

Designing a Farming Game with Social Design to Support Learning by Reciprocal Questioning and Answering

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Abstract: Most of learners usually hesitate and tend to keep silence in online discussion for learning in traditional e-Learning platform, but they are enthusiastic about posting messages and playing games in social networking sites. By taking the advantages of social learning games, this article presents an initial study on designing a farming game “The Secret Garden of Angels” with a social interaction strategy which is modeled from an icebreaker game ‘The Little Angel and Master’ in real world. The learning mechanism integrated into the game is learning by reciprocal questioning and answering. Through playing interesting farming game with classmates, the social learning game attempts to raise the learning motivation, interaction between teachers and students and among students, and then the learning achievement.

Keywords: Farming game, social learning, reciprocal teaching, reciprocal questioning and answering.

1. Introduction

Many recent researches have proven that students can gain positive learning outcome when using game based learning (Gee, 2003; Ulicsak, 2010; Ebner and Holzinger, 2007; Kim, Park and Baek, 2009; Papastergiou, 2009; Chen et al., 2011; Yien et al., 2011). By referring to NTL’s (National Teaching Laboratory Institute) learning pyramid, learning by ‘practice by doing’ will gets 75% retention rate and learning by ‘teaching other or immediate use of learning’ will gets 90% retention rate, where traditional lecture and reading just get 5% and 10% retention rate (Magennis and Farrell, 2005). Game based learning is a practical method similar to learning by ‘practice by doing’ in a way. According to the FutureLab’s (2010) survey, the main reasons of the adoption of game-based learning are to engage students and offer an alternate way of teaching. Through creating an immersive learning environment, students will be interested in learning and gain better outcome.

Most educational game is also called as a serious game that “does not have entertainment, enjoyment, or fun as their primary purpose” (Michael and Chen, 2005). But the most important issue we need to address is the students’ better willingness of playing educational games constantly without any pressure. We believe a good approach to learning should explicitly grasp student’s need and interest, or the meaningful learning will not occur as expected. Besides, teachers and parents often worry about how students can really learn something from games. How to design an educational game that can appropriately balances the entertainment and meaningful learning is an important issue in research of game-based learning.

In recent years, social networking services, such as Facebook, Twitter, MSN, and Plurk, are very popular to connect friends in daily life. One of the attractive factors is people can easily keep in touch with their friends in real world and can conveniently extend their social network to other strangers through playing social games (NM incite, 2011). By taking the advantage of the popularity of social networking games, this article introduces a novel design concept of farming game “The Secret Garden of Angels.” The social design of the game is adapted from an icebreaker of the real world, and integrates a domain-independent learning strategy into it. Through peer reciprocal questioning and answering, the learners will earn money and experience points to buy and plant more high valuable crops for

accumulating personal achievement. The significant aim of this social learning game is to facilitate meaningful interaction of learning among learners by sense of achievement, competition, and fun.

2. Designing the Game “The Secret Garden of Angels”

2.1 Background: The Angel and Master - a Real World Icebreaker Game

This initial idea of the social learning game comes from a real world icebreaker game “The Angel and Master.” Everyone who joins the game serves as an *angel* of someone called the *master*. Every angel is also a master of some angel. The angel’s mission is to actively and positively care for the master’s daily life, such as schoolwork support, health care, social activity invitation, tips on school life, and so on. One important rule is the angels cannot expose identity to their masters while doing anything. Moreover, everyone can play as a *passer-by angel* to care the other masters he/she likes to interact with, but is allowed to expose identity. This rule makes the participant with high popularity has more chances to interact with everyone.

The most interesting time is the “Thankful Meeting Day” in the end of this game. The identity of every master’s angel will be publicly announced after each master has expressed thankfulness or complaint for his or her angel. It will be a grateful and funny day. Through this icebreaker game, every participant will be more familiar with each other. By borrowing the idea of this game, the game “The Secret Garden of Angels” adapts the interactive mode to design the peer reciprocal teaching.

2.2 Learning by Reciprocal Questioning and Answering

Reciprocal teaching proposed by Palincsar and Brown (1984) is an instructional activity to facilitate interaction between teachers and students in dialogue form for constructing the meaning of text. The students are asked to play as a teacher in turn to lead the dialogues by four strategies: questioning, clarifying, summarizing, and predicting. Based on the concept of reciprocal teaching, Juang and Chan (2013) proposed a learning strategy that integrates reciprocal questioning and answering into a learning process with three stages. In the questioning stage, learners are asked to preview learning material, and ask questions on the system before entering classroom. After classroom learning, the learning process enters into the answering stage. Each student is assigned to answer some anonymous questions the system randomly allotted from those questions asked in the questioning stage. Finally, in the assessing stage, all questions and answers are public for reading, re-answering, and assessing by all learners and teachers of the course. Since all learners will publicly assess all questions and answers, learners are expected to pay regard to the quality and correctness of their posts.

