Online Vocabulary Learning
for Bilingual Secondary School Pupils

An Intervention Study with First-Year Learners
at the Hermann Wesselink College

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Abstract

This research focuses on vocabulary learning in relation to reported reading difficulties among first-year bilingual high school learners at Hermann Wesselink College. Based on an exploratory questionnaire and a review of relevant literature, an intervention activity was designed. Two parallel classes, an intervention group and a control group, were observed over the course of two weeks. The intervention group used an online study tool called Quizlet to learn relevant new vocabulary before coming to their history lessons. The intervention group spent less of their class time on vocabulary and general language questions, compared to the control group. Pupils participated relatively well, and generally rated the online study tool as useful. Conclusions about the reliability of the research are drawn, and practical suggestions for the school and further research are made.

1. Introduction

1.1 A Short Introduction

At the request of Hermann Wesselink College in Amstelveen, the reading problems of their first-year bilingual learners were investigated and an intervention activity was designed. Based on an exploratory questionnaire and a review of relevant literature, an intervention was designed using an online study tool to help pupils study relevant history vocabulary before coming to class. This research was conducted in close cooperation with Hermann Wesselink College, and as such it is highly relevant to the school. It functions as a pilot study regarding the use of online study tools with first-year bilingual learners of history. This research has especially gained relevance because the pupils' attitude towards language, their study strategies, as well as their perceived language problems were investigated before conducting this pilot. This means that the context of the pupils was taken into account, and the research could focus on the most relevant problem: vocabulary learning.

1.2 Why Focus on Explicit Online Vocabulary Learning?

When investigating second language reading skills, there are a number of important factors to consider. Clearly, knowledge of grammar rules, vocabulary and the principles of spelling are important to successful second language reading. But knowing how to navigate or manipulate a text, how to interpret punctuation symbols, how to acquire new vocabulary, or how and when to use a dictionary, are also important. Other factors that influence a pupil's reading skills include the ability to recognize words, knowing how to deal with ambiguity in a text, or how to guess from context, familiarity with the topic and the understanding of the task at hand (Ernesto, 2010). Next to knowledge and skills, the personal beliefs about the second language and a pupil's self-confidence also play a role in their ability to read texts in a second language. The pupils'

motivation, their ideas about self-efficacy, and their opinion about the second language are important to consider. (Macaro, 2010).

Knowing that it is such a wide variety of factors that contributes to the success or failure of the development of second language reading skills, it is important to investigate what exactly causes the reading problems of the first-year bilingual learners at Hermann Wesselink College. For this purpose, a questionnaire was conducted among the learners. Based on its findings, see below, this research focused its attention on vocabulary learning to enhance the pupils' reading skills.

Vocabulary learning is important in second language and bilingual education. It is generally believed that one needs to know about 8000 to 9000 word families[1] to read English texts, and about 5000 to 7000 word families to be able to speak English appropriately (Schmitt, 2008). This is quite a daunting amount of vocabulary for pupils to get a grip on, but it does not even come close to the estimated 20.000 word families known by the average educated native English speaker (Nation, 2001). Knowing a good amount of vocabulary is of crucial importance to develop any of the four language skills[2], but especially to improve one's ability to read. In order to grasp the meaning and ideas of a text, whether it covers biology, history or economics, rich vocabulary knowledge is important. Research shows that a reader needs to understand at least 98 per cent of the words of a text for him or her to fully understand the specifics of its content. This allows for about 1 out of 50 words to be unknown. An understanding of below 90 per cent of the words usually leads to insufficient understanding of the overall ideas and meaning of a text (Schmitt, 2008).

But what does it mean for a pupil to know a word or a word family? This might sound simple, but on closer inspection it becomes clear that this "knowing" consists of multiple elements. Pupils need to know about the spelling of a word, its meaning, how to pronounce it, and how it functions grammatically.

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[1] According to Nation, 'a word family consists of a headword, its inflected forms, and its closely related derived forms' (Nation, 2001). The words necessary, unnecessary, necessarily and necessity belong to the same word family.

[2] Speaking, writing, reading and listening.

Most explicit teaching and studying of vocabulary focuses on the meaning of words, and tries to link the meaning of a word linking to its form. This is indeed a crucial aspect of vocabulary learning, and should be given priority in the first stage of vocabulary learning. Other forms of knowledge, however, are also important and facilitate actual usage and remembering of the words learned (Schmitt, 2008). While the initial meaning-form link is best learned through explicit teaching, some of the more in depth aspects of knowing are served best by repeated exposure and accidental learning, for instance by reading and listening or watching a lot. Understanding the different aspects that go into 'knowing' a word is important, since it allows teachers to better support vocabulary learning among their pupils. In the context of this research, such an understanding improves the intervention activity designed for the learners at Hermann Wesselink College as it shows how varied the approach to learning should be.

The afore mentioned distinction between implicit and explicit learning is important in second language learning. It is often assumed that learners will pick up most of the words and language skills by simply being exposed to them in context. While exposure to the language certainly helps, it is becoming apparent that implicit learning is not as effective as is often assumed. Explicit learning of vocabulary is simply much more effective than implicit learning, as pupils learn faster, they learn more words and they remember the words longer when studying this way. It seems that learners do not focus on the exact meaning of words when they understand the general message of a text, and that they are not engaged enough to learn new words when they are guessing from context (Schmitt, 2008)[3].

