# The Development of Curriculum Training Course About the Create Three Dimensions Online Game for Instructor in Higher Education

Khammapun Khantanapoka[1], Pongpisit Wuttidittachotti[2]

Technological Education Department, Faculty of Technical Education[1]
King Mongkut's University of Technology North Bangkok.
Bangkok, Thailand, doramon86@hotmail.com
Department of Data Communication and Networking, Faculty of Information Technology[2]
King Mongkut's University of Technology North Bangkok.
Bangkok, Thailand.

*Abstract*— Current, online activities become to an important role in everyday life for teenagers. However, game education used very few in the high education. Most instructors in the University still use lectures combine with demonstrations method. They are not aware of the use instructional media in classroom. These researches have aims as follows; (1) Design and developed prototype template of 3D online game for education in the multiplayer pattern. (2) Design and developed online training course for Instructor in higher education about create 3D online game for education (Multiplayer). (3) Survey satisfaction of online learners in our courses.

Sample group was thirty instructors in University which have located in Bangkok, Thailand which have foundation computer skill. The result of the experiment found that Extension Plug-in Package (EPP) Version 4.0 supports accelerated learning in three dimensions such as easy to learn, spend a little time to learning and create a new challenging experience in learning. This template called We design online training courses under our model which called Demonstration then Expansion using Template or DET. We use the statistics t-test dependent for evaluate performance of curriculum which has been average score during training and after training KW#1 as 90.21/91.16 which was higher than the threshold criteria at 80/80. It show that the students' competencies corresponding with the objectives of the courses. The achievement of learners measured with score in before training (Pretest) at average score 14.60 percentage and after training (Posttest) at average score 57.46 percentage at significantly .05 They reported high satisfaction for our training course. The survey found that median value of complacency level by trainees at 4.17 which are within the range high level. It represents that trainees have attitudes good for our training course.

***Keywords- online multiplayer game; instructional media; online game template; online training courses; EPP;***

## I. INTRODUCTION

The foundation for the transition to active teacher learning is found in the adult learning theory of Malcolm Knowles in his studies of how adults learn. There are some similarities in the adult and child classroom, although adults generally have distinctly different motivations to engage in learning. Current, video games used in education which is changing the playing field for the way we live and learn. Over the years games became modern learning culture which more complex, often learning with individual electronic build exciting more than teachers in the classroom. Sometimes involving large distributed become to knowledge communities.

**Figure 1.** The scene of underwater city template by Unity

Online multiplayer games for education that support play and learn together from all over the world have come to dominate the digital entertainment industry and have increasingly become the dominant form of entertainment, particularly for children and adolescents (Magnussen & Misfeldt, 2004). The building online multiplayer games are a difficult task and very complex. It is the job of the programmer. It is an obstacle of educators to creating online multiplayer games which must to understand about hardware, data communication, logic and capabilities in

advanced graphics. We are necessary to create Prototype of Game Online Template (GOT) Version 1.0 that provides a resource package of online games. It allows the instructor transfer two dimension image to texturing on several 3D models within the virtual world. Educators contain knowledge object into several position of the 3D virtual world as template pattern. It is easies process and quickly in building online multiplayer games. It is the quality enhancement of the learning process in modern world which is innovative support cooperative learning and was classified in game based learning.

Game based learning describes an approach to teaching, where learners explore relevant aspect of games in a learning context designed by teachers. Teachers and learners collaborate in order to add depth and perspective to the learning experience from playing the online multiplayer games. We actively learn and practice the right way to do things. This keeps us highly engaged in practicing behaviors and thought assume processes that we can easily transfer from the simulated environment to real life. The development training courses in creating online multiplayer games for education is necessary for modern teachers in next generation.

