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Game Design and Learners' Attitude Based on Keyboard-Vocabulary-Learning-Method

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Abstract: The keyboard-vocabulary-learning-method (KVLM) introduced in this study is a method that combines keyboard typing, games and English vocabulary learning together. English belongs to the Indo-European language family. Due to the particularity of the language itself, it is the language most closely associated with computer keyboards. In addition, through the movement of ten fingers on the keyboard, the students' tactile sensation is mobilized, which deepen the students' memory effect. Based on that, software was designed. Game elements were incorporated to stimulate students' engagement in learning. We also did a research to test students' attitude towards this method. 292 primary students from three schools in Shanghai participated in this research. The results of descriptive, non-parametric and T test indicated that there was positive attitude towards KVLM. Besides, there is a significant difference between the extracurricular class and standard class. And there is also a notable disparity between the students of the lower and higher grades.

Keywords: keyboard; typing; English vocabulary learning; game; attitude

1. Introduction

Technology has found its way into the field of education transcends the national borders. Meanwhile the way of learning English has been considerably changed due to the technology. Recent years, many researchers (Johnson, 2005; Margo, F., 2009) have been focusing on designing digital instructional games based on the idea that it may help learners get involved and increase their interests.

In second language learning, vocabulary plays an important role because insufficient vocabulary knowledge may hinder the improvement of language learning. But the problem is that a lot of students have difficulty in vocabulary learning due to their low interest or low efficiency of memorizing the words. The technology provides a new way of memorizing English vocabulary.
However, blindly pursuing fancy technology without considering the nature of education or the feelings of students using technology may lead to failed learning. In other words, it is important to take account of the law of learning and students' attitude towards the technology that is chosen.
The keyboard-vocabulary-learning-method (KVLM) is based on the linguistic theory and related educational research. Meanwhile, it adds the elements of game, hoping to improve the students' learning interest.

2. Literature review

Cohen and Wickland (1990) found that whatever the reason, there is a connection between spelling ability and working memory. While vocabulary learning has a lot to do with memory, we assume that typing may pose influence on vocabulary study.

American scholar Dunn & (1993) proposed the VAK learning model, which refers to the three learning modes: Visual, Auditory and Kinesthetic. This model proposes that Visual type students are better at processing visual information and images, and absorbing knowledge through

language and spatial sense; Auditory type students are good at receiving external information by listening; while Kinesthetic type students strengthen learning through physical exercise.

The method (KVLM) in this study is trying to promote the students through the keyboard typing (Kinesthesia) and English listening (Auditory), combined with the screen text and picture (Visual). The combination of the three learning modes promotes the sensory stimulation and deepens the memory of English words.

Also, Research showed that the finger movements can activate sensorimotor areas in the contralateral hemisphere. Indovina, I., & Sanes, J. N. (2001) points out that visual attention alone resulted in sparse cerebral cortical and substantial bilateral cerebellar activation. Simultaneous performance of visual attention and finger movements yielded widespread cerebral cortical, cerebellar, and other subcortical activation, in many of the same sites activated for the movement or attention tasks.

In addition, linguist and educator Stephen Krashen proposed the theory of the Monitor Model. According to Monitor Model, there are five hypotheses and the fifth one is Affective Filter Hypothesis. It accounts for the influence of affective factors on second language acquisition. Affect refers to non-linguistic variables such as motivation, self-confidence and anxiety. According to the hypothesis, affect effects acquisition by facilitating or preventing comprehensible input of the second language. If the affective filter blocks comprehensible input, acquisition may fail or lead to low learning efficiency. Likewise, if students have positive affect, they are more likely to have a better academic achievement.

Researches directly related to typing assistant vocabulary learning are as follows. Gascoigne did three empirical studies from 2000 to 2006. The researcher found that students who typed a passage in the target language had better recall of the words than those who wrote out the same passage by hand. The researcher contributes the results to extra psychomotor steps involved in typing, which means more movement equals to better learning. However, Cunningham and Stanovich (1990) found that the first graders recalled words better on a spelling test when they had learned the words by writing than by typing on a computer keyboard, which contrasts to the former study. After that, Vaughn, Schumm, and Gordon (1993) sought to explore their results. No difference was found between two types of vocabulary learning. Also, Heift (2003) drew to the same conclusion. Dr. Carolee Sormunen did a project focusing on whether language arts skills could be learned while students were simultaneously improving keyboarding skills. And the result was positive.

