



How do Female and Male Students work with an Online Vocabulary Program?

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Abstract

This paper reports on a large-scale study carried out at the University of Victoria on second language vocabulary acquisition. The research investigated intentional vocabulary learning in combination with the use of information technology as suggested by Schmitt (2008). The research questions were how female and male learners used an online vocabulary program and if this was related to their learning outcome. A total of 186 first-year German as a foreign language students (104 female, 82 male) participated in the study over two semesters. The analysis showed that the male students used the program significantly less than the female students in the second semester. Although the female students slightly outperformed the male students on the vocabulary quizzes, the differences were not statistically significant.

1 Context of the study

Naturally, learners have individual preferences when it comes to studying a foreign language. Researchers are interested in questions such as what motivates the learners and how they can be motivated. In her book on gender differences in language learning, Chavez (2001) describes how female and male students interact differently in the second language classroom, and how they prefer different task-types, topics and feedback. However, little is said about information technologies (IT) in this context, an area that has seen an exponential rise in the last ten years. In today's foreign/second language classroom, software programs, online applications, or internet learner platforms are often used by instructors to enhance the learning experience. The question is, though, do they and if so, do they advantage or disadvantage female or male students?

Most of the studies on motivation towards language learning, in particular, using IT in the second language classroom, have produced mixed outcomes: while some reported gender differences, others found no evidence of such differences. The study of gender differences in relation to vocabulary acquisition, in particular on intentional second language vocabulary learning facilitated by a computer program, has more or less gone unnoticed. This article therefore aims to look into this area with a study that was carried out in several sections of a beginner's German program during one academic year at the University of Victoria in Canada. The program was specially designed so that the students could review words five times over a period of ten days and the following questions could be addressed: whether the students actually used the potential of the program, whether the female and male students used it similarly, and what impact such uses had on their learning outcome.

1.1 Motivation and anxiety towards a foreign or second language

Studies on motivation in relation to differences between female and male students in foreign or second language acquisition have produced mixed results. A large-scale survey on motivation with almost 5000 participants carried out in Hungary by Dörnyei and Clement (2001) using Gardner's socio-educational model reported that female students scored higher than male students in all aspects of motivation including integrative and instrumental factors. The target languages were English, German, French, Italian and Russian. A survey of almost 500 students carried out by Mori and Gobel (2006) in Japan in an English as a Foreign Language (EFL) classroom also used Gardner's model, yet did not confirm these results. One explanation might be the different cultural settings of these studies, as the cultural heritage and societal norms might play a role in motivation.

In her book on gender, Chavez (2001) describes how male students are often less engaged in the second language classroom. They don't interact as much with peers as female students do and are skeptical towards feedback received from peers. However, this behavior does not necessarily affect their learning outcome. Female students, on the other hand, are more willing to communicate, in particular with native speakers, and engage in discussions.

1.2 Information technology and the second language classroom

The next question is in what way female and male students handle information technology in the second language classroom and if there is a link to motivational factors. A large-scale study carried out in the United Kingdom based on 427 surveys and 85 audio logs reported that language students appreciate using Web 2.0 technology that allows them to create their own content (Conole, 2008). It was observed that language learners used this technology in a reflective, critical manner and integrated online sources with print materials. A similar result was reported by Lee (2005) in a study carried out at the University of New Hampshire surveying advanced Spanish students. Not all studies are that positive. Winke and Goertler (2008) surveyed 911 first- and second-year undergraduate French, German and Spanish language students at Michigan State University, and found that many students do not have the skills necessary to engage in the specialized nature of computer-assisted language learning tasks because these tasks are different than the everyday use of e-mail or Facebook. A study by Stracke (2007) carried out in Australia echoed these findings and added that some language students reject the computer as a medium of language learning because it is impersonal. In some cases, students showed high levels of anxiety to study in a hybrid or blended language learning context (Ushida, 2005). Ushida used Gardner's socioeducational model of second language acquisition for her study finding that students who were motivated to engage in the online component of the course showed higher scores on tests than those who had high levels of anxiety. Interestingly, those differences were not statistically significant. Ushida also reported the biggest disadvantage of such courses was the reduced interaction between teachers and students.