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[3] Based on these findings concerning implicit and explicit vocabulary learning, one would perhaps suggest focusing all vocabulary teaching on explicit vocabulary teaching. A teacher and his or her pupils, however, do not have unlimited time to spend on explicit teaching of vocabulary. They, therefore, have to rely on implicit learning as well. It is good to use both types of learning in a complementary manner to increase their effects. Words that are first taught explicitly can best be retained when pupils encounter them again and again while reading and listening. This would first facilitate the linkage of meaning and form, to be followed by the learning of collocation, grammatical functioning and pronunciation through implicit learning while reading and listening. It is estimated that a pupil needs to encounter a word about 8 to 20 times before they remember it (Schmitt, 2008, p.343).

Considering the benefits of explicit learning the intervention activity of this study will focus on this type of vocabulary learning. There are a number of ways to stimulate explicit second language vocabulary learning. Comparing a range of studies concerned with this topic, Schmitt lists a number of crucial components to effective explicit vocabulary learning. One important factor he distinguishes is the level of pupil engagement with the learning activity. Furthermore, most vocabulary learning occurs when pupils use words in a context that is relevant for them, when they feel a real need to learn words, when they get to manipulate and use the words immediately and when pupil-made word lists are incorporated into the classroom situation (Schmitt, 2008).

One type of activity that combines most of these features, and is thus often quite effective, is that of interactive online vocabulary activities (Yipa & Kwanb, 2006; Horst et al., 2011; Schmitt, 2008). While pupils often experience vocabulary learning as boring, using online tools motivates them to participate and truly engage with the vocabulary they are learning (Yipa & Kwanb, 2006; Horst et al., 2011). Another benefit of such online learning activities is that pupils can do them anywhere and at any time, which means that it does not have to take up precious classroom time. Based on these benefits, this research uses an online study tool to facilitate the explicit vocabulary learning among first-year bilingual learners.

When working with online vocabulary activities, there are a number of things to consider. Most researchers stress the need for more in-depth learning to be facilitated by the online activities (Wood, 2001; Horst et al, 2011; Yipa & Kwanb, 2006). An activity needs to go beyond the simple matching of a term with its definition. Its effectiveness should be improved by providing more context, variation and interaction. A pupil should encounter a word in multiple contexts, and see it in many different sentences, so that he or she can get a more in depth understanding of the meaning of the word, its collocation and grammatical functioning. Online activities should be based on predetermined and relevant vocabulary lists, to fit the learners' needs and facilitate the needed repetition.

Offering multimodal input, with pictures and sound bits of spoken words, also helps the pupil get a better understanding of the vocabulary.

When interviewing pupils, Yipa and Kwanb (2006) found out that they wanted more pupil interaction and positive reinforcement or game-elements. Pupils wanted to be able to win or break records and this was said to improve the pupil participation, motivation and learning. Concerning the practical design of the online activity, it is important that the website is easy to navigate, that the visual stimuli is not distracting from the goals of the activity and that it explains how the activities are best used as part of education. All these factors should be taken into account when selecting or designing an online study tool to support pupils in their vocabulary learning.

Having developed an understanding of the importance of explicit vocabulary learning, the usefulness of online study tools, and the different aspects that go into knowing a word, it is time to have a better look at the vocabulary pupils encounter. What kind of vocabulary should they be studying to make the intervention activity a helpful tool to improve their reading abilities? Vocabulary is commonly categorized in four categories: very frequent words[4], general words[5], general academic vocabulary[6], and subject specific vocabulary[7]. Academic words typically make up 9 per cent of academic texts, while technical subject specific words usually take up 5 per cent of a text (Nation, 2001). The rest of the text is made up of frequent and general words.

Pupils encounter 'very frequent', 'general' and 'general academic' words in each of their subjects, but the 'content specific' words are encountered only in one or perhaps two subjects specifically. Teachers usually spend more attention and time on subject specific vocabulary than on general academic vocabulary. General academic vocabulary, consequently, is 'often poorly described, difficult to locate in reference works, not consciously familiar to the subject (or language) teacher and rarely explicitly taught' (Clegg, 2007). This is a pity because pupils would benefit from their knowledge in each subject. Because of this wider usage,

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[4] Words such as: the, a, not, this, in, of.
[5] Words such as: work, zoned, walking, because, aired.
[6] Words such as: acquire, coherent, process, illustrate, contrast, unified, symbolize.
[7] Words such as: embryo, membrane, intestine, secrete, vessel.

Beck et al. suggest teacher should focus more of their explicit vocabulary teaching on general academic vocabulary (Beck et al, 2002). The teaching of both types of vocabulary is important, one because it is useful in all subjects, the other because the pupils' only chance of learning it is during the specific subject lessons. The intervention activity in this study will thus include both general academic vocabulary and content specific vocabulary. The selection of relevant vocabulary is left to the history teacher teaching both the control and the intervention group. This way the teacher's knowledge of the pupils, their curriculum, and their language and content background is best taken into account. This ensures that the pupils study words that are relevant for them and which are used and repeated in the classroom setting.