## II. Literature Review

### *A. Adult learning theory*

Adult learning is principles that effective to training course base on concept ten dimensions as follows: (1) Relevant dimension: to the experience or intended experience of the adult learner. Whereas children and adolescents will attempt to learn content isolated from its application, adults learn best when they see the relevance of the taught concept to their experience. (2) Engaged dimension the adult learner retains knowledge and concepts more readily if they are engaged in the process of discovery and exploration rather than being the recipient of information (3) Active dimension the learning process should be active, and replicate as closely as possible the environment within which the skill or knowledge will be applied. Rather than memorizing code sections, adults would retain and apply knowledge more effectively if they worked to discover the content, and then were able to practice its application in a simulation or scenario. (4) Learner-centered dimension; the traditional classroom taught concepts and prepared students to pass tests and other measures of their progress. Unfortunately, the student's retention of that knowledge was often nominal beyond the confines of the class. The emerging intent of police academy training is to produce the most effective outcomes possible; to see students apply classroom skills in a real-world setting. The focus on the learner acquiring knowledge is a critical step in effective training. (5) Adults need to know the reason why and necessity to learn for him and know the impact himself. Learning takes place when it is meaningful to the learner. Course designers have to select content to match the requirements of learner as possible. (6) Training course should be a guiding induced to get involved and focus on critical thinking and conclusion by learner. Instructors should be informed of the objectives and goals of training course. We should organize educational sorted by contents from easy to difficult topics. (7) Adults learner have experience , old knowledge and skills that we should be use training technique focus on learning through previous experience. (Experiential Techniques), practice, discuss and share previous experiences, activity solution and case study of each learner. (8) Adult learning tends to focus on useful knowledge in everyday life. Learners are willingness and very interested if something in training course can help make their work better more, solve the problem in their work. So, training content should be designed according to avidity in the real life. (9) Adults will best learning in a good environment such as lighting, moderate temperatures, interact within the group and friendly. (10) The difference learning between adults and children depend on order of learning style, children will begin attitude then select the knowledge and skills while adult will start development skill then create attitude and develop knowledge in the last process.

## III. Experimental

### *B. Template of Game Online Template Version 1.0*

Game Online Template Version 1.0 consisted four important events such as:

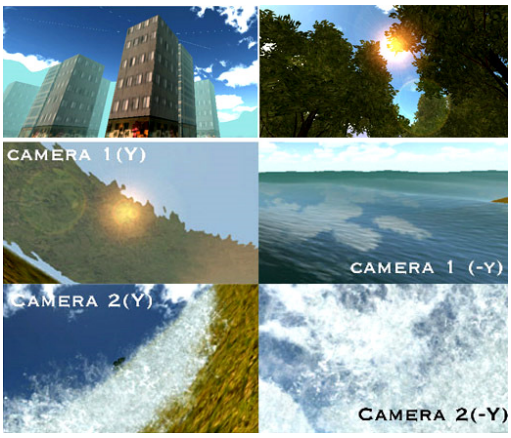


**Figure 2**. Virtual world of Template of Game Online Template

#### *a) Template Structure Item for game base learning*

Items are most often beneficial to the player character, but some games contain detrimental items, such as cursed pieces of armor that confers a negative bonus to the wearer, and cannot be removed until the curse itself is lifted; the means to do this may be costly or require a special item. Some items may also be of absolutely no value to the player. Items are especially prevalent in role-playing games, as they are usually necessary for the

completion of quests or to advance through the story. This paper defines the three types of items such as knowledge objects, object enhance life power, and strengthen the brain. It is the accumulation of knowledge by the greedy instinct of learners. It will be placed in the several positions within the virtual world for players accumulate.

*b) Template of Score for game base learning*

In games, score refers to an abstract quantity associated with a player or team. Score is usually measured in the abstract unit of points, and events in the game can raise or lower the score of different parties. Most games with score use it as a quantitative indicator of success in the game, and in competitive games, a goal is often made of attaining a better score than one's opponents in order to win.

*c) Template of Learning Experience Point*

Template of experience score is a unit of measurement used in many role-playing games (RPGs) and role-playing video games to quantify a player character's progression through the game. Experience points are generally awarded for the completion of quests, overcoming obstacles and opponents, and for successful role-playing. In many RPGs, characters start as fairly weak and untrained. When a sufficient amount of experience which is obtained, the character "levels up", achieving the next stage of character development. Such an event usually increases the character's statistics, such as health points and strength, and may permit the character to acquire new abilities or improve existing ones. When players discover the knowledge object / knowledge Item / knowledge application in the virtual world then the experience point (Exp) will accumulation is assume quantity of knowledge for learning.

*d) Template of Control in Online Multiplayer Game*

GOT controllers have been designed and improved over the years to be as user friendly as possible. This has led to a wide range of styles and button layouts, with some controllers being better at certain types of games. We use standard input by Microsoft PC such as Keyboard and mouse controller.

*C. Core Content contain within Training Course*

We design the Game Online Template (GOT) Version 1.0 for part of training course. Include used content in training for this research. We can separate factor of development into six frameworks as follows;

1. Terrain and Visual World framework: This system is responsible for manager the 3D terrain and visual world environment such as sky, terrain, house, countryside, surface of the water, ground, mountain, city, which must support MMO and Communication framework.

