Learning Cinema Authoring System in the Classroom

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Abstract: Nowadays, it's more and more important to have authentic instruction which lets students interact with learning context and apply their knowledge into real life. In this research, we construct a learning cinema authoring system. Teachers may edit backgrounds, characters and dialogues to construct a situation which is based on teaching context. Moreover, students could have an opportunity to learn in an authentic situation. After experiment, we discover that the system could help teachers on preparing authentic learning material. Students also have better motivation when they learn in the authentic situation.

Keywords: Authentic learning, authoring tools, digital learning playground

1. Introduction

Teaching material is the medium of instruction between students and teachers, but the interaction between students and teachers is sometimes not enough. With the development of technology, teachers can bring multimedia to the class and offer more interesting educational materials. However, these teaching tools cannot provide a vivid situation in the classroom, and students cannot get immersed in those learning contents. Recently, many governments build English villages for students to learn foreign language and culture in a language immersion environment. However, building various scenes costs a significant amount of money and students rarely have an opportunity to learning in the English village and thus, we use existing facilities in the classroom (projector and projection screen) along with tablet and Kinect to build an immersive learning environment.

In this research, we construct an authoring system for situational teaching material. Teacher may use the system to meet the needs of individual students or classes and integrate with different teaching strategies. Moreover, the system helps teacher creates situational learning environment that is not only distinctive but also related to the content of textbook.

2. Related Work

2.1 Authentic Learning

Brown, Collins and Duguid (1989) considered that knowledge is developed through situation and activity. They also advocated that learners should learn in the real situations because the situation provides learner with practical experience which makes learning more concrete. Moore et al. (1994) thought that although authentic learning emphasizes the authenticity of learning activities. A learning activity is authentic if it is related to the real situation and is goal-oriented, for example, learning cooking. Moreover, Choi and Hannafin (1995) believe that the learning would be effective when the meaningful situational occurs. Lave and Wenger (1991) proposed the situated learning theory as a community of practice and considered that learning is fundamentally a social process. Learners need to learn through participating in communities of practice and creating relations between newcomers and old-timers. Based on situated learning theory, Herrington and Oliver (2012) proposed a real situation module.

According to researches above, it is necessary for learners to gain knowledge through participating in activities of real-life situation. Therefore, we construct a situational environment which help students apply knowledge flexibly in real life.

2.2 Authoring Tools for Teaching

Several researches constructed authoring tools for instruction.

Cloze (Hutchful, Matur, Cutrell, & Joshi, 2010) is an authoring tool for creating content for multiple mice applications. Based on the needs of teachers with low computer proficiency, Cloze simplified the editing process of digital learning materials. In this study, they concluded some design considerations of designing authoring tools for teachers with low computer proficiency: consider task-oriented interfaces, consider providing content primitives and incorporate pedagogy.

EasyAuthor (Chimalakonda & Nori, 2013) is an authoring tool for teacher to create and manage learning content for adult illiterates in India. The main goal of EasyAuthor is to support easy editing of teaching materials and integrate literacy learning methodologies at the same time.

These authoring tools cannot provide an easy editing environment for situational learning, and students can't immerse in these contents.

In addition, Murray (1999) concluded that an authoring tool has the following goals:
● Decrease the effort (time, cost, and/or resources) for making intelligent tutors.
● Decrease the skill threshold for building intelligent tutors
● Help the designer/author articulate or organize her domain or pedagogical knowledge.
● Support good design principles (in pedagogy, user interface, etc.).
● To enable rapid prototyping of designs.

2.3 Background of Digital Learning Playground

Wang et al. (2010) built an interactive learning stage called Digital Learning Playground (DLP) that turns learning content into an authentic, task-oriented learning scenario. They placed a robot as learning companion on the stage table. The robot let students pay attention to target knowledge. Then, JIANG, CHEN, WU, and LEE (2011) applied augmented reality (AR) code to flash cards as a tool to trigger virtual objects on the screen. They found that it was not easy to gather younger learners' attention. Kuan-Chang, Chia-Jung, and Gow-Dong (2011) applied board-game mechanics on the interactive whiteboard and presented situational scenarios on the screen. They conducted an experiment in a high school setting and observed that the effectiveness and engagement of learning outperformed than traditional classroom teaching. However, learners would take significance of time to explore and deal with problems in educational simulation like board game with authentic situations. In order to make instruction process more efficiently. Chen et al. (2013) utilized existing facilities in the classroom and content of textbook to construct an immersive learning environment. By integrating student's image into learning context and using body motion as a way of interaction, students can get immersed into teaching content.

