzimmer ist nicht reserviert

3. Warum mussten die Eltern Geld überweisen?
Sie haben vergessen zu bezahlen
Das Zimmer ist teuer als sie gedacht haben
Es gibt ein Problem mit dem Computersystem
Sie müssen ein zweites Zimmer reservieren

4. Was ist so eklig im Hotel?
Die Rezeption
Das Zimmer
Der Flur
Das Bad

5. Wann gibt es zu viele Mücken?
Morgens
Nachmittags
Abends
Nachts

2. Mit Freunden im Schwarzwald

Nach dem schlechten Urlaub mit meinen Eltern, wollte ich dann mit meinen Freunden Marko und Jens eine Woche in die Berge in den Schwarzwald gehen. Wir hatten alle viel für die Uni zu tun und es war Zeit, ein bisschen **auszuspannen**. Ich habe den Urlaub geplant und ich wollte keine Führungen durch Museen, keine **Mücken**, die mich überall **stechen** und keine lauten Touristen am Strand. Ich habe eine günstige und ruhige Wohnung in einem leisen Haus gebucht und habe schon drei Monate vorher das Geld **überwiesen**. Ich wollte keine Probleme haben, wie das Jahr davor mit meinen Eltern.

Der Anfang von dem Urlaub war schön. Ich war so glücklich, mit meinen Freunden in den Urlaub zu gehen! Die Fahrt war schon viel besser als mit meinen Eltern. Wir hatten viel weniger **Gepäck**, niemand hat über den Verkehr **geflucht**, niemand war gestresst und wir hatten viel Spaß!

Dann sind wir am Haus angekommen, haben uns an der Rezeption eingetragen und sind in die Wohnung gekommen. Alles war perfekt!

Am Abend haben wir **gemeinsam** den Rest der Woche geplant, weil ich eine Wanderung machen wollte, Marko wollte nur in der Wohnung bleiben und schlafen, und Jens wollte ins Schwimmbad gehen. Da mussten wir Kompromisse finden...

Am zweiten Tag sind wir also in den nahen Bergen gewandert. Der Schwarzwald ist wirklich sehr schön! Aber leider ist Jens gerutscht und hat sich am Arm **verletzt**. Wir mussten zum Arzt gehen und leider hat sich Jens der Arm

gebrochen. Er war ziemlich böse auf mich, weil er dann nicht mehr schwimmen konnte und weil die Wanderung meine Idee war. Trotzdem sind wir am nächsten Tag ins Schwimmbad gegangen, weil man dort auch draußen liegen konnte. Das war wirklich keine gute Idee... Das Schwimmbad war mit Leuten **überfüllt** und wir mussten eine halbe Stunde am **Schalter anstehen**. Als wir draußen unseren Sonnenschirm aufgebaut haben, ist ein **Angestellter** gekommen und hat uns gesagt, dass wir ihn haben dürfen und dass wir ihn wegbringen sollen. So haben wir den ganzen Nachmittag ohne **Schatten** verbracht und ich habe einen Sonnenbrand bekommen. Am Abend sind wir dann gegangen und wir haben in die **ekligen** Duschen am Schwimmbad geduscht, dann sind wir zurück in die Wohnung gefahren und wir sind dort bis zum Ende der Woche geblieben. Dieser Urlaub hat besser angefangen, aber am Ende war er auch schlimm und ich will **künftig** allein in den Urlaub fahren.

Fragen:
1. Wie ist die gemeinsame Woche für die drei Freunde?
langweilig
spannend
lustig
interessant

2. Wie lange mussten die Freunde am Schalter im Schwimmbad warten?
10 Minuten
eine halbe Stunde
drei Stunden
sie sind nicht ins Schwimmbad gegangen

3. Warum wollen die Freunde ausspannen?
Sie haben viel für die Uni zu tun
Sie sind einfach faul
Sie haben alle einen stressigen Job
Sie haben Stress mit ihrer Familie

