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Primary Students' Financial Learning within a Pet-Nurturing Game Environment

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Abstract: In this paper, a My-Investment system was proposed to facilitate students' financial management learning in a game-based environment, in which each student owns a virtual pet and are responsible for a better life through learning financial management. To get some cues to understand the effect of the system, a case study was conducted through collecting and analyzing 21 primary students' interview data. The results show that My-Investment system can help students learn the knowledge of financial management, and the pets in the game can enhance their motivation to learn the knowledge of financial management.

Keywords: game-based learning, primary students, financial education

1. Introduction

In recent years, game-based learning has become a significant learning environment that can enhance students' learning motivation [1]. Some literature found that digital games can promote students' motivation in specific subject matters [2]. Among different game categories, simulation games are the one that could be applied to education in our daily life. This is because experience is the best teacher, and simulation games can simulate some phenomena in real life so that players immerse in these experience [3]. In addition, the game-playing in simulation games makes students' learning experience be more enjoyable [4].

Financial management plays an important role in human life, because many activities are related to consumption. Therefore, it is very important to develop the concept of financial management in early age. One of example is the use of credit cards. If people improper use the credit cards, the credit card debt will cause personal bankruptcy and increase the family's financial difficulties [5]. Recently, the financial education is also emphasized in primary schools. However, primary students are unfamiliar with the knowledge about financial management, because they have seldom experience in using credit cards or madding investments. Therefore, we develop a game-based learning system, My-Investment, for primary school students to help them learn the knowledge of financial management.

2. My-Investment system

The target uses of this system are primary students. To motivate students to learn in My-Investment, students are assigned as the role of host to take good care of their pets, as shown in Figure 1. For this purpose, students need to earn virtual coins and cultivate a good financial management habit. More specifically, students not only earn virtual coins, but also learn how to save or invest these coins in the system, so that students have more coins to satisfy their pets' needs. The conceptual diagram is illustrated in Figure 2.

Figure 1. The system snapshot

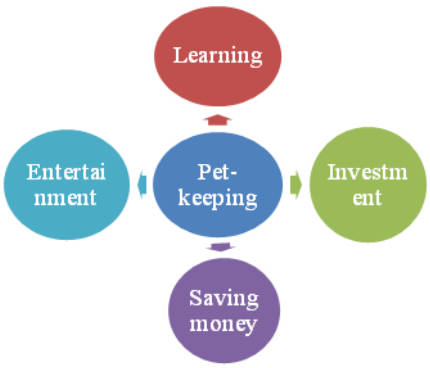

Figure 2. Conceptual diagram

3. Case study

After the My-Investment system was developed, a case study was undertaken to examine the design of the My-Investment system since we hope to use a design-based research to gain some revision cues after students' use in a practical setting. The purpose of the case study is to investigate the following three questions: (1) what did students learn from the My-Investment system? (2) what was students' perception of virtual pets?

3.1 Participants and method

The participants were 21 fifth-grade primary school students in Taiwan (aged eleven), including 12 boys and 9 girls. Every participant used the My-Investment system in a computer laboratory for four 50-minute sessions within a month. After their use sessions, a one-by-one oral interview method was conducted by two researchers to collect data about these three questions. To raise the validity, students could immediately use the system during the interview to remind them of the details.

3.2 Results

3.2.1 What students learned

The result of interview was analyzed by two researchers, respectively. The comparison of their coding consistency was further conducted and the reliability of .86 was gained. Those inconsistent items were discussed again for final coding. Table 1 summarizes the result of their analysis. Four major categories about what students learned from the system are listed, including "distinguishing the needs and wants", "saving money", "taking notes", and "considering both price and quality". It seems to imply that what students learned about financial management were conservative strategies, such as saving money (38%) and taking notes (24%); distinguishing the needs and wants (33%) is a part of reducing expenditure, conservative strategy, too.

Table 1. Summary of what students learned

Categories (percentage)	*Selected responses of students*
Distinguishing the needs and wants (7/21=33%)	"Could not buy something unnecessary." (#02), "Only buy what I need." (#04),"I would think whether I really need it." (#05).
Saving money (8/21=38%)	"Save money in the bank will receive interest." (#08), "Know how to save money." (#10), "It is important to save money." (#13), "Taught us how to save money." (#15).
Taking notes (5/21=24%)	"Now I know the importance of taking notes." (#16), "Taking notes helped remind me of not spending too much money." (#19), "When I earn money, I would take notes." (#20)
Considering price and quality	"If I want to buy a computer from two choices: one is with a discount; another has good quality but without discount. I would choose the latter." (#21)

(1/21=5%)

3.2.2 Students' perception of virtual pets

Table 2 shows the result of students' perception of virtual pets, of which reliability was .76. Students' perception of virtual pets was categorized as three levels: "very care", "care", and "don't care". It is apparent that most of the students (76%) care about their pets, especially they are willing to spend money for their pets (11/16=68%) or earn money harder for their pets (5/16=31%). It appears that virtual pets play a driving force for students' money making, which further results in an economy cycle (i.e., earning money, and then spending or investing these money), and provides more opportunities for students to learn financial management.

Table 2. Summary of students' perception of virtual pets

Perception (percentage)	*Behaviors*	*Selected responses of students*
Very care (16/21=76%)	Earning money (5)	"The purpose of playing this game is to nurture the pet and make money." (#01), "Earn more money to buy food for my pet." (#09), "Play this (game) is to satisfy the pet. Thus, I try to make money as could as possible." (#12)
	Consumption (11)	"Buy some goods that the pet likes." (#19),"Buy the food for my pet."(#13), "Often go to the store to buy something. It depends on the pet's needs." (#20), "Buy something to eat." (#07), "I will go to the bank (to withdraw money)" (#08).
Care (3/21=14%)	Consumption (3)	"Often buy the rice to feed" (#05), "It depends on what the pet wants, and I just buy them for him."(#06)
Don't care (2/21=10%)	Earning money (1)	"I just want to make money only." (#04)
	Consumption (1)	"Sometimes (buy food for the pet)." (#15)

4. Conclusion

Through analysis of interview results, we have some preliminary results: (1) students can learn financial management from My-Investment, especially the strategies conservative but closely related to their daily life. (2) Pet-nurturing can enhance students' motivation to learning the knowledge of financial management, which drives a game cycle and offer more learning opportunities for student to learn financial management. Further system revision could be planned according to these results in the future work.

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