Based on the accumulated experience from previous studies, we separated the scene in DLP into three elements: background, character, and dialogues. In addition, the interactive whiteboard is heavy and expensive, so we replace interactive whiteboard with tablet and build an authoring system which lets teacher design scenes as teaching contents.
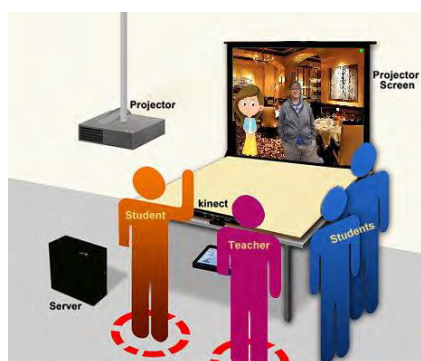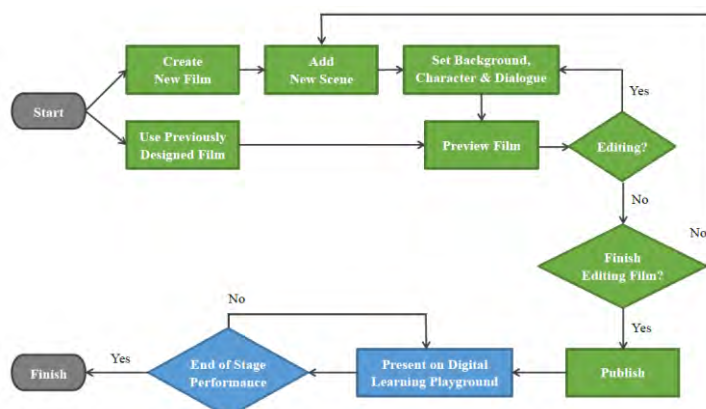

Figure 1. Device settings

Figure 2. Procedure of Learning Cinema

3. System Design and Implementation

3.1 *System Architecture*

The settings of the system is shown in Figure 1. We construct a situational stage using projector, projection screen, Kinect and speaker. Projector presents situational scenes and virtual characters on the screen. Kinect captures student's body motion and integrates it into the scene. Speaker plays dialogues of the scene. Besides, the authoring tool on tablet is used as a manipulation tool of the stage.

3.2 *Learning Cinema*

The procedure of Learning Cinema is shown in Figure 2. The system lets teacher design situational teaching material for English or other language courses. Teacher may choose one of the scenario as teaching theme (such as ordering food in a restaurant). Next, teacher could design and arrange the scenes in the film. After editing, teacher presents situational teaching material through Digital Learning Playground (DLP) and allow students to have a stage performance. Students can practice listening and speaking skills on stage.

Figure 3. Setting background of the scene.

Figure 4. Previewing the scene.

3.2.1 *Authoring Tool*

In order to allow teacher who uses computer less often to make situational learning contents easily, we implement authoring system on the tablet. Teacher could create new film or edit previously created film. See Figure 3 as an example, each film is composed of multiple scenes, teacher may set background, character and dialogue of each scene. In addition to materials provided by system, teacher can shoot photos, searching pictures on the Internet or record dialogues then upload to material library for later use. Material library makes the content more diverse and allows teachers to design more flexibly. As shown in Figure 4, teacher could preview whole scene or film and make proper adjustment after editing. When all of the editing is done, the film is published to database.

3.2.2 *Presentation*

Film will present on DLP. Students may interact with the character and get immersed into the virtual scenes presented. Authoring system on the tablet is used as manipulation tool which enables teachers to switch between scenes and play dialogues of that scene to practice making conversations with students, and the subtitle of dialogues will display on the tablet when playing. Moreover, the system will record students' presentation on stage.

4. Experiment

We proposed the following two hypotheses:
- Students have better learning motivation when they are learning in authentic situation.
- Our system can help teachers to prepare and do authentic learning in the classroom.