Not many studies have investigated gender differences regarding attitudes, motivation or performance using computers. Based on an investigation of 850 secondary school students (444 males, 406 females) in Ontario using different online learning objects covering concepts in biology, history, chemistry, general science, geography, mathematics, and physics, Kay and Knaack (2007) found no marked individual differences between female and male students. In the context of second language learning, studies of this kind are surprisingly hard to find. One explanation might be that no clear picture has emerged regarding motivation comparing female and male students so far.

1.3 Vocabulary acquisition

The process of acquiring a word in a second language has been investigated by several researchers. One area of investigation is the context, in which words are acquired by. Oxford (2003) points out that one would expect that certain tasks favor certain learner types. In vocabulary learn-

ing, the medium chosen to present the words as well as the tasks to be carried out by learners do play a role. Rimrott (2009) investigated different presentation modes (visual, audio, definition, and International Phonetic Alphabet) in her research with first-year students of German. Her findings suggested that a combination of all four options produced the highest word retention rates among students. Although the study did not explicitly investigate gender differences, male and female students did perform similarly on the vocabulary quizzes (Rimrott, personal communication, July 12, 2009).

A few studies have investigated gender differences in relation to learning strategies in second language vocabulary acquisition. Zoubir-Shaw and Oxford (1995) reported that female students studying French used more vocabulary learning strategies such as guessing or working with contextual clues than male students. Young and Oxford (1997) carried out a similar study with learners of Spanish. In that study, they did not find differences between female and male students. However, in a study on Chinese learners of English as a Foreign Language, Gu (2002) reported the same differences as Zoubir-Shaw and Oxford (1995). It is worth noting that these studies on strategies were on incidental vocabulary learning, a term used to describe how learners acquire words by reading. It is also worth noting that none of these studies used a computer program.

A study that did use information technology in the context of vocabulary learning in relation to gender differences was carried out by Grace (2000). Grace used a compact disc, which illustrated a French dialogue with images and audio. It also explained some words by giving definitions and offered an English translation of the French dialogue. One group was allowed to use all the functions of the CD, the other group was to use all functions, minus the English translation. Results showed that students of the group who had access to the translation outperformed the other group on two post-vocabulary tests, one carried out immediately after students finished working with the CD, the other two weeks later. However, there were no differences in performance between female and male students.

What is missing from this type of research is a study on intentional vocabulary learning using information technology. Intentional vocabulary learning has recently made a comeback (Nation, 2001, 2009). Hulstijn and Laufer (2001) point out that an explicit memorization stage following other strategies such as inferring or verifying will greatly improve retention. In other words, words need to be repeated over periods of time in order to be stored in memory and consequently be available when needed. This view is shared by others (Mondria, 2003; Schmitt, 2008). How often words need to be repeated and in what time frame it should take place are still debated.

Out of this context of motivation, intentional vocabulary acquisition and information technology, the following research questions were developed:

1. Do female and male students use the online vocabulary program designed for first-year students of German similarly or differently?
2. Do female or male students score higher on the vocabulary quizzes administered after each chapter of the program?

2 Methodology

The data for this study was collected at the University of Victoria from September 2008 to April 2009. It was part of a research study that investigated intervals and time-sets in second language vocabulary learning. At this point, it is still unclear how often and in what time frame words need to be repeated in order to be stored in long-term memory. However, first results indicated that reviewing words five times over a period of ten days led to very high scores on retention tests (for more information see Schuetze & Weimer Stuckmann, 2010a).

2.1 Participants

In the fall of 2008, 117 students enrolled in the program of German 100A (Beginner's German

Level I) participated in the study. There were four sections of German 100A, the number of students in each section ranging from 31 to 34. A pre- and post-study questionnaire survey was conducted. The pre-study questionnaire used several criteria to filter out students according to their background (German speaking parents, previous German course at university level, more than 6 months in a German speaking country after the age of 11, three years of high-school German). The post-study questionnaire asked participants if they had used other means besides the online vocabulary program of learning vocabulary during the study phase (flash-cards, websites that accompany the textbook which provides additional activities). That left the data of 100 students (56 female, 44 male) to be analyzed. In the spring of 2009, the same criteria were applied to the 90 students enrolled in German 100B (Beginner's German Level II), 82 of whom had continued from 100A. The data of 86 students (48 female, 38 male) was used for the analysis.

