Exploring Teachers as game-based learning courseware and scenario co-designers for enhancing student English learning

Shelley S. C. Young & F.W. Lin

Institute of Information Systems and Applications, National Tsing Hua University, Taiwan
scy@mx.nthu.edu.tw

Abstract: The purpose of this study was to explore and describe how to transform the fixed text-based English learning materials into a flexible inviting and interesting online game-based courseware through the collaboration of a research team composed of three parties: school English teachers, experts from university and a software company that might not be possible otherwise. This paper describes the rationale of applying Universal Design for Learning (UDL) into the curriculum design, system frame work, and game scenario. In addition, a formative evaluation was conducted to the target students. The results of the evaluation indicate that most of the learners were positive to the game-based courseware design in terms of learning content and interface design. Further research is presented at the end of this study.

Keywords: Universal Design for Learning (UDL), Game-based learning, Competitive learning, English vocabulary learning

Introduction

Nowadays online games have become an indispensable role in many children's lives and leisure activities. Games provide engaging activities and bring fun and joyfulness, and moreover, games might provide a useful and attractive new method of learning. Ministry of Education (MOE) in Taiwan has been promoting integration of information technology (IT) in teaching and learning for years. However, most teachers remain to feel it difficult and challenging because most of the online game systems do not offer learning activities that are designed with integrated learning content, nor do they offer teachers the opportunity to incorporate appropriate learning materials into the systems (Yang, Chen, & Jeng, 2010). This paper reports on a systematic longitudinal study through intensive interactions and observations. The authors investigated and described how the three parties, school teachers, Learning Technology Lab in university and a software company, applied the curriculum design model Universal Design for Learning (UDL) (Rose & Meyer, 2002), to the common courseware stipulated by the Ministry of Education (MOE) and transformed the paper-based fixed English curriculum into a flexible game-based online learning scenario enriched with multiple learning modalities in the hope that the jointly designed courseware could attract students and engage them through multiple learning modalities to support class-based and after school learning or self-paced learning during their free time. The following research questions guide this study:

(1) How could the research team transform the English curriculum into an inviting and interesting online courseware that would bring more learning opportunities to adapt to diverse student needs in the afterschool settings?

(2) How should the research team design the text-based curriculum into a flexible online

learning materials and environment? What curriculum design model could the team use and what metaphor and design principles could be concluded?

(3) What would the curriculum turn out like in terms of an interesting learning environment? How would the target students perceive the online courseware and learning environment in terms of learning content and interface design?

1. Methodology

The methodology adopted in this study could be divided in two parts: curriculum development and online courseware evaluation. For the curriculum development, it is primarily a qualitative approach. This study on curriculum development is interpretive and descriptive in nature and uses the case-study method. Case studies are used to examine a specific unit such as an event, a program, an organization, and a time period in depth and detail, in context, and holistically. Triangulation was used to improve the probability that findings and interpretations would be reliable.

2. Results of curriculum development

2.1 Design of game-based online English learning environment

The research team followed the three principles of the Universal Design for Learning (UDL) (Howard, 2004; Rose & Meyer, 2002) including: 1. To provide multiple means of representation; 2. To provide multiple means of action and expression; and 3. To provide multiple means of engagement. Each party on this research team could have its role in engagement in design of the curriculum. Through the brainstorming design based on the guidelines of UDL, the research team transformed a courseware into the online English game-based learning materials. The design principles and scenario are concluded as follow:

(1) To ensure the learners' commitment to the game, role-playing and the plot of the play are important components of the game design.
(2) To create a more enjoyable and comfortable environment, the plots of the play, the colors and the scenes of the game are designed to fit the learners' age level.
(3) To provide a "multi-battle" model as a tactic to promote learners' motivation.
(4) To provide different levels and barrier-battles for learners to compete with each other to increase their English vocabulary power through the competitive process.
(5) To be adaptive to learners' different abilities so that earners can set their own learning goals and tactics as their abilities grow.
(6) To be a useful vocabulary-building strategy-tactics multimedia model, combining text, audio and video components.

2.3 Game design as to recruit learner interest and sustain efforts

The metaphor of a "Magic island" game model was designed into this learning content and scenarios. The online learning environment was developed and named "English Magic Rainbow Island" that offers 12 levels of challenging courseware for self-study and competitive activities. Two game modes are designed: a barrier mode, where learners can play different roles to set out on their English adventure journey; and a multi-battle mode, where learners compete with either themselves as genies or others in the "Magic Island". Through the learning by playing process, they could learn more vocabulary that empowers them to pass 12 different-level challenges represented by 12 different genies in the barrier

mode. These magic genies also demonstrate 12 different vocabulary learning levels. The multi-battle mode is called "Arena"; arena is a place for learners to learn the vocabulary in the game. The vocabulary competition is controlled by the computer which generates questions based on the learner's vocabulary level; the learner should answer the questions correctly and faster than their competitors in order to win the game.

2.4 Learning materials and pedagogical design

The goal of the game-based English courseware was to provide instruction and self drill-and-practice with vocabulary and sentences. English teachers in the elementary school differentiated the vocabulary and sentences into 12 levels based on the frequency of their appearance in the textbooks, and the students' learning situations in the real world. The learning materials in the game were divided into two major parts, a "word-building zone", and a "sentence-practicing zone". The two major zones provide multimedia learning opportunities for learners, including: words, pronunciation, graphics, and example sentences. Learners will be able to understand the meanings of the words and understand more about their usages in authentic living contexts. To evaluate the learners' performance in listening, pronunciation, reading and spelling, the related exercises and questions have been designed and integrated into the learning contents.

3. Conclusion and implications

The results indicate that this "English Magic Rainbow Island" jointly designed and implemented under the research team composed of three parties overall has received users' positive feedback. A software development company could be as a partner to assume the system development work. The role of the education and technology expert in the university could be an important interface between the school teachers and the software company to provide advices based on relevant learning theories and research experiences. The implementation of the highly-demanding online courseware would one the one hand offer more flexible learning opportunities to satisfy diverse student learning needs in the after school settings and, one the other hand, would help ease teacher's teaching load. The teachers involved in this joint research project expressed their thoughts that their technological knowledge and pedagogical content knowledge Technological Pedagogical and Content Knowledge have been trained and enhanced through the long-terms engagement and they could appropriate apply what they incorporated into the game-based learning courseware to associate with their classroom-based teaching as to maximize teaching effectiveness and efficiency. The empirical data on how the "English Magic Rainbow Island" is actually integrated into English learning contexts and in the after school learning settings and how students learn and benefit in the game-based environment will be collected and analyzed and reported in terms of learning outcomes, students' motivation, and online learning strategies in a separated paper.

References

[1] Howard, K. L. (2004). Learning and Leading with Technology, 2004 - 4.17.143.133. accessed 2010.12.20. http://4.17.143.133/udl/downloads/LLT.pdf .
[2] Rose, D. H., & Meyer, A. (2002). Teaching Every Student in the Digital Age: Universal Design for Learning Alexandria, VA: ASCD.
[3] Yang, J. C., Chen, C. H., & Jeng, M. C. (2010). Integrating video-capture virtual reality technology into a physically interactive learning environment for English learning, Computers & Education. 55, 1346-1356.