In the above theoretical framework, it is concluded that vocabulary learning is a crucial component to developing reading skills among second language learners. Additionally, it has been made clear that there are many aspects to knowing a word, and these should be taking into account when studying second language vocabulary. This means vocabulary learning should be varied, interactive, and contextualized and include spelling, meaning-form linkage and grammatical functioning. Moreover, a distinction between explicit and implicit vocabulary learning has been made, and since the former proved more effective the intervention activity will focus on explicit vocabulary learning. Reviewing effective explicit learning activities, online vocabulary learning activities were chosen as the focus for this intervention study, because they combine successful aspects and show good results. Finally, concerning the type of vocabulary beneficial to the pupils, it was concluded that both general academic and content specific words are relevant, and to ensure the selection of relevant and contextualized words this selection is left to the history teacher at Hermann Wesselink College.

1.3 Research Question and Sub-Questions

Our general research question is:

What are effective interventions to help first-year bilingual pupils at Hermann Wesselink College with their vocabulary problems?

As such, this research primarily has a design function.

This general research question will be answered using the following sub-questions.

1. What are the reading problems generally experienced by first-year bilingual pupils at Hermann Wesselink College?
2. What is the role of vocabulary learning in these reading problems?
3. What is the effect of an online intervention?

This third sub question can be further subdivided into the following three questions.

a. Is there a measurable difference between the intervention group and the control group concerning their in-class language difficulties, the type of questions asked and the time spent on explicit language and vocabulary teaching?

b. How do the pupils make use of the study features of the online study tool?

c. How do the pupils experience the usage of an online study tool, such as Quizlet.com, and do they think it is helping them?

1.4 Hypotheses

Based on the literature review and informal conversations with two teachers at Herman Wesselink College, the following hypothesis has been formulated concerning the general research question: *The usage of an online study tool, such as Quizlet.com, is expected to be effective in helping pupils improve their vocabulary learning, and thus their reading skills.* The link between reading skills and vocabulary learning is assumed based on the exploratory questionnaire, which suggests that the pupils mainly experience problems in reading due to lack of vocabulary knowledge.

Concerning the various sub-questions, the following hypotheses are proposed.
1. Based on the literature, first-year bilingual learners are expected to mostly experience problems with new vocabulary.
2. Vocabulary learning and lack of vocabulary knowledge is expected to play a major role in the reading problems of the pupils. This hypothesis is based on our informal conversations with teachers at Hermann Wesselink College and a review of literature.
3. Based on a review of relevant literature, the use of an online vocabulary study tool is expected to be beneficial to pupils' vocabulary learning. Regarding the three sub questions, the following hypotheses are proposed.
    a. A noticeable difference is expected in the time spent on explicit vocabulary teaching between the intervention class and the control group. A positive difference is expected, in the sense that fewer vocabulary questions will be asked by the pupils who studied the words in advance using Quizlet.
    b. Based on relevant literature, it is expected that the pupils will be participating well using the interactive online study tool.
    c. Finally, based on relevant literature, it is expected that the pupils will be positive about the effectiveness of using the online study tool.

1.5 Definition of Variables

The following research variables are relevant in answering our research question and sub-questions.

1.5.1 Initial Questionnaire
- reading problems as perceived by the first-year bilingual learners
- attitudes and beliefs held by these learners about their language ability
- personal information about the learners (age, gender, years of English language learning, mother tongue, et cetera. This may provide relevant information in cross-referencing the data; it did not, however).

1.5.2 Intervention Activity
- time spent on explicit vocabulary teaching in the two classrooms
- online pupil participation at Quizlet.com
- the experience of the teacher regarding the intervention activity
- pupil evaluation of the using of Quizlet.com

2. Methodology

2.1 Context and Respondents

The Hermann Wesselink College is a school for Dutch mainstream and bilingual education that is located in Amstelveen, which is part of the Amsterdam agglomeration. The intervention group consists of 24 first-year pupils of bilingual VWO. This means, the pupils are 12 or 13 years old and follow the pre-university track of high school education. It is a mixed-gender group and the same history teacher teaches both the control group and the intervention group.

2.2 Research Setup and Instruments

As mentioned earlier, an exploratory survey was carried out among the intervention and control group, to get a better view of the respondents' skills and attitudes regarding the English language. Based on that survey conducted in December and on a review of the relevant literature, the decision was made to focus on vocabulary learning. A further literature study was carried out in order to gain more understanding of vocabulary learning and, more specifically, the use of online vocabulary study tools.

Based on this, an online intervention was carried out using the online study tool Quizlet.com. After comparing a variety of online options, this specific online study tool was selected because it gives teachers the opportunity to create their own word lists and track pupils' online participation. It is also easy to navigate, and it offers the pupils multimodal input. Furthermore, it tests both spelling, listening, and understanding of definition and it gives the pupils immediate feedback on their performance. After an introductory lesson, the pupils were invited to do a range of activities on the website as homework for the next week. These activities helped the pupils gain understanding of the vocabulary to be used during the following history lesson. The selection of the vocabulary studied using in these online activities was made by the teacher,

based on her experience with the group and the curriculum. The selection of vocabulary was left to the teacher, to ensure that the relevant words were studied with definitions that fit the curriculum.

