Analysis on the feasibility of introducing digital board game into classroom teaching – from teachers' perspective

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Abstract: An educational board game module integrating with textbook materials was introduced to current teachers. This module served as a teaching aid that was equipped with as set of educational equipment-Digital Learning Playground. The aim of the study was to investigate the feasibility of adding situated interaction with a board game structure into ordinary school settings.

Keywords: Board game, Digital learning playground, game-based learning, teaching aid.

1. Introduction

Board game learning has many advantages [5, 7]. Board game has a board. The board in the game is the place where players share information, show status, and interact with each other. Modern board game can be divided into Roll-and-Move, Open Movement, Worker Placement, Simultaneous Action, Role Selection and Cooperative Play [12]. The type Roll-and-Move has already commonly designed into textbooks.

Board game is extensively been used for education. Some researches combined Board Game with technical ability. And some combine Board Game with knowledge. Studies have shown that the board game to join the teaching element has a positive impact on teaching [2, 3, 8, 15].

2. Motivation & Related Work

In the school learning, many teachers put games into the classroom, to allow students to practice the new knowledge in the classroom through games. However, teachers make preparations for class contents spend very much time in thinking game. Chen (2011) used an existing board game and added learning activities that based on the theme of the board game [5], board game placed in the teaching site, and can enhance students' learning motivation and learning outcomes [8].

To help teachers combine knowledge into the board game in a short time. We have previously done a pilot study [9]. The purpose of our pilot study is translating existing English teaching materials to be Roll-and-Move type board game. Our design combine

school knowledge and board game learning, and equipped with a set of educational equipment- Digital Learning Playground (DLP) [3, 5, 9, 11].

3. Instructional design & Learning equipment

We are going to try to take a board game learning system with textbook materials in classroom settings. We apply Digital Learning Playground (DLP) (Fig.1) that consists of a big screen presenting textbook materials with videos and audios, and a flat table serving as a game board that students can join in it. A PC control center, two projectors, and a Kinect device is the rest of DLP [4, 9, 11]. Kinect sensor captures the student's body movements. In additional, we design various interactive games for students using Kinect sensor. We use TPRS (Teaching Proficiency through Reading and Storytelling) model into our "Roll-and-Move" game structure. TPRS is proven that a common teaching methodology exposes learners to a sufficient authentic language with variety of comprehensive questions such as low-leveled, open-end, personal relevant questions [10, 12,14] (Fig.2).We use Kinect to achieve interactive scenario game. The interactive system runs through physical action, students enhance the relevance with game element by reality physical action. We call this Total Physical Interaction (TPI).

Total Physical Interaction (TPI) is like a visualizing version of Total Physical Response (TPR) [1] which uses body actions and movable contexts to enhance the connection between cognition and knowledge. In this instructional design, we design some interaction games from the vocabulary of textbook, such as "Wash Face." This face-washing game is trying to enhance the relationship with the phrase "wash face." After playing this game, the students will really know the action performed in the game means "wash face."

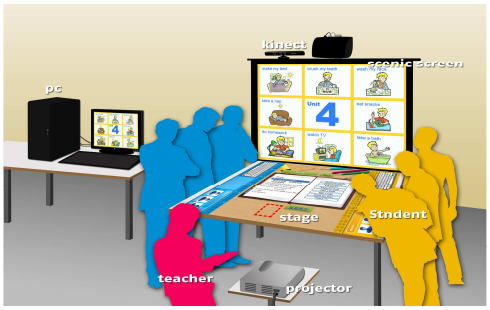

Figure 1. Digital Learning Playground Architecture.