4.1 Procedure

First experiment was held in one of the university in Taoyuan, Taiwan. Subjects were 12 university students who aged between 18 and 23. They were divided into 4 groups and there were 3 or 4 people in each group. In a 30-minutes experiment, we taught students some basic conversations in textbook and how to use our system. Then each group had a stage performance of situational film previously edited by teacher. After the presentation, students conducted an IMI questionnaire.

Second experiment was held in a primary school in Taichung, Taiwan. Subjects were 11 teachers who teach either English or Taiwanese. The experiment took about one hour. At first, we introduce the system and have a tutorial on it. Then, teachers would use our system to design teaching material for one of the situation. Next, teachers filled in a questionnaire edited by ourselves. At the end of experiment, we randomly chosen five teachers to conduct unstructured interviews.

4.2 Questionnaire

4.2.1 Intrinsic Motivation Inventory (IMI) Questionnaire

IMI questionnaire (Ryan, 1982) has seven subscales to measure participants' intrinsic motivation and self-regulation. We use the IMI Questionnaire to measure students' learning motivation. We choose four of seven subscales: Interest/Enjoyment, Effort/Importance, Pressure/Tension and Value/Usefulness. The participants had to rate each question by using the Likert seven-point scale, ranging from very true to not at all true (very true=7, not at all true=1).

4.2.2 Self-edited Questionnaire

The purpose of this questionnaire is to understand the mechanism and functions in this system via taking teachers' advice. The questionnaire have 8 questions, and the participants have to rate each question by using the Likert five-point scale, ranging from very true to not at all true (very true=5, not at all true=1).

5. Results and Discussion

5.1 Questionnaire

5.1.1 IMI Questionnaire

We use Cronbachs' alpha (α) coefficient to examine reliability of the questionnaire. As shown in Table 1, the reliabilities of subscales are over 0.7 except Interest/Enjoyment subscale, we speculate that all participants are college students who played many multimedia games and the situation provided by our system may not be exciting enough for them. The discussion of each subscale is presented below.

5.1.1.1. Interest/Enjoyment

This subscale investigating whether participants feel interesting and enjoyable in the situation. The higher score is better and the average score is 5.22. It represents that the participants feel pleasure when they do learning task. One participant said, "I am learning with the computer and I still think that it would be more interesting to learning with real people." We speculate that our system didn't provide learner to have body interaction with virtual character, so the participants may feel unreal.

5.1.1.2. Effort/Importance

This subscale figures out how much effort did participants put on learning. The higher score is better and the average score is 5.02. We observed that some participants mimicked the sound of the role and they tried their best to perform better in the situation.

5.1.1.3. Pressure/Tension

This subscale investigating how much pressure the participants feel in the situation. The lower score is better. We observed that some participants were shy when they were talking to virtual character. But the statistics show that participants who took learning activity before are less nervous. We speculate that it was their first time using our system and they have to speak loudly and present in front of other unfamiliar people so they would under pressure.

5.1.1.4. Value/Usefulness

The subscale finds out whether the contents that participants learn from the realistic situation are helpful or not. The higher score is better. According to the interview, most of the participants believed that the learning mechanism is very helpful. One of participant said, "It can practice speaking and listening which is very helpful for me." On the other hand, some participants thought that the mechanism did not help for them. We speculate that participants are used to learning with textbooks and the mechanism provided by our system is unfamiliar for them.

Table 1: Reliability and average scores of IMI questionnaire.

Subscale	Cronbachs' alpha (α)	Mean	Standard Deviation
Interest/Enjoyment	.48	5.22	0.65
Effort/Importance	.86	5.02	1.07
Pressure/Tension	.94	2.87	1.24
Value/Usefulness	.89	4.79	0.94

5.1.2 Self-edited Questionnaire

The result of self-edited questionnaire is shown in Table 2. The average score is 4.43, it is a positive evaluation overall. And we discover that the score of question number 1 is 3.91. According to interview, some teachers had years of teaching experience and they didn't spend much time preparing teaching material. If they use our system, they would spend more time on preparation.

Table 2: Average scores of self-edited questionnaire.