All the above research focused on the test score of two methods of vocabulary learning (typing and handwriting). Very little research has been performed to address whether the students accept the technology used for their learning, whereas the present study pay attention to students' non-linguistic variables such as motivation, attitude, self-confidence, anxiety and so on.

Based on the above, the software was designed. This thesis will introduce the concept of the software on the basis of substantial theory and the specific functions of the software, and explain the results of the research about students' attitude towards this learning method.

3. Game Design

3.1 The Concept

Based on relevant theoretical research, developers hope to design software that combines vocabulary memory with typing to mobilize learners' visual, auditory, and tactile sensations, boosting learners' interest and attitudes, thereby enhancing vocabulary memory effect. From the perspective of education, if adds any game elements into the learning, the focus should still be on education itself. The game is just an auxiliary way. Excessive use of the game may cause unsatisfactory results.

3.2 The Design

The software was developed using Visual Basic which is a programming environment from

Microsoft. It combines typing and game together. It is software that cooperates fingering practice with word memory. Language was learned, at the same time keyboarding skill was being developed. There two phases of learning.

The first phase: In order to allow the learner to mobilize more finger movements as much as possible, the developer has designed a set of ten-finger typing method. The learner needs to practice the fingering before the vocabulary memory learning. Only after reaching the proficiency level, one can start to memorize the words.

After learning the ten-finger typing method, the learner uses the ten-finger game in the software to practice. The learner should press the keys on the keyboard in the specified time according to the letters on the falling ball. If it is correct, the ball will disappear; if it is wrong, the ball will fall on the lower left of the screen. In this way, the students will clearly know which letter they has make mistake.

In addition, the learner can select the corresponding practice stage according to his or her proficiency, and can select the speed, number of balls and the time when the ball falls. For example, from 1 to 7, the speed at which the ball falls is getting faster and faster; by choosing the number of balls, student can control the number of balls that fall at the same time. Through the progressive exercises, the learners' responsiveness at the fingertips is exercised. After the game is over, the software will automatically score.

Figure 1. Different stages of fingering practice

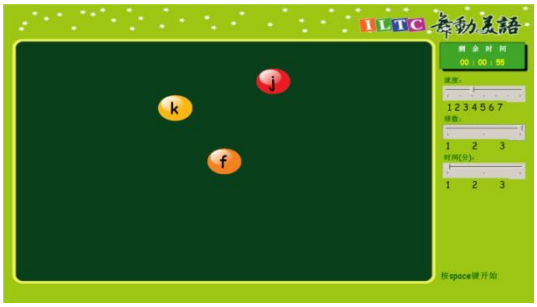

Figure 2. Ten-finger practice game

The second stage: after the learners fingering proficiency is up to standard, students begin to memorize the words. Under the word memory practice mode, students need to pass through three levels: including General Learning, Memorize Learning, and Overall Inspection. The first level: General Learning Method (Figure 3), the software provides English words, Chinese translation and pronunciation. The learners need to type the word completely without mistakes; if there is a mistake, they need to complete correct typing for three times; otherwise learners would keep typing until they meet the requirement. At the same time, the software will automatically record the time they use, correct rate and so on. The second level: Memory Learning Method, the software only provides Chinese translation and English pronunciation; the learners need to use their own memory to type the correct words. Similarly, only when the word is spelled out correctly, learners can pass the game; the software also records information about the time they use, the number of exercises, and so on. The last level, that is, the Overall Inspection, learners should quickly type the English words according to Chinese translation within the limited time. The difference is that the software will give

the score after the learner completes all the questions.

In the process of passing the game, the software will automatically recruit the words that the learner has made mistakes, and the learner needs to go to the “gas station” to strengthen the memory until the word can be remembered accurately.

Figure 3. General learning method

4. Methodology

Like above mentioned, if students have positive affect, they are more likely to have a better academic achievement. In order to find out whether the students have positive attitude towards the KVLM, we did an empirical research in local primary schools.