4. Was ist mit Leuten überfüllt?
Die Stadt
Der Zug
Das Schwimmbad
Die Kneipe

5. Wo ist Jens verletzt?
Am Fuß
An der Hand
Am Bein
Am Arm

3. In der Jugendherberge in Berlin

Dieses Jahr habe ich entschieden, nicht mehr mit meinen Freunden und meiner Familie in den Urlaub zu gehen, sondern ich wollte einfach ein Wochenende allein in Berlin verbringen. Ich hatte aber nicht viel Geld und ich musste ein günstiges Zimmer in einer Jugendherberge buchen. Ich habe mein Wochenende so geplant, dass ich mich für eine Führung durch die Stadt eingetragen habe, aber auch Zeit habe, **auszuspannen**. Berlin hat viele Aktivitäten und viel Geschichte, und ich habe mich sehr auf den interessanten Urlaub gefreut. Am **Schalter** der Jugendherberge hat mir der **Angestellte** einen Stadtplan gegeben, so konnte ich ohne Probleme durch die Stadt reisen. Das Gute an einem Urlaub im Frühling war, dass ich keine Probleme mit **Mücken** hatte, die mich im Sommer immer **stechen**. Es war auch nicht so heiß, so konnte ich im **Schatten** sein, ohne unter dem Sonnenschirm zu bleiben. Und am besten war, dass die Stadt nicht mit Touristen **überfüllt** war und ich musste nicht überall lange **anstehen**.

An meinem ersten Tag habe ich gesehen, dass die Jugendherberge ein bisschen **eklig** und nicht sehr leise war, aber es war so billig, dass es doch in Ordnung war. Ich war auch wenig in meinem Zimmer, weil ich so viel sehen wollte. Am Abend habe ich meine Sachen und mein **Gepäck** in meinem Zimmer gelassen und ich bin durch die Straßen gelaufen und habe Fotos gemacht. Als ich aber in mein Zimmer zurückgekommen bin, hatte jemand meine Sachen und mein Geld gestohlen! Ich musste meine Eltern anrufen, damit sie Geld auf mein Konto **überweisen**. Mein Vater hat ziemlich viel **geflucht** und hat gesagt, dass ich **künftig** wieder einen **gemeinsamen** Urlaub mit der Familie machen soll.

Ich habe in Berlin viel erlebt, viele Kneipen und Kultur gesehen und es war der beste Urlaub in den letzten zwei Jahren. Auch wenn ich mein Geld verloren habe, war das Wochenende wirklich schön, und niemand war am Ende **verletzt**! Das ist doch super! Vielleicht darf ich nächsten Jahr wieder allein in eine Stadt reisen, aber werde auf mein Geld und meine Sachen besser aufpassen!

Fragen:

1. Was passiert mit seinem Gepäck?
Es ist zu schwer
Er vergisst es zu Hause
Es wird gestohlen
Er verliert es im Zug

2. Warum muss er nicht lange anstehen?
Er verbringt seinen Urlaub in seinem Zimmer
Es gibt nicht viele Leute in der Stadt
Er geht nur in den Park spazieren
Er ist immer früh da

3. Warum hat er kein Problem, Schatten zu finden?
Es gibt viele Bäume in Berlin
Er bleibt immer in seinem Zimmer

Er geht in viele Museen
Es ist Frühling und es ist nicht so heiß

4. Warum wird er nicht gestochen?
Er hat einen Spray gekauft
Er hat immer lange Kleidung an
Es gibt keine Insekten in der Stadt
Er geht nicht aus dem Zimmer.

5. Welchen Urlaub soll er künftig machen?
Familienurlaub
Urlaub allein
Urlaub mit Freunden
Er darf nicht mehr in den Urlaub gehen

the baggage
Answer:

To put money from one account to another
Answer:

At a later time
Answer:

A bug that eats blood
Answer:

To curse
Answer:

Packed with people
Answer:

Staff member
Answer:

To rest
Answer:

wounded
Answer:

Dark outline made by the sunlight
Answer:

That is how a mosquito eats
Answer:

collaborative
Answer:

A large desk with tellers
Answer:

To queue
Answer:

Repulsive
Answer:

APPENDIX 6: RECEPTIVE RECALL TEST

Der Schalter.
1. The baggage
2. A bug that eats blood
3. A large desk with tellers
4. Dark outline made by the sunlight
5. I don't know