2.2 Online vocabulary program

An online vocabulary program called ViVo© (Virtual Vocabulary) was developed to test different intervals and time-sets (for a detailed overview see Schuetze & Weimer-Stuckmann, 2010b; for screenshots, see Appendix). The program was used by students to learn words in the target language, and at the same time, it recorded student activities to allow the researcher to track a learner's progress. ViVo presented lexical items to learners with images, sound files, lexicogrammatical information, target language sample sentences, intercultural information, the meaning in English and a practice field with spell check. The design of ViVo followed the principle of a multimodal approach that has proven to work very well (Jones & Plass, 2002; Kim & Gilman, 2008; Rimrott, 2009) and cater to different learning style preferences (Cohen, 2003; Oxford, 2003). ViVo was organized by chapters following the example of the textbook used for first-year students of German at the University of Victoria. For each chapter, forty words were programmed into ViVo. Only base words were used following the definition by Nation (1990) that a base word is any word whose meaning cannot be predicted on the basis of its components. The base words were taken from the respective chapters of the textbook at a ratio of three content words to one function word.

The forty words were presented to students of German in each chapter using the multimodal approach. Each chapter was used for ten days. The first encounter with the words consisted of using all the information presented (images, sound files, lexicogrammatical information, target language sample sentences, intercultural information, meaning in English) and retyping the words into the program using the practice field with spell check. In the review session, each student was prompted with the image and the meaning in English, and then asked to type in the German word. If the answer was correct, the program would acknowledge it and move to the next item. If the answer was incorrect, the program would give the option of reviewing all the information previously presented. The student could then try again. After that, the program would automatically move to the next item whether the student's answer was correct or incorrect. After that first encounter, students would work with the program depending on the programming mode. At the end of each chapter, students would take retention tests.

ViVo was programmed into two rehearsal modes to test intervals and time-sets: a uniform spaced interval and a graduated spaced interval. In the uniform mode, the lexical items were presented every two days: day one, day three, day five, day seven, day nine. Therefore, the rehearsals were equally spaced with a maximum of five rehearsals. In the graduated mode, the spacing was made unequal by providing more dense spacing in the first few days and less dense spacing in the last few days. The order was day one (twice), day two, day four, day seven. The maximum number of rehearsals was also five.

2.3 Task

Two sections of German 100A were assigned to work with ViVo in the uniform mode and two sections were assigned to work with ViVo in the graduated mode. German 100B only had three

sections. The students who had done 100A previously continued working with ViVo in the previously assigned mode regardless of what section they were in. The new students were assigned a program mode to balance the number of students in each mode.

On day ten of each chapter, all students wrote an online quiz. On day fourteen of each chapter, all students wrote a print quiz. There were a total of five online and five print quizzes for German 100A, and a total of five online and five print quizzes for German 100B. In all quizzes, students had to give the German equivalent after being prompted with the English word. The rationale for having two quizzes per chapter was threefold. First, after each chapter, the online quizzes tested all forty lexical items students had practiced with ViVo, whereas the print quizzes tested only twenty of those forty lexical items. Second, all quizzes were marked by a research assistant for the purpose of this study (see below); however, students received a participation mark for the online quizzes but a percentage mark for the print quizzes. Each online quiz therefore served as a practice for students to see how many lexical items they remembered before taking the print quiz. Third, the print quiz was four days after the online quiz thus testing long-term retrieval of lexical items.

2.4 Data analysis

The data was collected based on the overall research design that investigated intervals and time-sets. Therefore, the data of female and male students using ViVo was collected differentiating how often they had used the program and what interval (uniform or graduated) they had worked with.

ViVo kept track of students' use: the program recorded the time and period a student logged onto the program. The data was compiled for every chapter to track the students' progress and was compared between the female and male students with a univariate analysis of variance.

