Designing a Typing Game with Chinese Words to Sustain Flow Experience of Children

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Abstract: In this study, we argue that the development of flow-based typing games should not only stimulate motivation but also sustain motivation of the design of typing Chinese words. In particularly, this system combined level- and star-mechanism to adjust the content of level (challenge) and the speed of typing (skill) of typing games; it possible enables children to sustain the flow experience. Findings revealed that the potentiality of flow-based typing game for sustaining the flow experience of children and facilitating the accessibility of numerous Chinese words. Besides, some implications about the experimental results were also discussed.

Keywords: typing game, flow theory, game-based learning, Chinese input

1. Introduction

In general, "Learning" is defined as the act or experience of the learners who acquired the knowledge or skill by instruction. To engage in this process of gaining knowledge or skill, the learners must be motivated [1, 2]. *Flow theory* is a way to implement and achieve motivation. According to the definition of flow theory [4], many people reach a perfect balance between challenge and skill, and then they will find a flow experience to keep the user's experience within the user's flow channel. This paper will focus on how to design a typing training exercise to sustain the practice and help students construct their typing skills. We will try to motivate the learners to improve their typing skills rather than decreasing the patience. In order to make an enjoyable learning environment, we design a system, named My-Pet-Typing. It is not only enhancing the typing speed of learners, but sustains their typing behavior.

2. How to learning the typing skill

Typing is a simple mechanical action. If you want to improve typing skill, you just practice again and again. Most of the way to practice the typing skill makes use of typing software which differentiated between drill-based and game-based software. Generally speaking, drill-based typing software does not have an element of entertainment like game-based software, but it usually has a virtual keyboard and the shape of a hand. It aims to help the beginner to know the standard fingering, and they will get the feedback score of speed, accuracy, and duration time (Figure 1(a)).

In fact, there are so many typing websites provide the learners to practice on World Wide Web, some of them include, in addition to many typing information, statistical chart, most typed, most mistyped, and so on (Figure 1(b)). Game-based software usually contains the little animation, colorful pictures, and multimedia, even offer instant feedback in visual

and audio form. It is often most effective with particular learners who enjoy learning with game. On the other hand, some of the learners can type faster and faster when they indulge in game mode.

(a) Game interface (b) Typing information

Figure 1. Type Fu (From: http://type-fu.com/)

In Taiwan, the students learn to use the keyboards correctly at the first, in order to find the BoPoMoFo (Zhuyin) on the keyboards. After a period of time, they must learn how to type a "key sequence" of Chinese character, typing in phonetic symbols and tone. It can require the learners to type the vocabulary or an idiom, and then proceed to the next stage, and then they can complete sentences and whole article.

3. Design of Flow-based Typing Game

In previously study, we developed a game-based typing system, entitled My-Pet-Typing [6], was established to develop the typing ability of elementary school students, and provided a pleasant effective learning environment for typing, also can help the students enhanced the Chinese words of them.

3.1 Game design

Typing exercise is boring and dry, but it is proficiency can be built by repeating to practice. Most situations in using Chinese typing software, the learners are not interest in typing practice because of it usually repeated the same materials and played the unexciting game. Such game lacked a serial of process to cause the players have to spent long time to concentrate without interrupt. So we design a game with breaking through the barricade for the elementary school students to develop the Chinese typing skills, and record the progress of typing.

It provides the students who play at an appropriate level for their ability have to explore it by one way and accomplish to unlock it. In other words, students have to reach the lowest standard for passing the mission, then lock the next mission and get the basic reward in My-Pet-Typing. It just spends three or five minutes in each mission. For the next time, the students can play the progress continue due to all of typing record will be saved by computer server.

When the game starts, it assigns the question through the train by moving (Figure 2(b)), and the students have to type the answer in the specific area. Then, the results of mission will transfer to rewards through the "Star", and it will be wrote down on the bottom of mission diagram (Figure 2(a)).

(a) Missions

(b) Game interface

Figure 2. The interface of Flow-based typing game

3.2 Balance to Challenge and Skill

In order to keep the students are able to play the typing game continue, the game environment which support flow and enable learning must closely match the skill level of each student and also provide the clear goals and immediate individual feedback of tasks [1]. In flow-based typing game, the challenge refers to the learning materials and the number of practicing Chinese words. About the learning material, level of game is designed according to formal education in elementary school of Taiwan. The students have to type all vocabularies in the game level and assure of all of the answer are correct. And then, to calculate typing speed is according to the right score and the duration of typing activity, on the other words, typing speed (wpm) is that a student can input the amount of words in one minute.