The features of the learning by reciprocal questioning and answering emphasize on the lesson preview before classroom learning, two-phase answering, and comprehensive assessment. First, learners will be more engaged in classroom learning if they have previewed the lessons before entering the classroom. Through browsing those questions posted by learners, the teacher can easily conclude an approximation of learners’ starting point for learning the new lessons. Second, two-phase answering insures that each question has assigned to one learner for answering in double-blind interaction mode, and then engages learners in open discussion of second phase. Two-phase answering also avoids plagiary of answers in answering stage. Third, comprehensive assessment gives learners a soft constraint to be serious about their questioning and answering.

2.3 Main Script of the Game “The Secret Garden of Angels”

“The Secret Garden of Angels” is a farming game which interaction model is designed by referring to the icebreaker game “The Angel and Master.” Players of this game can regard a farm as a course, a farm host as a teacher, and a farmer as a student. Every player can create a farm to be the host or join an exist farm to be a farmer. The first task of a teacher, the farm host, is the pairing of angels and masters. The teacher has three choices for pairing according to: gender segregation, no gender segregation, and

learning achievement. For examples, a male master should be assigned with a female angel; a farmer with low learning achievement should be assigned with an angel with high learning achievement.

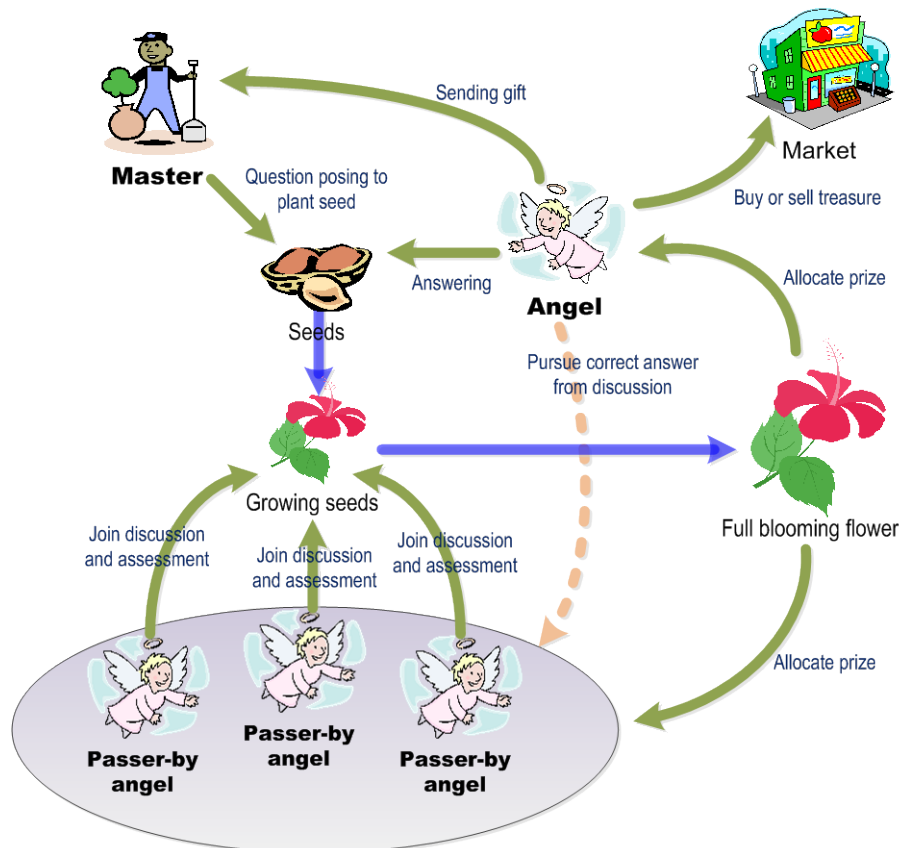


Figure 1. The game operation flow.

After planting seeds on cropland, time for growing seeds is started. In this time, every farmer can visit other farmers' cropland and click seeds to get into discussion. That is the passer-by angels who are not anonymous to the master can provide different answers. While discussing questions in seeds, all messages of discussion will be assessed by clicking "like" or "unlike" buttons in the individual question. The passer-by angels who join the discussion will earn experience points if the "like" button of his or her message has been clicked.

After the growing time, the angel and passer-by angels who join the discussion in a seed will share the prize according to the setting value of the seed. The original angel will earn 50% prize and the passer-by angles will share another 50% prize. The players can use the prize money to buy seeds, decoration, or gifts for personal collections or sending them to others. The experience points are used to represent personal performance of participation so as to provide teacher a reference of evaluating students. Therefore, the angels should endeavor to find out the answers for their masters and the masters should reply actively and positively to earn more prize and experience points.