The second set of data analyzed the online and print quizzes that the female and male students wrote after each chapter. In the quizzes, the students were prompted with the meaning in English and had to provide the meaning in German. The 3 to 1 ratio of content to function words that had been practiced with the program was used for words tested. A research assistant marked all quizzes differentiating between major errors (wrong meaning) and minor errors (spelling, wrong article). A univariate analysis of variance was carried out to compare the data compiled for the female and male students.

In order to be consistent, results of the gender study are presented differentiating between the two modes. In German 100A, 100 students from four sections were selected for the study. Of those 100 students, 48 worked with the uniform mode (26 female, 22 male) and 52 with the graduated mode (30 female, 22 male). In German 100B, 86 students from three sections participated. They were divided into 42 students working with the uniform mode (24 female, 18 male), and 44 with the graduated mode (24 female, 20 male). The following results are presented: program use and vocabulary quiz scores.

3 Results

3.1 Program use

The number of rehearsals in each chapter was five; however, some students opted not to participate in each rehearsal. Figures 1 to 4 show how often students enrolled in German 100A and 100B used ViVo during the course of each semester. The vertical line refers to the number of students, the horizontal line to the chapters, the series to the frequency of use (series 1: students used ViVo five out of five possible reviews; series 2: four out of five possible reviews; series 3: three out of five possible reviews; series 4: two or less out of five possible reviews).

Figure 1 shows that students used ViVo differently from chapter to chapter in German 100A when working with the uniform interval. Initially, most students used all five reviews but, in chapter three, most students used four reviews. In fact, the number of students using four reviews in-

creased steadily. In chapter four, series one and two were tied. The number of students using two or less reviews peaked in chapter three, tying series two. Except for chapter one, the number of students using three reviews was the lowest.

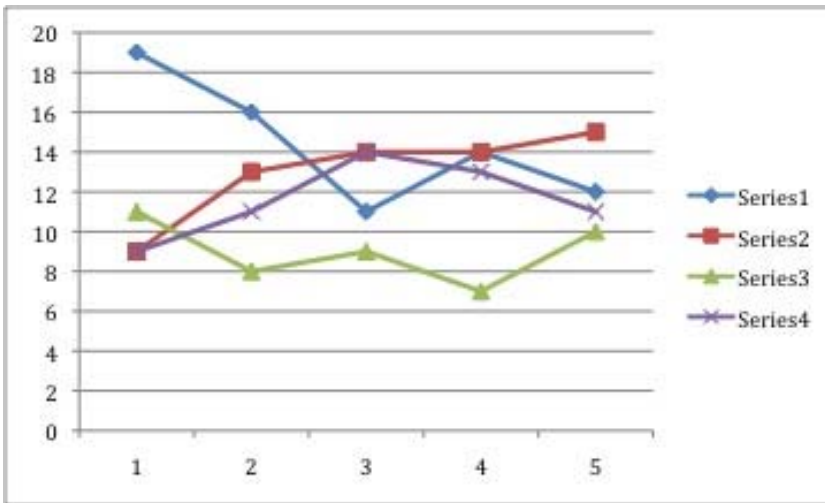


Fig. 1: Use of overall German 100A Fall 2008 students in uniform interval

A univariate analysis of variance determined that the pattern described was similar when comparing female and male students using ViVo in uniform mode. The significance value was $p=.278$ (female students: 6.25 Mean frequency, 1.71 Standard Deviation; male students: 5.75 Mean frequency, 1.44 Standard Deviation).