Figure 2.2.1 Quizlet Flashcard Activity – One Side

Quizlet.com offers four main types of activities: Flashcards, Speller, Learn, and Test. The Flashcard activity shows pupils online cards with the term on the front and the description on the back. The pupils can also choose to have both the term and the description on one side of the flashcard at first, and then practice later with only seeing the description once they click the card (see figure 2.2.1).

During the speller activity, the pupil hears one of the terms being pronounced, and needs to spell it (see figure 2.2.2a). They also see the term next to the box they need to type in (figure 2.2.2b)

Pupils can also test their vocabulary knowledge the other way around by clicking 'prompt with term'. Working with the Learn feature, pupils link the definition with the term, and vice versa. They have to do this flawlessly twice, before they can move on to the next study feature. This last activity is a test, with up to four types of questions: 'written', 'matching', 'multiple choice', and 'true/false'. Next

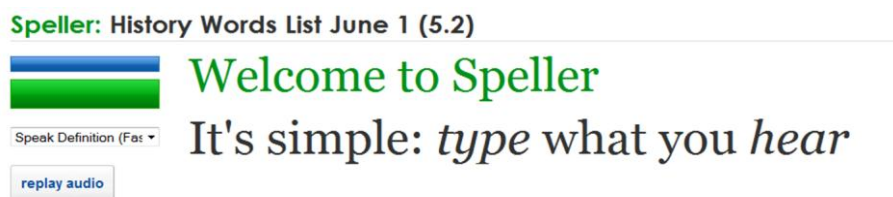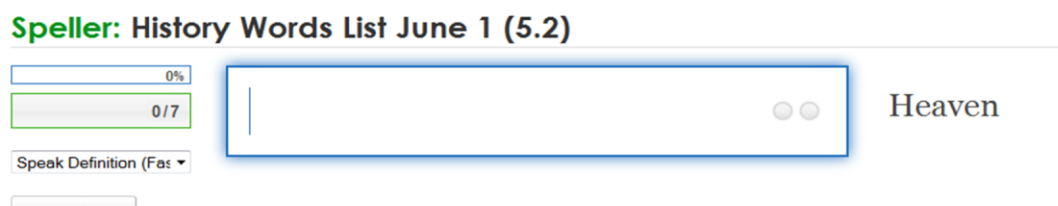*Figure 2.2.2a Quizlet Speller Activity - Introduction Screen*

Speller: History Words List June 1 (5.2)

Welcome to Speller

It's simple: *type* what you *hear*

Speak Definition (Fas ▾)

replay audio

Figure 2.2.2b Quizlet Speller Activity

Speller: History Words List June 1 (5.2)

0%

0 / 7

Speak Definition (Fas ▾)

Heaven

to these four activities, pupils can also play two games: Scatter, and Space Race. These activities were not included into the research, and were not mentioned to the pupils, but pupils used them nonetheless.

The lessons before which the pupils from the intervention group had studied the relevant vocabulary using Quizlet.com were observed in both the intervention group and the control group. These lessons were taught by the same teacher and to comparable groups of pupils. The lessons were also meant to cover the same content because the groups were following the same curriculum. Every time a language question arose, either prompted by the teacher or by one of the pupils, this was recorded. Furthermore, the specific content of the question was written down and the time spent on this issue was also registered. For these observations, the observation form as shown in Annex 2 was used.

After the four observations had taken place, a survey was carried out among the pupils of the intervention group, which is shown in Annex 3. Finally, an email with open questions was send to the teacher, to establish her experience with the intervention.

2.3 Method of Analysis

2.3.1 Analysis of Initial Questionnaire

The initial questionnaire allowed for a quantitative analysis with use of the Lickert scale. Since the students were asked to answer each statement with an answer between 1 ('completely disagree') and 5 ('completely agree'), different aspects of dealing with and reading in English could be analysed in such a manner. The pupils were offered multiple statements about the same aspect, so as to increase the validity of the data. These statements were combined to represent each element. With use of SPSS, calculations were made as to how many pupils agreed or disagreed with a certain statement. Next to this, comparisons were made between the difficulty pupils attributed to different school subjects. Also, calculations were made to show which strategies pupils most often use when dealing with difficult English texts. The use of these strategies was divided into 'applied' (when a pupil either answered 'neutral', 'agree', or 'completely agree') and 'applied often' (when a pupil answered 'completely agree'). The use of strategies was then cross-referenced with the enjoyment pupils have of reading English texts.

2.3.2 Analysis of Observations

Observation forms have been filled in for four lessons. During, the specific vocabulary discussed in class was recorded. Each vocabulary instance[8] was written down along with the time spent on it, whether it was teacher or pupil induced and whether it was a vocabulary or a general language instance. Two persons observed each lesson. In order to make table 3.2.1, each instance has been taken into account even if it only appeared in one observation form, under the assumption that an observer may have missed some instances. Since this only happened with three instances, inter-observer reliability is fairly high.