	Question	Mean	Standard Deviation
1	Compare with traditional way, using this system would enable me to accomplish authentic learning material more quickly.	3.91	1.04
2	Compare with traditional way, using this system would assist me to accomplish authentic learning material better.	4.27	0.65
3	I can do more diverse teaching activity by using this system.	4.64	0.51
4	Templates provided by system can help me reduce time to prepare authentic learning material.	4.55	0.52
5	I'm glad to share my situations to other teacher.	4.73	0.47
6	It is very convenient to edit situation by tablet.	4.27	0.65
7	It is easy to control teaching process through tablet.	4.18	0.98
8	Integrating students' image into the situation would be more fun in teaching.	4.91	0.30
Total		**4.43**	**0.51**

5.2 Teacher Interview

5.2.1 Integrate Students' Image into Authentic Scenes

Some teachers believed that it can attract students at the first time. When they are familiar with this learning mechanism, they might lose interest. On the other hand, most of teachers thought that students will be very excited to see their classmate or themselves in the scenes at first, even disrupt the class. But they believed that it will be better after implemented few times.

5.2.2 Students Having Better Learning Motivation

Every teacher has his own way to attract students' attention and motivation. Most of teachers thought that the learning mechanism provide by our system is very attractive and let students have better motivation.

5.2.3 Editing and Reusing Teaching Material

Some teachers don't spend much time preparing teaching material before the class. They would spend more time if they use our system. Teachers said that if the system provide a large amount of templates, it may reduce time for preparation. Besides, most teachers are willing to share situation films to other teachers.

6. Conclusion

In this research, we provide a system which can help teachers to construct corresponding authentic situations and provide an opportunity for students to learn in an authentic situation. Students immersed in teaching content by integrating student's image into learning context. Teachers believed that the learning mechanism provided by our system will attract students' attention and have better learning motivation. Moreover, the system can help teachers on preparing authentic learning material. Results of IMI questionnaire show that students have better motivation when learning in the authentic situation. The teachers' opinions are consistent with students' questionnaire result. In addition, both of teachers and students thought our system not only can use in language learning but also can apply in scientific experiments, self-introduction or interview simulation.

Acknowledgements

References

Brown, J.S., A. Collins, and P. Duguid, Situated cognition and the culture of learning. *Educational researcher*, 1989. 18(1): p. 32-42.

Moore, J. L., Lin, X., Schwartz, D., Petrosino, A., Hickey, D. T., Campbell, O., & Hmelo, C. (1994). The relationship between situated cognition and anchored instruction: A response to Tripp. *Educational Technology*, 34(8), 28-32.

Choi, J.-I. and M. Hannafin, Situated cognition and learning environments: Roles, structures, and implications for design. *Educational Technology Research and Development*, 1995. 43(2): p. 53-69.

Lave, J. and E. Wenger, Situated learning: Legitimate peripheral participation. 1991: Cambridge university press.

Miller, R., A Guide to Authentic E-learning–By Jan Herrington, Thomas C. Reeves, and Ron Oliver. *Teaching Theology & Religion*, 2012. 15(2): p. 202-203.

Hutchful, D., Matur, A., Cutrell, E., & Joshi, A. (2010). Cloze: an authoring tool for teachers with low computer proficiency. Paper presented at the Proceedings of the 4th ACM/IEEE International Conference on Information and Communication Technologies and Development, London, United Kingdom.

Chimalakonda, S., & Nori, K. V. (2013). EasyAuthor: supporting low computer proficiency teachers in the design of educational content for adult illiterates. Paper presented at the CHI '13 Extended Abstracts on Human Factors in Computing Systems, Paris, France.

Murray, T. (1999). Authoring Intelligent Tutoring Systems: An Analysis of the State of the Art. *International Journal of Artificial Intelligence in Education*, 10, 98-129.

Wang, C.-Y., et al., Constructing a Digital Authentic Learning Playground by a mixed reality platform and a robot, in Proceedings of the 18th International Conference on Computers in Education. 2010.

Jiang, J.S., et al., Constructing a digital learning playground with augmented reality and flashcard, in Proceedings of the 19th International Conference on Computers in Education. 2011.

Kuan-Chang, C., Chia-Jung, W., & Gow-Dong, C. A Digital Board Game Based Learning System for Authentic Learning. Paper presented at the 11th IEEE International Conference on Advanced Learning Technologies (ICALT), 2011.

Chen, C.-F., et al., Classroom Group-directed Exploratory Learning through a Full-body Immersive Digital Learning Playground, in Immersive Education Initiative 2013.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of personality and social psychology*, 43(3), 450.