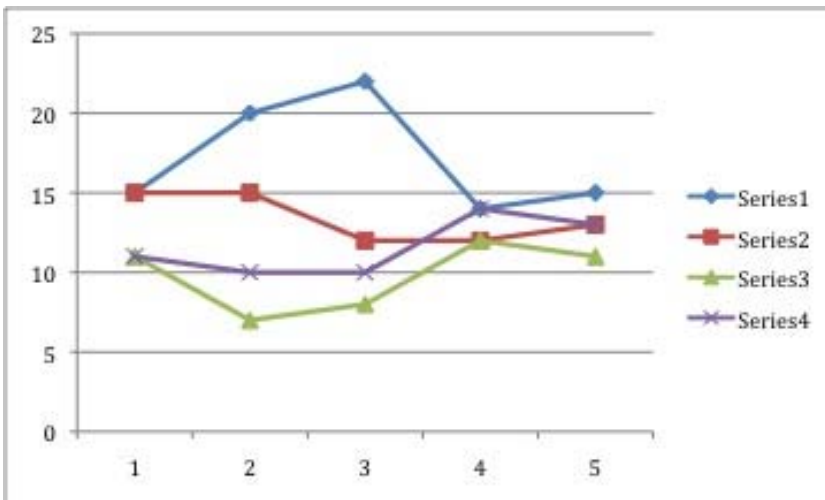


Fig. 2: Use of overall German 100A Fall 2008 students in graduated interval

The series for the graduated interval in German 100A looked different (see Fig. 2). Initially, most students used five or four reviews. While series one continued to rise until a sharp downturn in chapter four, series two declined in chapter three. The number of students using three reviews was the lowest. The number of students using two or less reviews was the highest in chapter four. A univariate analysis of variance determined that the pattern described was similar when compar-

ing female and male students using ViVo in graduated mode. The significance value was $p=.118$ (female students: 6.85 Mean frequency, 2.03 Standard Deviation; male students: 6.10 Mean frequency, 1.74 Standard Deviation). In conclusion, there were no statistically significant differences between the female and male students using either program mode in German 100A.

The graphs of the uniform and the graduated program mode showed different patterns. In the uniform mode, the female and male students alike used the program as much as possible in the beginning, but settled for using it four out of five times in the end. In the graduated mode, female and male students alike used the program four or five times at the beginning, then used the program as much as possible, although in general they used it less in chapter four. Possible explanations for these differences are in the program mode themselves: the graduated mode with the condensed practice intervals required the students' attention more than the uniform mode. Interestingly, female and male students responded to the demands of the program mode similarly.

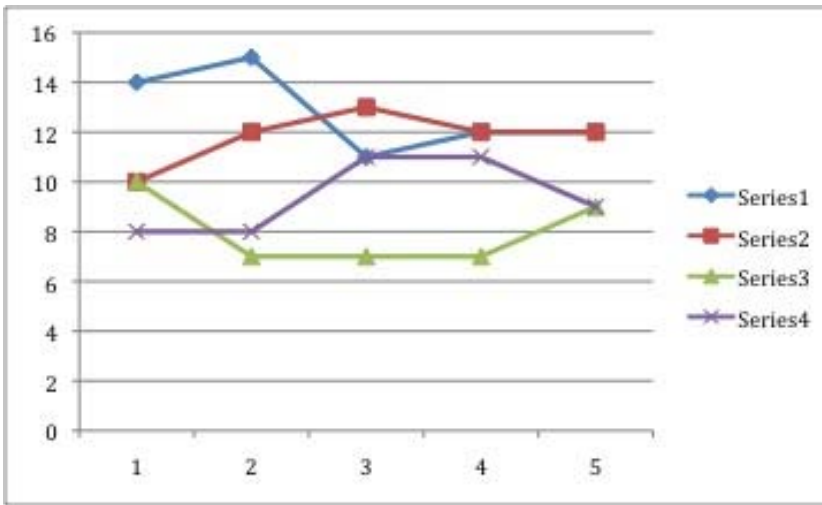


Fig. 3: Use of overall German 100B Spring 2009 students in uniform interval

Figure 3 shows that most students in German 100B used five out of five possible reviews in the beginning and four or five reviews in the end. Similar to Figure 1, the number of students who used two or less reviews rose in chapter three. Students worked with chapter three after the mid-term in German 100A as well as in German 100B.

A univariate analysis of variance determined that the female and male students in German 100B used ViVo differently in the uniform mode. Overall, the female and male students used ViVo less than in German 100A. However, the gap between female and male students that was already visible in German 100A was now statistically significant: $p=.031$ (female students: 5.60 Mean frequency, 1.27 Standard Deviation; male students: 4.90 Mean frequency, 1.25 Standard Deviation).