For each instance that has been recorded by each observer, the teacher- or pupil-induced box was checked and the time it took was recorded. After the

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[8] Vocabulary instance: a moment spent discussing a specific word

observations, the average time spent on a vocabulary or general language instance was calculated.

3. Results

3.1 Exploratory Survey

The explorative questionnaire was conducted to investigate the possible causes for, as well as the nature of, the experienced reading problems among first-year bilingual learners at the Hermann Wesselink College. The questions focused on the nature of the perceived reading problems, personal information and language background of the pupils, their attitudes and beliefs about the English language and their personal language abilities, and the applied study and reading strategies.

On the whole, it seems that most pupils are quite confident about their English language abilities. More than half of the respondents think they are good at English. About a third registers a neutral response to the statement, and ten per cent of pupils do not think he or she is good at English. About five per cent of pupils state that English is very difficult, while the vast majority does not agree with this statement. All respondents believe that his or her English will improve this school year. Not only do the pupils generally feel confident about their English language abilities, they also generally enjoy reading English text. A large group, some 71 per cent of the pupils, enjoys reading English texts, of which 35 per cent even enjoys it very much.

Notwithstanding their general confidence and enjoyment, about a third of the pupils do think that using English as a language of instruction generally makes school more difficult for them. Fifteen per cent is neutral about this influence, while half of the pupils do not report experiencing more difficulty at school due to the use of the English language. Concerning subjects that involve a lot of reading, such as History, Geography or Biology, the percentage of pupils who find it more difficult because of the English language goes up to 86 per cent.

When asked about this, a total of 73 per cent of pupils finds History, Biology and Geography more difficult than the overall bilingual curriculum.

When asked what they find most difficult in reading English texts, the pupils mainly report struggling with new words, long words or texts about a new topic. The pupils each made a top three of difficulties encountered when reading English texts, and these were combined to form figure 3.1.3 below.

Figure 3.1.3 Most Important Difficulties Experienced When Reading English Texts
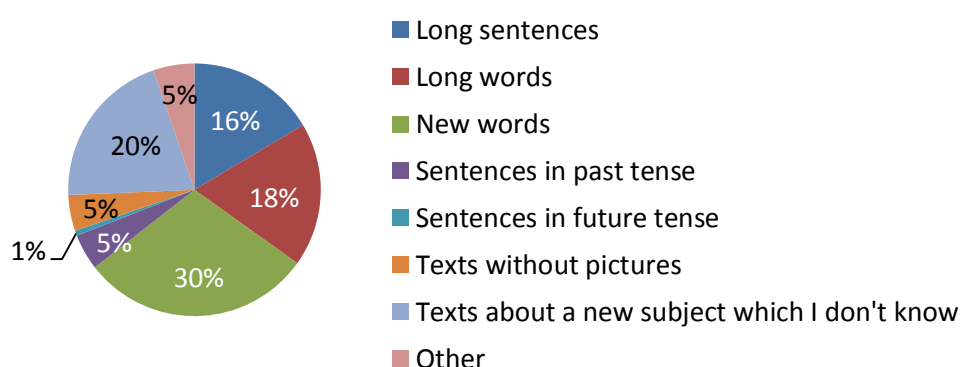

Figure 3.1.3 shows that new words, texts about a new subject, and long words are the three language features mentioned most often by pupils as a cause for reading difficulties. Together, these issues make up 68 per cent of the top three issues related to reading English texts. The issues all relate to vocabulary and vocabulary knowledge.

Pupils were asked to report levels of agreement with statements about the reading strategies they use when reading a difficult English text. Most pupils feel they know what to do when they encounter difficulties reading an English text. About 10 per cent is neutral about their ability to handle difficulties and only 1.4 per cent of pupils does not know what to do. About half the pupils, 46 per cent, reports using one or more strategies very often. The other half of the pupils only uses strategies sometimes. Pupils who do apply a strategy very often, mostly look at the context to guess the meaning of a difficult word (see figure 3.1.4). A little over 40 per cent of the pupils who apply a strategy very often, apply more than one of the strategies to that extent.

Table 3.1.1 shows the strategies pupils use most, in order of importance. It can be concluded that mostly, pupils read difficult parts more than once or find the meaning of difficult words by making use of their context. These are also the strategies that are applied most often ('completely agree' was answered by 20 per cent and 25 per cent of the pupils, respectively). Also, more than half the pupils ask other pupils for help. However, this strategy is not applied as often. What is striking is that pupils sooner ask each other than the teacher. This either implies independent learning or teachers who do not appear to be approachable for issues like these. Only 22 per cent of the pupils use a dictionary when a difficult word is encountered. 6 per cent uses a dictionary often; the other 17 per cent does use it, but not very often.

Table 3.1.1 Strategies Applied by Pupils When Reading a Difficult Text

Importance	Strategy	Applied by	Applied often by
1	Read it more than once	72%	20%
2	Find the meaning of a difficult word by using its context	70%	25%
3	Ask another pupil for help	54%	7%
4	Ask the teacher for help	42%	4%
5	Use a dictionary	22%	6%
6	Find an equivalent of a difficult word in L1	21%	7%
7	Skip parts that are not understood	10%	4%

When cross-referencing the number of strategies used by pupils with the enjoyment they have of reading English texts, we find that the more enjoyment a pupil gets from reading English texts, the more they will try to apply strategies to

understand difficult English texts. Furthermore, the survey results show that when a pupil enjoys reading English texts, he or she will apply more strategies to tackle difficult words.