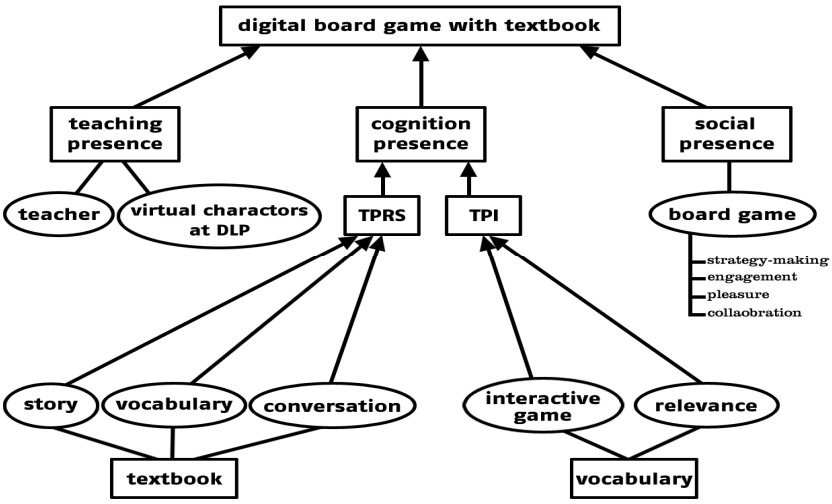

Figure 2. Design Flow with DLP Architecture

4. Experiment & Result

Game-based learning can enhance students' motivation, and students can learn in the game. After the pilot study, we confirmed that the design can effectively catch the students' attention, confidence, and satisfaction. We want to know that the design can help teachers' when they are teaching and preparing teaching materials. So we do the following hypothesis.

- Textbook materials into a Roll-and-Move board game can help teachers to enhance students' motivation in classroom.
- Textbook materials into a Roll-and-Move board game can help teachers to create more teaching situation.
- Textbook materials into a Roll-and-Move board game can provide students a chance to practice knowledge.
- Textbook materials into a Roll-and-Move board game can reduce teacher's burden of preparation.

After unstructured interviews with eight English teachers, they said that our system help textbooks vivid, and richer situational performance. Textbook materials into board game can catch students' attention to focus. Game always is a tool of teachers to promote an atmosphere because game could make students feel excitement and enhance students' concentration.

5. Discussion

In the interview, we found that the teachers all have their own teaching methods; however, most teachers would like to incorporate new technology in teaching if it could motivate students to learn.

Science and technology gradually changed people's behavior. Teachers seem to look forward to see the convenience brought by digital tools. Teachers could save more time to focus on students' progression. But most importantly, those teachers in Taiwan look forward to have a teaching aid that can sustain students' interest in language learning.

5.1 In social presence

Game assisted learning in the aspect of social presence can create human interaction, develop social skills and confidence [13, 16].

Ms. Chen expressed that confidence to students in EFL English learning is crucial. "If an educational game can make children be excited about learning and forget shyness, it would be a valid learning game design. Students with high English competency are full of confidence, while children with low or middle level feel inferior to speak out or even be put on the spot. You should avoid that letting students feel speaking English in front of everybody is sort of punishment."

5.2 In teaching presence

In this section, we would address the teachers' perspectives and expectation of using games as a teaching device. There were two types of teachers who had experience using games in teaching and who had had not.

One of the teachers, Miss Wu seldom used games in teaching because there were so many things to concern when she was delivering a lesson, such as classroom management, and time constrain. She seldom has time to jam a game in her teaching, if there is extra time, she may use games to do summary.

Ms. Lu is one of the teachers who often uses magic props, the game reference book "Give Me Five," for teaching [6]. The teacher said, "She spent so much time on game selects. The difficult part was how to combine teaching elements with simple games."A general agreement to the teaching aid with games is the aspects of simplicity. Teachers hope that games into classroom must be easy to understand.

5.3 In cognitive presence

Many teachers did not use Teaching Proficiency through Reading and Storytelling (TPRS) in teaching, however, many of them used Total Physical Response (TPR) method. In this section, we focused on how TPRS and TPI enhance students learning in teachers' perspective.

5.3.1 In our designed TPRS

Eight teachers haven't have heard about "Teaching Proficiency through Reading and Storytelling," but TPR. Miss Yeh used TPR in her class. She realized TPRS is similar to the activity of reading comprehension check. And our system incorporating their comprehension questions into a board game structure. This allows students to cope with high-level thinking problems with situations under a play-together learning atmosphere. Besides that, she also stated "Digital Learning Playground makes the textbook contents come alive with video and audio input.