This farming game has been designed by Flash, a 2D animation tool, and embedded in Facebook, a popular social networking site. Anyone who has Facebook account can play this game directly after a short registration process. Players can create a farm to be a teacher and has some

management tools to operate each cropping period (see Figure 2). Also, the players can join in other farms as a student and have some management tools for communication, shopping, recording, and ranking (see Figure 3).



Figure 2. Main page of the farm host (teacher)



Figure 3. Main page of the farmer (student)

3. Research Design

The research questions of this farming game are listed below:

1. Is the game valid to raise the performance of students' preview of lessons before classroom learning?
2. Can the social design of the game facilitate students' online positive interaction for learning?
3. Can the learning strategy raise the learning outcome?

This study will adopt quasi-experimental research method with pretest and posttest to explain the third question related to students' learning outcome. The pretest will be a background knowledge test to evaluate whether both control group and experimental group have the approximate ability to learn the new lessons. The posttest will be a midterm or final exam that aims at the long-term learning achievement after several cropping periods.

Moreover, in order to answer the first and second question, this study will develop a questionnaire survey based on the framework proposed by de Freitas and Oliver (2006). The framework provides four dimensions for evaluating games- and simulation-based education. The first dimension is the *context* where the play/learning takes place. The second dimension is the *learner specification* including the learning background, style and preferences. The third dimension is the *mode of representation* which reveals how the game affects the learners' internal process of critical reflection. The fourth dimension is the *pedagogical consideration* including the learning processes during both the formal learning time and informal learning time. By considering the four dimensions, the questionnaire aims to survey the degree of satisfaction of learners in learning motivation, person interactivity, online interactivity, and sense of learning achievement.

Besides, to survey the details of how the learning and reflection occurred in embedding game playing into course, this study will invite some participants with heterogeneous attributes to join the focus group interview. The results can provide qualitative evidence to explain whether the game design is appropriate for learners.

4. Conclusion

Social learning game is of high potential to attract students' interest in learning by playing the game they are conversant with. This initial exploration of a framing game with social design provides a touchstone of the possibility of designing a domain-independent learning activity into a game. Although the farming game is a well-known game to many students, the author believes this will reduce the learning difficulty for beginners. Teachers and students are willing to try the game just using their conventional operation concept. Then, they will pay much attention on the learning activities embedded in the game.

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References

- Chen, W. F., Wu, W. H., Chuang, T. Y., & Chou, P. N. (2011). The effect of varied game-based learning systems in engineering education: An experimental study. *International Journal of Engineering Education*, 27(3), 482-487.
- de Freitas, S., & Oliver, M. (2006). How can exploratory learning with games and simulations within the curriculum be most effectively evaluated? *Computers & Education*, 46(3) 249-264.
- Ebner, M., & Holzinger, A. (2007). Successful implementation of user-centered game based learning in higher education: An example from civil engineering. *Computers & Education*, 49(3), 873-890.
- Futurelab (2010). Game-based learning survey. Retrieved Dec. 22, 2011, from http://archive.futurelab.org.uk/resources/documents/project_reports/Games_survey_analysis_report.pdf
- Gee, P.J. (2003). *What video games have to teach us about learning and literacy*. NY: Palgrave Macmillan.
- Junag, Y. R., & Chan, J. (2013, May). *Cooperative learning with all classmates by peer-questioning, answering, and assessing*. Paper presented at The 17th Global Chinese Conference on Computer in Education, Beijing, China.
- Kim, B., Park, H., & Baek, Y. (2009). Not just fun, but serious strategies: Using meta-cognitive strategies in game-based learning. *Computers & Education*, 52(4), 800-810.
- Magennis, S., & Farrell, A. (2005) Teaching and learning activities: Expanding the repertoire to support student learning. In G. O'Neill, S. Moore, & B. McMullin (Ed.), *Emerging issues in the practice of university learning and teaching*, Dublin: AISHE.
- Michael, D., & Chen, S. (2005). *Serious games: Games that educate, train, and inform*. Boston: Thompson Course Technology PTR.
- NM Incite (2011). Friends & frenemies: Why we add and remove Facebook friends. Retrieved Dec. 26, 2011, from <http://www.nmincite.com/?p=6051>.
- Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1(2), 117-175.
- Papastergiou, M. (2009). Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation. *Computers & Education*, 52(1), 1-12.
- Ulicsak, M. (2010). Game in education: Serious games. A FutureLab Literature Review. Retrieved Dec. 12, 2011, from <http://archive.futurelab.org.uk/projects/games-in-education>.
- Yien, J. M., Hung, C. M., Hwang, G. J., & Lin, Y. C. (2011). A game-based learning approach to improving students' learning achievements in a nutrition course. *Turkish Online Journal of Educational Technology*, 10(2), 1-10.