The graph of the students using the graduated interval (Fig. 4) in German 100B looked quite different. Most students consistently used five reviews. The number of students using four reviews dropped in chapters three and four before rising again. In the last chapter, the number of students using four reviews was the same as those who used three reviews and two reviews or less. Figure 4 is actually similar to Figure 2. In German 100A, students using the graduated interval also used five reviews the most.

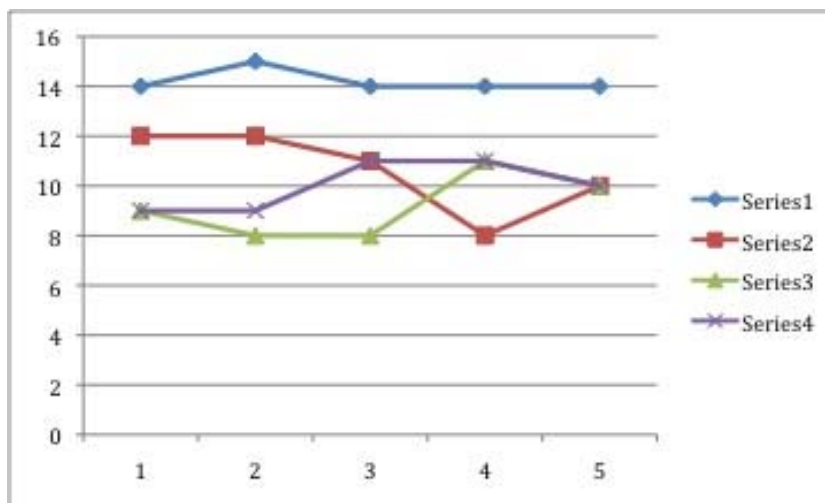


Fig. 4: Use of overall German 100B Spring 2009 students in graduated interval

A univariate analysis of variance determined that female and male students in German 100B also used ViVo differently in the graduated mode. Again, the female and male students used ViVo less than in German 100A, and again, the gap between the female and male students that was already visible in German 100A was now statistically significant: $p=.019$ (female students: 5.90 Mean frequency, 1.55 Standard Deviation; male students: 5.05 Mean frequency, 1.14 Standard Deviation). In summary, the male students mean use score dropped more significantly than that of the female students in German 100B.

3.2 Vocabulary quiz scores

The second analysis looked at the scores of the five online and the five print quizzes the students wrote in German 100A as well as in German 100B. After the research assistant had marked the quizzes, the scores of female and male students were compiled and compared using a univariate analysis of variance. Overall, scores were high. In the online quizzes, the female and male students using the uniform mode scored higher than those using the graduated mode while in the print quizzes, the opposite was true. However, none of the differences were statistically significant.

	Mean	Standard Deviation	Significance
Online uniform	Female: 93.23 Male: 92.77	8.48 9.51	$p=.684$
Online graduated	Female: 86.36 Male: 89.91	12.46 12.56	$p=.077$
Print uniform	Female: 85.31 Male: 83.26	15.95 16.09	$p=.269$
Print graduated	Female: 86.18 Male: 84.05	15.05 12.64	$p=.165$

Table 1: Quizzes of German 100A Fall 2008 students' univariate analysis of variances

Nevertheless, an interesting comparison is that of the female and male students. Table 1 shows that in German 100A, the male students slightly outperformed the female students in the online quizzes, but in the print quizzes it was the other way round.

In German 100B, these patterns were different (Table 2). First, the female and male students using the uniform mode outperformed the students using the graduated mode in both types of

quizzes (online as well as print). Second, female students slightly outperformed the male in all of the two types of quizzes. None of the differences were statistically significant, though.