5.3.2 In our designed TPI

Mr. Chen also commonly used TPR in class. He stated "TPR energizes a class and usually elicits high responses from students. Total Physical Interaction (TPI) is like a visualizing version of TPR, same as using physical action to enhance cognition, but with visualized and movable relevant contexts." The teacher showed his inclination to use TPI in language learning. He also mentioned the physical vocabulary games motivate a lot of students to try and put shyness behind. However, the operation of game play should be easier. Complicated game play caused frustration.

5.4 Challenges and Future Directions

The main concern which was addressed to most of the teachers is that the DLP equipment is suitable for small group of learning once a time. The classroom setting and the teaching flow with DLP need to be well-designed and avoid students to be idle. As to future work, some teachers also suggested our materials should be theme-oriented. As to our future implementation, the materials should be better classified in themes, such as food ordering, hobbies, and daily activities.

6. Conclusion

In this research, we design a module for Roll-and-Move board game, and provide a teaching aid which can accept by in-service English teacher. In our design, excessive number of

students cannot play at the same time, and therefore this model is suitable for small-class. In order to strike a balance between play and learning, and considered that teachers is actual users. A digital board game equipped Digital Learning Playground (DLP) is constructed. Hence our teaching tool can enhance the convenience while teaching. In addition, after class the teaching tools can also assist teachers to prepare for the future courses. In the future, we will try to find a better board game-based pedagogical methodology to let students practice knowledge through board game structure.

Acknowledgements

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References

[1] Asher, J. J. (1969). The Total Physical Response Approach to Second Language Learning. *The Modern Language Journal*, vol. 53, pp. 3-17.
[2] Bell, R. C. (1979). *Board and Table Games from Many Civilizations*. New York: Dover Publications.
[3] Caldwell, M. L. (1998). Parents board games, and mathematical learning. *Teaching Children Mathematics*, 4, 365-367.
[4] Chen, C. H., Chi, Y. L., Wu, C. J., Li, C. S., & Chen, G. D. (2010). Constructing a Digital Authentic Learning Playground by a mixed reality platform and a robot. *International Conference on Computers in Education*. 121-128.
[5] Chen, K. C., Wu, C.J., and Chen, G.D., (2011) A Digital Board Game Based Learning System for Authentic Learning. *Advanced Learning Technologies, IEEE International Conference*, pp. 25–29.
[6] Eisele, B. & Eisele, C. (2001). *Give me five*. Taipei: Caves Books.
[7] Harris, C. (2009) Meet the new school board : Board games are back-and they're exactly what your curriculum needs. *School Library Journal*, vol. 55, pp. 24–26.
[8] Hinebaugh, J. P. (2009). *A board game education.* American: Rowman & Littlefield Education.
[9] Huang, P. H., Wu, C. J., & Chen, G. D. (2012). An approach of building an engaging virtual authentic environment for classroom learning. *International Conference on Advanced Learning Technologies.*
[10] Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *JOURNAL OF INSTRUCTIONAL DEVELOPMENT*, vol. 10, pp. 2–10.
[11] Lee, W. J., Huang, C. W., Wu, C. J., Huang, S. T., & Chen, G. D. (2012). The Effects of Using Embodied Interactions to Improve Learning Performance. *International Conference on Advanced Learning Technologies.*
[12] Mayer, B., & Harris, C. (2010). *Libraries got game aligned learning through modern board games*. AMERICAN LIBRARY ASSOCIATION: CHICAGO.
[13] Piper, A.M., O'Brien, E., Morris, M.R., and Winograd, T. (2005) SIDES: A Collaborative Tabletop Computer Game for Social Skills Development. *Stanford Univ.: Technical Report.*
[14] Ray, B., & Seely, C. (2008). *Fluency through TPR Storytelling: Achieving Real Language Acquisition in School, Berkeley*. CA: Command Performance Language Institute.
[15] Selvidge, E. (2006). Journey to Egypt: A board game. *Montessori Life*, 18(4), 36-39.
[16] Zagal, J.P., Rick, J. & Hsi, I. (2006). *Collaborative games: Lessons learned from board games. Simulation & Gaming*, vol. 37 no.1, 24–40.