All in all, the pupils quite enjoy reading English texts. Furthermore, they are quite confident about their own level of English. However, not many strategies are applied to improve their understanding of a text or their English skills in general. The more a pupil enjoys reading English texts, the more strategies he or she will apply. The majority of the pupils, some 60 per cent, expect the teacher to explain all difficult words that they will encounter. This research focuses on finding a way to help the teacher with this.

3.2 In-Class Observations

After conducting the exploratory questionnaire, and starting the intervention activity with the pupils in the intervention group, in class observations were carried out. Tables 3.2.1 to 3.2.4 show the relevant data of the in-class observations performed at Hermann Wesselink College, combining the findings of the control group and the intervention group during each of their two lessons.

Important to note is that in each table, lesson 1 has two columns for the intervention group. This is because only part of the lesson was the same as that of the control group. Therefore, only the language and vocabulary instances of that part of the lesson which was similar were taken into account, so as to have comparable data. The total of that lesson is shown as well, but it has not been used to draw conclusions.

Table 3.2.1 shows the time which was spent on language and vocabulary during both lessons, in the control group and in the intervention group. This table shows that in the control group, a higher percentage of the time was dedicated to language and vocabulary.

Table 3.2.1 Time Spent on Language and Vocabulary

	Lesson 1			Lesson 2	
	Control Group	Intervention Group		Control Group	Intervention Group
		Relevant	*Total*		
Average time spent on each instance (sec)	33	9	*16*	20	24
Total time spent on language and vocabulary (min:sec)	4:24 (8.8%)	0.53 (4.4%)	*3.55 (7.8%)*	4:47 (6.8%)	3.39 (6.1%)

Table 3.2.2 shows a summary of all four in-class observations. Important to note is that this table deals with both general language and vocabulary instances. For only vocabulary instances, see table 3.2.3. Teacher-induced and pupil-induced instances are shown separately, since only pupil-induced instances show questions from pupils, and teacher-induced instances may well be a question from the teacher what a certain word means which the pupils answer correctly.

Table 3.2.2 Summary of In-Class Observations

	Lesson 1			Lesson 2	
	Control Group	Intervention Group		Control Group	Intervention Group
		Relevant	*Total*		
Number of minutes of observation	50	20	*50*	70	60
Number of general language and vocabulary instances	8	6	*15*	14	9
Number of teacher-induced vocabulary and general language instances	6	2	*4*	7	6
Number of pupil-induced vocabulary and general language instances	2	4	*11*	7	3

Table 3.2.3 shows all the number of instances during which vocabulary was discussed. It is important to note the difference in the number of teacher-induced and pupil-induced vocabulary instances. In the intervention group, lesson 2 had more teacher-induced vocabulary instances than pupil-induced instances. It was observed that the teacher asked what the words meant, and that the pupils knew the answer. This means time was spent on vocabulary, yet in a different way: pupils did not need to ask what the words meant, as they had learned them through the Quizlet intervention.

Table 3.2.3 Vocabulary Instances

	Lesson 1			Lesson 2	
	Control Group	Intervention Group		Control Group	Intervention Group
		Relevant	*Total*		
Total number of vocabulary instances	8	6	*15*	11	9
Total number of teacher-induced vocabulary instances	6	2	*4*	6	6
Total number of pupil-induced vocabulary instances	2	4	*11*	5	3
Total number of subject-related vocabulary instances	8	3	*10*	10	9
Total number of non-subject-specific vocabulary instances	0	1	*3*	1	0

Table 3.2.4 shows the instances during which Quizlet vocabulary was discussed. With Quizlet vocabulary is meant: the words studied on the Quizlet tool so far. In the first lesson, this involves the first word list. In the second lesson, it involves both lists. Again, teacher-induced and pupil-induced instances are shown.

Table 3.2.4 Quizlet Vocabulary Instances

	Lesson 1			Lesson 2	
	Control Group	Intervention Group		Control Group	Intervention Group
		Relevant	*Total*		
Number of Quizlet vocabulary instances	3	1	*1*	10	4
Number of teacher-induced Quizlet vocabulary instances	2	1	*1*	6	2
Number of pupil-induced Quizlet vocabulary instances	1	0	*0*	4	2

The information from the tables is threefold. Firstly, comparing the number of vocabulary and general language instances between the control and the intervention group, there was not one clear difference. In the first week there was an unexpected difference between the two groups, as there were 7 more instances in the intervention group compared to the control group. This unforeseen difference could be explained by the fact that the two lessons were not comparable in content, since the control group had already discussed the topic before while the intervention group was introduced to the topic for the first time. Furthermore, the wordlist that the pupils studied on Quizlet.com did not fully match the content of the lesson. Looking at the second lesson, however, the difference between the two groups was as expected, since the intervention group had 5 less instances than the control group. In these second lessons the content and format were comparable and related to the words studied online by the pupils. This difference between the two groups in the second week occurred when 72 per cent of the intervention class worked with the Speller and/or Learn modus of the Quizlet website, and 64 per cent of pupils did the Test.