4.1 Participants & design

In total, 292 pupils of Grade 3 and Grade 4 took part in the empirical study. Classes were recruited from three local primary schools in Shanghai. There are two types of class: extracurricular class (students choose this course based on their interest) and standard class (students are obliged to take part in the course). The words chosen were from their new semester text book, which means they need to make some efforts to use the software to memorize them.

4.2 Questionnaire

This research attempted to figure out students’ attitude towards KVLM through the use of a questionnaire. The questionnaire is a 5 point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree” with 25 items. The questionnaire items were based on the scales that were developed by former researchers (Desmet, P., 2009; Saeed, M., 2014; Cecchini, 2014; Alemi, M., 2015). We modified the items and then translated them into Chinese. The questionnaire has five sections: **attitude towards English; attitude towards KVLM; interest; self-confidence; concentration**. The Cronbach alpha reliability for the scale was .976.

4.3 General Procedure

The students took the course once a week for two semesters at school. The words chosen were from their text books. The software was used in the classroom and with the help of the teachers, who were trained to teach them typing with ten fingers, and after the students started the second phrase, teachers assisted them to use the software. After the whole course finished, the questionnaire was assigned to them.

5. Result

Out of 290 questionnaires, only 240 were available. The questionnaire was based on a 5-point Likert scale from 1-point to 5-point, which means low scores such as one or two provide evidence for

negative attitude, low interest or confidence and bad concentration. Table 1 shows the descriptive statistics of the mean of the scores based on the collected data.

The mean for the scores of the five sections are: 4.44; 4.41; 4.30; 4.30; 4.28. The higher the scores were on the scale, the more positive attitude was evaluated towards the use of KVLM. The total mean of scores showed a very positive affect towards this learning method. From the data, we can also tell that students believed they will be better in learning English vocabulary and more confident which would boost their motivation. The present research provides the evidence that students are technological motivated. According to Affective Filter Hypothesis, they are more likely to achieve academic success. The positive attitude may be contributed to finger movements. Also, students hold that "memorizing words by typing is much more fun than writing on paper".

Table 1

Descriptive statistics of the overall mean

Section	N	Mean	SD
Attitude towards English	240	4.44	0.79
Attitude towards KVLM	240	4.41	0.81
Interest	240	4.30	1.02
Confidence	240	4.30	0.97
Concentration	240	4.28	0.92

In order to see whether there is a significant difference between the extracurricular class and standard class, a non-parametric was run as shown in Table2. The results reveal that there was a significant difference between different types of class and the score of extracurricular class was much higher than that of the standard class. The results reveal that students in extracurricular class were more engaged in the keyboard-based vocabulary learning.

Table 2

Non-parametric test of two types of classes

Section	Extracurricular Class	Standard Class	MannWhitney	p
Attitude towards English	4.795	4.248	-5.521	0.000**
Attitude towards KVLM	4.756	4.023	-6.171	0.000**
Interest	4.753	4.019	-6.132	0.000**
Confidence	4.682	4.087	-4.666	0.000**
Concentration	4.788	4.209	-5.678	0.000**

The non-parametric test was also taken to check the difference between lower graders and higher graders. The results show that there was significant difference between different grades. The Table3 shows that Grade3 has higher scores than Grade4, which may translate to the idea that the younger the age of the students were, the better their results. It is assumed that the younger students

are more curious about the technology and typing is a new skill for them. Besides, they don't need to throw the old habit of typing, which makes it easier to learn the ten-finger typing.

Table 3

Non-parametric test of two graders

Section	Grade3	Grade4	MannWhitney	p
Attitude towards English	4.775	4.325	-3.899	0.000**
Attitude towards KVLM	4.787	4.077	-5.222	0.000**
Interest	4.754	4.093	-5.047	0.000**
Confidence	4.744	4.295	-3.955	0.000**
Concentration	4.677	4.151	0.92	0.000**

*P<0.01 **p<0.01

6. Conclusion and Future Work

Based on the ground theory and previous research, the research group drew the conclusion that more finger movement leads to better learning. The software was designed to improve the English vocabulary learning combined with game and typing. The later research data shows that students have positive affect towards the use of the software. This positive result is in fact a great leap to achieving a positive attitude to learning.

Future work includes the use of wearable devices to test the frequency of the mistakes they make. Also, some pictures of the words will be added to the software in order to increase the visual stimulation.

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