Fluchen.
1. That is how a mosquito eats
2. To curse
3. To queue
4. To rest
5. I don't know

künftig.
1. At a later time
2. wounded
3. repulsive
4. Packed with people
5. I don't know

der Angestellte.
1. A large desk with tellers
2. A bug that eats blood
3. The baggage
4. Staff member
5. I don't know

stechen.
1. To queue
2. To put money from one account to another
3. That is how a mosquito eats
4. To curse
5. I don't know

Gemeinsam.
1. repulsive
2. At a later time
3. Packed with people
4. collaborative
5. I don't know

das Gepäck.
1. The baggage
2. Staff member
3. Dark outline made by the sunlight
4. A bug that eats blood
5. I don't know

anstehen.
1. That is how a mosquito eats
2. To queue
3. To curse
4. To rest

verletzt.
1. collaborative
2. repulsive
3. wounded
4. At a later time
5. I don't know

der Schatten.
1. Dark outline made by the sunlight
2. A large desk with tellers
3. Staff member
4. the baggage
5. I don't know

überweisen.
1. To curse
2. To queue
3. To put money from one account to another
4. To rest
5. I don't know

überfüllt.
1. collaborative
2. repulsive
3. At a later time
4. Packed with people
5. I don't know

die Mücke.
1. Staff member
2. Dark outline made by the sunlight
3. A bug that eats blood
4. A large desk with tellers
5. I don't know

ausspannen.
1. To put money from one account to another
2. To rest
3. To curse
4. That is how a mosquito eats
5. I don't know

eklig.
1. At a later time
2. repulsive
3. wounded
4. collaborative
5. I don't know

APPENDIX 7: CONTEXTUALIZED CHAT TASK

Rollenspiel:

Student 1:
Sie gehen mit Ihrer Familie/mit Ihren Freunden/allein in den Urlaub. Als Sie zurückkommen, treffen Sie einen Freund/eine Freundin. Er/sie fragt, wie der Urlaub war, was Sie dort gemacht haben, was Sie dort gesehen haben etc.
Er/sie hat viele Fragen und Sie sprechen über Ihre Reiseerlebnisse.

Student 2:
Sie treffen einen Freund/eine Freundin. Er/sie ist gerade von dem Urlaub zurückgekommen und er/sie erzählt seine/ihre Reiseerlebnisse. Sie möchten auch bald in den Urlaub fahren und Sie haben viele Fragen an Ihren Freund/Ihre Freundin.

Try to create a dialogue while using as many of the following words as possible:

der Schalter
der Angestellte
das Gepäck
die Mücke
der Schatten

überweisen
fluchen
anstehen
ausspannen
stechen

eklig
verletzt
gemeinsam
künftig
überfüllt

APPENDIX 8: QUESTIONNAIRES

English experimental group:

1. How many of the three texts did you read?
☐ 0 ☐ 1 ☐ 2 ☐ 3

2. Did the pictures and the English translations help you understand the texts?
☐ yes ☐ no

3. What information did you mostly focus on?

☐ picture
☐ translation
☐ both
☐ none
☐ other: _____

4. To what extent did you find this information helpful while reading the texts?

5. To what extent did you find this information confusing while reading the texts?

6. How did you like the chat? You can comment on positive and negative issues.

German experimental group:

1. How many of the three texts did you read?

☐ 0 ☐ 1 ☐ 2 ☐ 3

2. Did the pictures and the explanations in German help you understand the texts?

☐ yes ☐ no

3. What information did you mostly focus on?

☐ picture
☐ explanation
☐ both
☐ none
☐ other: _____

4. To what extent did you find this information helpful while reading the texts?

5. To what extent did you find this information confusing while reading the texts?

6. How did you like the chat? You can comment on positive and negative issues.

Control group:

1. How many of the three texts did you read?

☐ 0 ☐ 1 ☐ 2 ☐ 3

2. How difficult was it to read the texts (1= very difficult; 7 = very easy)?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

3. Would you have liked to have some type of annotation (in-text or as footnote) to help you understand the text?

☐ yes ☐ no

4. If yes, what kind of annotation would you have preferred?

☐ picture that shows the meaning of a word (in-text)
☐ translation of words (in-text)
☐ translation of words (as a footnote)
☐ explanation of words in German (in-text)
☐ explanation of words in German (as a footnote)
☐ other: _____