	Mean	Standard Deviation	Significance
Online uniform	Female: 91.76 Male: 88.39	12.47 16.41	p= .209
Online graduated	Female: 89.00 Male: 88.54	14.53 17.99	p= .884
Print uniform	Female: 88.19 Male: 87.44	11.62 13.61	p= .679
Print graduated	Female: 87.26 Male: 84.23	12.66 10.69	p= .117

Table 2: Quizzes of German 100B Spring 2009 students' univariate analysis of variances

The analysis of the program use did show that students used fewer rehearsals in German 100B than German 100A. However, this did not necessarily result in lower quiz scores as scores in the online and print quizzes in German 100B were high. It was particularly the male students who used fewer rehearsals in German 100B. Whereas their quiz scores stayed the same or decreased in German 100B (except for the print uniform category), the quiz scores of female students actually rose in German 100B (except for the online uniform category). In other words, there was a correlation between using the program and quiz scores.

It was also interesting to see that female students slightly outperformed the male students in all of the print quizzes. The print quizzes were written four days after the online quizzes, they were marked with a percentage mark, and they tested twenty of the forty lexical items practiced. It is difficult to say which of these factors or combination of factors might have influenced the quiz results. However, the fact that the female students retrieved lexical items successfully during the print quizzes might be an indication that these items had been stored in their long-term memory. The term long-term memory is problematic, however, a well-cited study carried out on spaced intervals by Karpicke and Roediger (2007) speaks of long-term retention in terms of ten minutes to two days. It should be noted that the print quiz scores of male students were also quite high and only slightly below of the scores of the female students. It is also possible that knowing they would receive a percentage mark, female students took the print quizzes more seriously than the male students and consequently worked with the program more often as shown in the section on program use.

4 Discussion

The analysis showed that statistically there were some differences between the female and male students in terms of how they used the online vocabulary program in the second semester. The male students used the program significantly less in German 100B. They also scored lower on vocabulary quizzes in German 100B than the female students, although those differences were not statistically significant. One factor might be the attitude of some of the male students who either got bored with the program or assumed that less reviews would still give them good results in the quizzes, or perhaps were simply happy with their results on the quizzes. It should be remembered that quizzes were written after each chapter, so each student received feedback on the scores before the next chapter started. That gave each student a chance to change his/her behavior when using the program. It should also be remembered that a post-study questionnaire ruled out participants that had used other means to study vocabulary and their data was not included in the analysis.

The literature review showed that studies on differences between female and male language students often report conflicting results. The study presented here was the first to bring information technology, second language vocabulary acquisition with a focus on intentional learning, and gen-

der together. The rationale of the study was that an online learning tool, such as ViVo, should actually benefit all learners and enhance the learning experience. However, there is the possibility that the program advantages or disadvantages female or male students. Chavez (2001) described that among other differences, male learners are less engaged in the second language classroom while female students appreciate opportunities to communicate, in particular with native speakers. An online learning tool such as ViVo can therefore potentially be more interesting for male students because it provides a new learning environment outside the classroom and boring for female students because it is non-communicative. However, the results of this study show that the opposite was true. The answer to research question one – Do female and male students use the online vocabulary program designed for first-year German similarly or differently? – is that female and male students used the program differently in the second semester; male students used it less. The answer to research question two – Do female or male students score higher on the vocabulary quizzes administered after each chapter of the program has been completed? – is that female students scored higher on the quizzes but differences were not statistically significant. In summary, it was the female students who were more engaged with the non-communicative online tool they used outside the classroom than the male students.

The results also showed that the online vocabulary program faces the challenge of being interesting enough to be used over longer periods of time, in particular by male students, as this might have an effect on long-term retention. Therefore, the design and pedagogy of this program has to be well thought out. Programmers, instructors and students would need to work together so that everyone has the opportunity to benefit from such a program.

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Appendix

Herzlich willkommen
User:
toemmel

Logout

Kapitel 7

You can lose a game, an object or a friend.

to lose

verlieren Der Fußballclub Bayern München spielt nicht gut.
Er verliert 5:0 gegen das Team aus Hannover.

Retype German word:
verlieren

next item >>

A) Graphical user interface, ViVo© in practice mode (2009)



Vivo Virtual Vocabulary Box

Kapitel 7

Herzlich willkommen
User:
toemmel

[Logout](#)



to lose

Your entry:

verliiren

We suggest:

verlieren

next item:



this item's info:



B) Graphical user interface, ViVo© review mode (2009)