To maintain the student's Flow experience, the exercise must balance the challenge of the game and the student's skill to address and overcome it [2]. According to Csikszentmihalyi's [5] flow theory, the learners reach a state, called *Flow*, which let a person has higher learning performance and pay attention to achieve the goals of task [1, 3, 7]. The Flow-based typing game provides the challenge which follows the textbook in formal education becomes difficult with the grade of students. If the students do not achieve the lowest standard of mission, it does not unlock and means it reduces the opportunity of outside the flow zone for students.

4. Preliminary Evaluation

4.1 Research Design

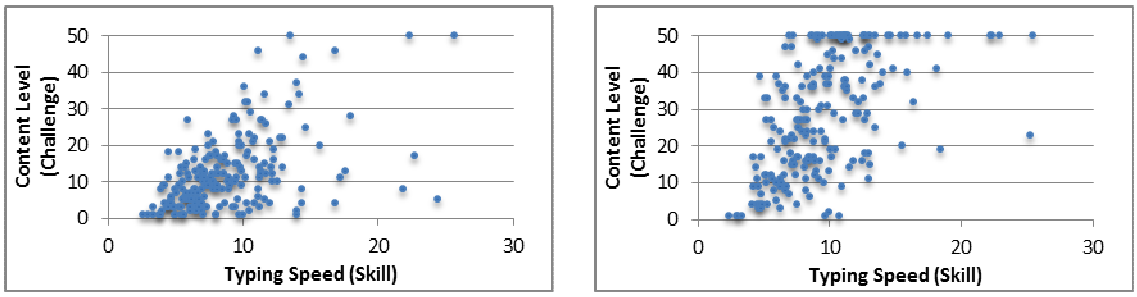
The participants are 205 elementary school students from 8 classes of grade 2 students who aged 8 to 9 years. In this study, all of students have owned a small tablet computer themselves and they are in a wireless environment classroom. The game was started to play at last semester. Four levels of typing game played, and total missions are 50 (Level 1 has 8 missions. Level 2, Level 3, and Level 4 have 14 missions for each.). Each mission had twenty to thirty Chinese words, including the content from grade 1 to grade 2. So far they had played for six months.

Table 1. Chinese Words of Level

	Time	Level	The Number of Mission	Range
Grade 1	1st Semester	1	8	1~8
	2nd Semester	2	14	9~22
Grade 2	1st Semester	3	14	23~36
	2nd Semester	4	14	37~50

4.2 Results

To calculate the total typing speed for all students during the duration of six months, the average is 9.57 wpm (Word per Minute). Figure 3 illustrates the student distribution between the typing speed and content level after one month a) other one is six month later b) At first one month, most of the students are at a low-challenge and a low-skill state. After six months, a group of students who are at low-challenge and low-skill move the upper challenge and raise the skill slowly. However, more and more students' level already pile up at the highest end. The phenomenon maybe impairs the ability of investigators to determine the central tendency of the data.



(a) One-month later (b) Six-months later

Figure 3. The student distribution between content level and typing speed

5. Discussion

5.1 Sustaining the Flow Experience of Children

The objective of this paper is to design a typing game to sustain flow experience of children, and so many students have done it (complete 50 levels). But as a matter of fact is students make less progress of typing speed during the game duration. Furthermore, while they have accomplished all of missions, they will no longer play the game when they feel it is not necessary.

5.2 Facilitating the Accessibility of Numerous Chinese Words

Moreover, there are many students who although get the high-challenge (Level 4), typing skill is lower than average speed (9.57 wpm) after the game starting for six months. On the other hands, it is difficulty to draw up the standard of typing skill with elementary school student because of the past typing exercise have no records to show the typing data with such age of students. When students do not familiar with the Chinese words and input method, the present model provides a simple learning environment to help them practicing the typing skills and know the vocabularies. After a period of time, while the students can master the typing skill and access numerous Chinese words through the typing game, then it will ask the students to strengthen their skilled and raise the typing speed. In order to pass the mission to get more rewards or compete with peers in the game, the students just type as fast as they can.

6. Next Step

In this study, we hope to the students who get the flow experience can help them to sustain the typing exercise. It is important to balance the challenge and skill of *flow theory*. The original design of the typing game in order to let the students easy to play, but it seems to cause the challenge of game is too easy to improve the typing speed difficultly and slowly. In other words, the challenge design does not take the typing speed into consideration that the relationship between the challenge and skill is too low. Next, we will add the time pressure for developing efficiency in game and the game will become more excited with students. Finally, Flow-based typing game will start a serial of researches and designs which can help the students construct their typing skills to sustain the practice until the typing no longer becomes the block of learning in the future.

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