Examining Computer Game Attitude Influence on Students' Voluntariness of Using Educational Mobile Role-Playing Game

Chris Lu, Maiga Chang, Kinshuk
School of Computing and Information Systems, Athabasca University, Canada
Email：chrischien630@gmail.com, {maigac, kinshuk}@athabascau.ca

Echo Huang, Ching-Wen Chen
Department of Information Management, National Kaohsiung First University, Taiwan
Email：{echoh, chingwen}@nkfust.edu.tw

Abstract: *The research team applies narrative theory to design a location based context-aware mobile role playing game in order to make students feel that they are living in the game world and role playing an actor, exploring the game world, completing the quests, and learning things. The research finds that students' confidence of playing computer games and degree of liking computer games do not influence their voluntariness of using such game in the future; on the contrary, their attitude towards computer games and how they feel comfortable to computer games significantly influence their voluntariness of using such game.*

Keywords: context-aware, location-based, educational mobile game, role-playing game, computer game attitude scale

1. Introduction

In 2010, the research team developed a context-aware mobile educational game called CAMEG (Lu, Chang, Heh, Huang, & Chen, 2010a, 2010b). The game generated a series of learning activities (i.e., a learning activity chain) to make the students interact with specific real (e.g., projector, rest room, pine tree, etc.) and virtual (payroll system, business policy, E-Commerce course, etc.) objects in the authentic environment. The series of learning activities were automatically generated for the student according to student's learning history, surrounding context (i.e., learning objects associated with the chosen role that the student wants to play and the chosen learning theme, student's location, etc.). Multi-agent system design principle had been adopted into the game; hence, the game could run on different smartphones easily with multiple agents' help (Lu, Chang, Heh, Huang, & Chen, 2011a).

In 2010, a usability assessment had been conducted for the game. The results indicated that male and female participants felt quite differently to the effectiveness of the game. In particular, female participants' responses to the perceived effectiveness and satisfaction toward the game were more positive than male participants (Lu, Chang, Heh, Huang, & Chen, 2011b). In order to make the CAMEG be interesting and get users motivated in playing it, this research team takes narrative elements into considerations (Ying, Wu, Chang, & Heh, 2009). At the end, the enhanced mobile

educational game with stories - Context-Aware Mobile Role-Playing Game (CAMRPG) was developed in 2011 (Lu, Chang, Kinshuk, Huang, & Chen, 2011c).

The research team then raises a research question: does computer game attitude influence a student's voluntariness of using such educational mobile role-playing games? A pilot is conducted. In this pilot, a questionnaire is used to gather students' attitudes toward computer games; and statistical analysis method such as independent T-test is used to find the answer for the research question.

2. Pilot Design and Data Collection

In the beginning, the researchers introduced the game and did a demonstration in a Management Information System (MIS) class of the Department of Information Management (IM), National Kaohsiung First University of Science and Technology (NKFUST), Taiwan. The researchers explicitly told the students that there was no compensation, reward, or recognition for anyone who participate this study as well as nothing will happen to the students who do not want to join the study.

The experiment environment of the pilot took place in three laboratories in the fifth floor of teaching building E of the university. The researchers took MIS course contents and concepts into the game and built a virtual science park in the fifth floor of teaching building E where many famous IT business and company virtually reside in it for participants learning MIS concepts while playing the game.

The participants were asked to fill up the questionnaire before they came to see the researchers at scheduled time in order to gather necessary data for analyzing and verifying the proposed research questions. All participants had 20 minutes to play the game at the authentic learning environment with the smartphones the researchers prepared. After that, the researchers collected their voluntariness of using such game in the future with five questions.

The questionnaire was revised from the Computer Game Attitude Scale (CGAS) questionnaire proposed by previous researchers (Chappell & Taylor, 1997; Chen, 2010), and had 31 five-point Likert-scale items (5 for "strongly agree" to 1 for "strongly disagree") categorized into six factors: "attitude towards computer", "attitude towards computer games", "comfortable", "liking", "behavior", and "confidence".

The research team verified the revised computer game attitude scale's validity and reliability before using statistical methods to examine the answers of the two research questions. Some participants did not show up at the scheduled time, hence, the correspondent responses of the questionnaire were removed. In addition, two participants' responses were removed because they had extreme values for all questions and had conflicting answers for the flip-flop items. The final valid sample includes 62 students, 34 male and 28 female students.

The results showed that all factors have a good measure of reliability except the behavior factor. The research team reviewed the three items of the behavior factor and believed that these items might not explain the factor well in this research because of the different subjective situations this research has. The three items had no correlation with the other factors, either. Therefore, the behavior factor was removed. Some

items' removal could improve the reliability of the scale, for instances, the removal of Q19 would make the Cronbach's alpha value of "Attitude toward computer games" factor become 0.799; the removal of Q2 would make the Cronbach's alpha value of "Confidence" factor become 0.955. The research team decided to remove these two items, either.

Next, the research team used Principal Component Analysis to examine the items' validity within the factors. Some items with factor loading less than 0.6 were not good enough for presenting the factor, therefore, those items were removed. At the end, a valid and reliable revised computer game attitude scale with five factors and 21 items was determined and confirmed. The research team then applied quantitative statistical method to get the answers for the research questions.

3. Data Analysis and Results

In order to answer the proposed research question, we use the independent T-test to explore whether or not different groups of participants have different attitudes toward computer games. The statistical analysis data in Table 2 shows that male participants like computer games much more than female participants as well as have higher confidence in playing computer games.

Table 2. Independent T-test to examine the different perceptions that male and female participants have toward the computer games.

Factor	Gender	N	Mean	Standard Deviation	T value
Liking	Male	34	3.5000	0.67295	
	Female	28	2.9286	0.88591	**-2.885***
Confidence	Male	34	3.6985	0.88715	
	Female	28	2.9911	1.01032	**-2.935****

***: p < 0.001, **: p < 0.01, *: p < 0.05

Although male and female participants are significant different in having confidence of playing computer games and liking computer games, the two factors have no influence on participants' voluntariness of using games like CAMRPG for learning. Table 3 lists the independent T-test results of examining the relationships of perceptions toward computer games and the voluntariness of using such mobile educational games.

Table 3. Independent T-test to examine different perceptions toward computer games may influence participants' voluntariness of using this game and similar games in the future.

Factor	Voluntariness	N	Mean	Standard Deviation	T value
Attitude towards computer games	High	17	3.9853	0.68733	**2.304***
	Low	9	3.3333	0.68465	
Comfortable	High	17	4.1882	0.59779	**2.323***
	Low	9	3.5778	0.71024	

***: p < 0.001, **: p < 0.01, *: p < 0.05

We divided participants' voluntariness into three groups: High, Med, and Low group. The High group participants have larger than 3.50 average score of the five five-point Likert-scale voluntariness questions (5 for "strongly agree" to 1 for "strongly disagree") and the Low group participants have less than 3.00 average score. The results show that only attitude towards computer games and comfortable to computer games make participants have significant different voluntariness of using this game and similar games for learning in the future.

Acknowledgements

The authors wish to thank the support of Athabasca University, NSERC, iCORE, Xerox and the research related gift funding provided to the Learning Communities Project by Mr. Allan Markin.

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