5. How did you like the chat? You can comment on positive and negative issues.

APPENDIX 9: TEST RESULTS BY SECTION

Pretest:

Section	N	Mean	SD	Median
German 1	24	9.00	3.81	9.0
German 2	14	7.79	4.89	8.5
English 1	22	9.68	3.52	10.0
English 2	13	7.15	3.72	8.0
Control 1	25	9.88	4.29	10.0
Control 2	10	7.90	3.64	8.0

$F(5,102)=1.31$, $p=.266$

Comprehension question – set 1:

Section	N	Mean	SD	Median
German 1	25	3.32	.99	3.0
German 2	15	3.27	1.44	3.0
English 1	21	3.38	1.07	3.0
English 2	12	3.50	1.57	4.0
Control 1	25	3.12	1.48	3.0
Control 2	9	3.67	.71	4.0

$F(5,101)=.33$, $p=.895$

Comprehension question – set 2:

Section	N	Mean	SD	Median
German 1	17	3.82	1.19	4.0
German 2	11	3.55	1.44	4.0
English 1	20	3.45	1.19	4.0
English 2	12	3.50	.67	4.0
Control 1	21	3.05	1.07	3.0
Control 2	9	3.33	.87	4.0

$F(5,84)=.97$, $p=.442$

Comprehension question – set 3:

Section	N	Mean	SD	Median	p-adjusted
German 1	18	3.78	1.11	4.0	.545
German 2	13	3.46	1.76	4.0	
English 1	19	3.68	1.38	4.0	.650
English 2	11	3.46	1.21	4.0	
Control 1	19	2.74	1.15	3.0	**.024**
Control 2	9	1.22	.83	1.0	

$F(5,83)=6.25$, $p=.003$

Immediate production test:

Section	N	Mean	SD	Median
German 1	22	2.93	3.09	2.0
German 2	14	2.00	1.72	1.75
English 1	19	2.29	2.27	1.0
English 2	15	3.00	3.50	2.0
Control 1	21	.86	1.26	0.0
Control 2	9	.72	1.44	0.0

$F(5,94)=2.65$, $p=.084$

Immediate receptive test:

Section	N	Mean	SD	Median	p
German 1	22	10.68	3.66	11.5	.465
German 2	14	9.71	4.10	11.0	
English 1	19	10.00	2.65	9.0	.209
English 2	15	11.40	3.72	12.0	
Control 1	21	7.05	2.99	7.0	.957
Control 2	9	7.11	2.67	7.0	

$F(5,94)=4.77$, $p=.003$*

*Significant differences were found between sections belonging to different groups

Immediate Chat – word use in context:

Section	N	Mean	SD	Median	p
German 1	23	2.35	1.9	2.0	.145
German 2	8	3.63	2.56	3.5	
English 1	20	4.15	2.74	4.5	.661
English 2	14	3.71	2.95	3.0	
Control 1	22	1.27	1.28	1.0	.269
Control 2	9	1.89	1.62	2.0	

$F(5,90)=4.82$, $p=.003$*

*Significant differences were found between sections belonging to different groups

Delayed production test:

Section	N	Mean	SD	Median
German 1	23	2.72	3.23	2.0
German 2	14	2.93	2.58	2.25
English 1	18	2.50	3.48	1.5
English 2	11	1.96	1.99	2.0
Control 1	22	1.16	1.5	.5
Control 2	10	.35	.78	0.0

$F(5,92)=2.13$, $p=.068$

Delayed receptive test:

Section	N	Mean	SD	Median	p
German 1	23	9.57	3.55	9.0	.176
German 2	15	7.87	3.94	8.0	
English 1	18	8.94	3.28	9.0	.228
English 2	12	10.58	3.97	11.5	
Control 1	23	7.17	2.23	7.0	.386
Control 2	10	6.30	3.40	7.5	

$F(5,95)=3.15$, $p=.033$*

*Significant differences were found between sections belonging to different groups

Delayed Chat – word use in context:

Section	N	Mean	SD	Median	p
German 1	8	2.25	2.32	2.0	.826
German 2	12	2.42	1.0	2.0	
English 1	22	2.86	2.08	2.5	.744
English 2	8	5.13	3.94	4.0	
Control 1	24	2.54	1.74	2.5	.231
Control 2	10	1.00	1.16	.5	

$F(5,78)=3.76$, $p=.012$*

*Significant differences were found between sections belonging to different groups

APPENDIX 10: PRODUCTIVE AND RECEPTIVE TEST RESULTS BY WORD TYPE

1. Immediate receptive test

a) Total of accurate nouns:

Group	N	Mean	SD	Median
German	36	3.91	1.36	4.0
English	34	4.44	.86	5.0
Control	30	3.07	1.17	3.0

$F(2,97)=11.45$, $p=.000$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	1.38	**.000**	**.319**
Control and German	.85	**.027**	**.102**
English and German	.53	.179	.051

b) Total of accurate adjectives:

Group	N	Mean	SD	Median
German	36	3.39	1.55	3.0
English	34	3.27	1.29	3.0
Control	30	1.9	1.19	2.0

$F(2,97)=11.63$, $p=.000$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	1.37	**.000**	**.237**
Control and German	1.48	**.000**	**.225**
English and German	.12	1.0	.002

c) Total of accurate verbs:

Group	N	Mean	SD	Median
German	36	3.0	1.69	3.0
English	34	2.91	1.69	3.0
Control	30	2.1	1.47	2.0

$F(2,97)=2.93$, $p=.058$

2. Immediate productive test

a) Total of accurate nouns:

Group	N	Mean	SD	Median
German	36	1.36	1.3	1.0
English	34	1.43	1.45	1.0
Control	30	.45	.86	0.0

$F(2,97)=6.08$, $p=.003$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	.98	**.006**	**.143**
Control and German	.91	**.005**	**.145**
English and German	.07	1.0	.001

b) Total of accurate adjectives:

Group	N	Mean	SD	Median
German	36	.74	1.0	.5
English	34	.72	.95	.5
Control	30	.27	.47	0.0

$F(2,97)=3.06$, $p=.052$

c) Total of accurate verbs:

Group	N	Mean	SD	Median
German	36	.74	1.0	.5
English	34	.72	.95	.5
Control	30	.27	.47	0.0

$F(2,97)=3.06$, $p=.052$

3. Delayed receptive test

a) Total of accurate nouns:

Group	N	Mean	SD	Median
German	38	3.61	1.41	3.5
English	30	3.87	1.38	4.0
Control	33	3.3	1.31	3.0

$F(2,98)=1.34$, $p=.267$

b) Total of accurate adjectives:

Group	N	Mean	SD	Median
German	38	2.74	1.35	3.0
English	30	3.03	1.27	3.0
Control	33	2.18	1.24	2.0

$F(2,98)=3.58$, $p=.032$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	.85	**.009**	**.106**
Control and German	.55	.077	.045
English and German	.3	.36	.013

c) Total of accurate verbs:

Group	N	Mean	SD	Median
German	38	2.55	1.75	3.0
English	30	2.7	1.54	3.0
Control	33	1.42	1.09	1.0

$F(2,98)=7.14$, $p=.001$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	1.28	**.001**	**.194**
Control and German	1.13	**.006**	**.129**
English and German	.15	1.0	.002

4. Delayed productive test

a) Total of accurate nouns:

Group	N	Mean	SD	Median
German	37	1.61	1.96	1.0
English	29	1.03	1.42	.5
Control	32	.47	.81	0.0

$F(2,95)=4.93$, $p=.009$

Comparison	Mean Difference	P-adjusted	η^2
Control and English	.57	.174	.060

Control and German	1.14	**.009**	**.123**
English and German	.57	.568	.027

b) Total of accurate adjectives:

Group	N	Mean	SD	Median
German	37	.77	.98	.5
English	29	.7	.73	.5
Control	32	.39	.62	.00

$F(2,95)=2.13$, $p=.124$

c) Total of accurate verbs:

Group	N	Mean	SD	Median
German	37	.42	.75	.00
English	29	.55	1.49	.00
Control	32	.05	.2	.00

$F(2,95)=2.43$, $p=.093$