Secondly, an expected improvement was found when comparing the percentages of time spent during comparable lesson parts[9] in both groups on vocabulary and general language questions and teaching. During the first week,

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[9] Comparable lesson parts: parts of two lessons that covered the same topic.

8,8 per cent of lesson time was spend on vocabulary and language instances in the control group, and 4.4 per cent of the comparable lesson time was spend on this in the intervention group. During the second week, 6.8 per cent of the lesson time was spend on vocabulary and language instances in the control group, and 6.1 per cent of the comparable lesson time was spend on this in the intervention group. This shows a positive difference between the intervention and the control group, but in the second week it was only a small difference of 0.7 per cent points.

Thirdly, almost no non-vocabulary instances were observed. In both the control and the intervention group the pupils and the teacher focused mostly on vocabulary learning and not on general language issues.

Fourthly, the intervention group asked fewer questions on words that were in the Quizlet study list. In the first week, there was a difference of 2 instances between the control and the intervention group concerning the Quizlet-words, and in the second lesson the control group asked 6 more questions than the intervention group about these words. This difference is easily explained by the intervention activity.

3.3 Analysis of Online Pupil Participation

During the two weeks in which the intervention activity was executed the online activity of the pupils was tracked. As is visible in table 3.3.1, pupil registration increased towards the second week. Online participation went down in the second week concerning the Learn and/or Speller features, but more pupils completed the Test. As a side-effect of this intervention study, it was found that 44 per cent of pupils did extra game activities with the relevant history word lists, and 76 per cent of pupils worked or played with other word lists, for instance to help them study for German or Latin, or more general topics such as Magic Cards or Fruits, et cetera.

Table 3.3.1 Pupil Activity on Quizlet

	Lesson 1	Lesson 2
Number of registered pupils	21	25
Number of pupils who worked on Learn and/or Speller	19 (90.5%)	18 (72%)
Number who did the test	12 (57.1%)	16 (64%)
Number of pupils who played games related to the wordlist	4 (19%)	11 (44%)
Number of pupils who worked or played with other unrelated wordlists on Quizlet.com	18 (86%)	19 (76%)
Number of registered pupils who did not participate	0 (0%)	0 (0%)

3.4 Pupil Questionnaire

After the in class observations, a questionnaire with both open and closed questions was conducted. The total number of pupils who filled in this questionnaire is 21. All of these pupils had used the tool. Of this group of pupils, 86 per cent found Quizlet a useful online study tool. The three pupils who did not find Quizlet a helpful tool said this was because they could also learn from the book. They did not see the added value of the online activities. However, the other pupils were enthusiastic about it and said it helped them a lot and made learning more fun. Almost a third of the pupils said they learned better because it was more fun and more varied to study with Quizlet. Furthermore, 55 per cent of the pupils mentioned things like "It helps me during the lesson", "It helps me to study the terms", "Now I do not have to look up so many words", and "I now know all the terms because of Quizlet".

Table 3.4.1

Quizlet Section	Used By	Rated Among Most Useful By
Flashcards	38%	10%
Speller	71%	33%
Learn	95%	24%
Test	81%	14%
Games	unknown	29%

As can be seen in table 3.4.1, the sections that were said to be used most were first Learn, followed Test, then Speller, then Flashcards. The Flashcards section was therefore not reported to be used much. Speller, the games, and Learn were most often rated among the most useful sections[10]. The Speller section involves hearing the term as well as reading it and having to copy it. This is what pupils found most helpful. The games were also rated as helpful, because it involved a different and more fun way of learning. Also, the Learn section was found to be helpful. This section involves trying to give the correct term corresponding to the definition, or vice versa, and then seeing the correct answer and copying it until it is correct. What pupils find important is that the study tool prompts both terms and definitions. This means pupils learn the terms 'both ways', as they call it: they both have to give the term with the definition, and the definition with the term. What was also mentioned was the combination of activities, which made the tool useful. This made it more fun and more useful at the same time.

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[10] Pupils could rate more than one section as most useful, which explains why the per centages do not add up to 100%.

4. Conclusion and Discussion

Concerning the first sub-question[11], one can conclude that the first-year bilingual learners at Hermann Wesselink College mainly struggle with new words, long words or texts about a new topic. Together, these three concerns account for a little over two thirds of the experienced reading difficulties. Regarding the applied reading and vocabulary learning strategies, it can be concluded that the vast majority of pupils know what to do when they encounter difficulties while reading an English text. The four most popular strategies are, in order of frequency, reading a fragment more than once, finding the meaning of a word by looking at its context, asking another pupil for help, and asking the teacher for help. Furthermore, 73 per cent of learners find subjects involving a lot of reading, such as History, Geography and Biology, more difficult than other subjects in the bilingual curriculum. It can also be concluded that the pupils are fairly confident about their English language abilities, as more than 50 per cent of them think they are good at English. Two thirds of the learners state that they enjoy reading English texts. Only a third of the learners agree that studying in the English language makes school more complicated for them.

In regards to the second sub-question[12], one can conclude from the literature that useful vocabulary intervention activities should take the different aspects of knowing a word into account. They should therefore include spelling, meaning-form linkage, grammatical functioning, collocation and pronunciation. Furthermore, the intervention should be interactive and engaging, with varied and multimodal in- and output, and it should present the vocabulary to the pupils in different contexts. Online activities, such as those offered on Quizlet.com, combine many of these features.

The conclusions relating to the third sub-question[13] will be discussed following the structure of its respective sub-questions. Firstly, concerning the

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[11] What are the reading problems generally experienced by first-year bilingual pupils at Hermann Wesselink College?

[12] What kind of intervention can we design to support pupils in overcoming their reading difficulties?

[13] What is the effect of this intervention activity?

hypothesized measurable difference between the intervention group and the control group concerning their in-class language difficulties, one can conclude that there was no clear difference between the number of observed language instances in the two groups. When comparing the percentages of time spent on general language and vocabulary teaching during the comparable lesson parts[14], however, a noticeable difference was found. While the difference was small for the second lesson, it can be said that the control group spent a bigger portion of the two lessons on general language and vocabulary teaching than the intervention group. Especially concerning the words studied with the online Quizlet study tool, the pupils of the intervention group had fewer in-class questions about them and spend less class-time trying to figure out their meaning compared to the control group. The lack of difference in percentage of time spent in the second lesson can be explained by the questions asked by the teacher instead of the pupils. It was observed that the pupils knew the answers to these questions, which means they already knew the words because of the intervention. This is in line with the theory-based hypothesis concerning the effectiveness of online interactive vocabulary study tools.

With regard to the online participation of the pupils, the following can be concluded. The pupils participated quite well, with an average participation rate of 81 per cent for the study features, and an average participation rate of 60 per cent for the test feature. About one third of the pupils went beyond what was required, playing games with the relevant history vocabulary list. Concerning the pupils' evaluation of the online study tool and its usefulness in the curriculum, a large majority of 86 per cent stated that they find Quizlet a useful study tool. The pupils find it fun, varied and motivating, and said it saves them time because they do not have to look up the words themselves. Both the conclusion concerning their participation and their evaluation of the activity are in line with the theory-based hypothesis that online study tools are experienced as helpful and motivating by pupils.

In combining these conclusions, the following can be stated about the effects of the intervention activity. The intervention activity was effective in

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[14] Comparable lesson parts: parts of two lessons that covered the same topic.

bringing the percentage of class-time spent on vocabulary and language teaching down in the intervention group compared to control group. Especially concerning the Quizlet words, a difference was observed. The pupils also stated the activity was useful. It should be noted that the effects could be increased if all pupils participate and complete all study and test features.

Finally, concerning the overall research question of this research, it can be said that this intervention activity using the online study tool Quizlet to pre-study words used in the classroom is effective to help first-year bilingual pupils in their lessons at Hermann Wesselink College.

Based on these research findings, the following areas would benefit from further research. The results and conclusions of this study are based on only two observed lessons for each group. A longer period of observations could provide more in-depth information on the effectiveness of the online intervention as well as pupils' commitment to learning with Quizlet. Perhaps one could also compare the effects of Quizlet to that of another online study tool. Furthermore, the conclusions consider first-year pupils and their performance towards the end of the school year. One could investigate the effects of using Quizlet in the beginning of the school year. The findings for the effectiveness of the Quizlet tool are only valid for these particular lessons. To be able to make more general statements, more research would be necessary. A longer period of observation could give more insight into whether the intervention is effective over time.

One could investigate the importance or effect of giving Quizlet as non-mandatory homework. The spontaneous participation and current usage of the online tool shows a real commitment that could be restrained if seen as mandatory homework. Another way to look at it would be to give the website as a tool to students, merely explaining how to use it, and let them free to use it or not depending on their personal needs. Some pupils stated that the website did not add anything to the book. This category of pupils would then have the choice not to work with a tool that does not add anything to their learning process.

The conclusions drawn above suggest that using the online tool Quizlet by history teachers is advisable. Usage of Quizlet for other subjects as Biology and

Geography could be investigated. Nevertheless, the same positive outcomes are expected because Quizlet does not rely on the words one has to learn but on how one learns words. Because Quizlet has been given as mandatory homework by the teacher with no tangible consequences if not done, usage of Quizlet as homework is advisable and it will be up to the teacher to see it as a mandatory assignment or as a learning tool among others.

Furthermore, one could investigate the possibility of using the online tool with definitions in Dutch to facilitate the understanding of beginning first-year pupils.

To reflect on the research process, one can add that the questionnaire that took place in December gave more insight on the classroom situation. Its outcome has been used to narrow down the research to specific vocabulary learning, which is the core of the problem for first-year bilingual students of history. Conducting the research, the expectation was for the lessons to be comparable content-wise. However, the control group was already further than the intervention group, so only a small part of the intervention group lesson was comparable to the control group. This shows that communication is important and one should not be afraid to speak their mind to clear practical parameters. One should not forget that a school is a variable in constant motion, even if the staff is very helpful, researchers have to be more flexible than the school.

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