2. Camera and Viewport framework: this system is responsible for the virtual cinematography in the game. It ensures that the avatar is always on screen, that the relevant aspects of the 3D world are shown, and that this experience is achieved in a dynamic, interesting, responsive way, perspective while objects are movement.

3. Character and Animation framework: This is the avatar itself. It is a 3D model of the person if action of the player that is under direct user control. The character must represent the hero as well as possess the functional attributes necessary for the learning objectives.

4. Controls and Artificial Intelligent framework: this system refers to the control layer that the user interacts within the game. The genre and context of the game can and should affect how this system behaves which are impacted by the hardware that is available to the user to interact with.

5. MMO and Communication framework: Games are almost ubiquitously built around a client-server architecture, where each client connects to a single server. Each client represents an instance of the game running on a computer. In some cases the server might also have a client, for instance some games allow you to host a game without starting up an external server program. While an MMO (Massively Multiplayer Online) might directly connect to one of these servers, many games do not have prior knowledge of the server IPs.

6. Knowledge contents into item game framework: It may be in the form of knowledge cards, key, navigation labels, knowledge Labels, dialogue, and event, displayed on the screen, 3D model, Include conditions evince of knowledge objects.

*D.Development Online Training Course About the Create Three Dimensions Online Game for Instructor in Higher Education*

We use CMS-Moodle open source learning platform manage service learners which details of the development online training course as follows:

1. Analysis about knowledge and competencies which necessary to creating online multiplayer game for education. We define the structure of the each lesson. Next, analysis about essential properties of developer is able to create online multiplayer game for education which these data have been Texts, document and any knowledge sources.

2. Define the objective of the training course.

3. Analysis of the main topics and subtopics, the content of topics, requirement of knowledge characteristics, the objective of teaching and topic summary.

4. Create lesson plans by use the results of the analysis of the topics and subtopic process makes lesson plans by accordance with the objectives of the training course.

5. Define about course description, criteria for curriculum implementation, determine the course outlines for create an online learning course about create three dimensions online game for education.

6. Design online courseware using mixed models between linear programming model and branching programming model which the learners will get content in order of easy to difficult. However learner can return to repeat learning as needed. Our course contains the topics as following:

Topic 1. Introduction to Game, Unity UI Basics, essential concepts of Unity as follows describe the game development process, overview about Unity and tools, 3D coordinate space, terrain toolset.

Topic 2. Introduction to 3D model, character animation, texture and shade . Include various file type was accepted by Unity.

Topic 3. Introduction to Scripting , Using the script by C# and JavaScript and programming concepts.

Topic 4. First Person Camera Game,Collision Detection Technique. It covers process of creating first person shooting games, ray casting, technique of detects the collision (Collision Detection Technique) various case.

Topic 5. Head-up display (HUD), Sound FX: Create a simple interface in the game, define interactive and event respond and use sound effects and music.

Topic 6. Physics dynamic and Artificial Intelligent: define various parameter of physical force such as gravity and bounce effect, foundation of AI.

Topic 7. Inserting knowledge content and exercises in the game. It covers template item, score design ,

Topic 8. Control by player and multiplayer

Topic 9. Connecting to Photon cloud database and implements by Game Online Template (GOT) Version 1.0 which provides compound support online multiplayer system.

Topic 10. Menu Design ;

Topic 11. Research about performance of edutainment product. Include instructional model of multiplayer game.

7. Develop tools for research as follow; Game Online Template(GOT)Prototype Version 1.0, online Courseware e-learning about the create three dimensions online game for instructor in higher education, course evaluation form by experts, quizzes form measure basic skill in computer. quizzes and evaluation form in duration online training.

8. Efficiency evaluate of the quizzes and evaluation form with 20 learners which is not a sample. We perform like a true event.

9. Define the population and sample group. The populations are instructors in higher education, success in Bachelor's degree or Master's degree and teaching in university at least 2 years. They have basic knowledge in information technology. The samples group was selected by Purposive Sampling for 20 lectures in high education. They must measured fundamentals in computer skill.

10. The experiment and data collection with statistics; efficiency evaluation of e-learning which content online training course about creating three dimensions online game for Instructor in higher education.

11. Conclusions and research reports.

*D.Online Training Course & Demonstration-Expansion-Template model (DET)*

We use Moodle open source learning platform which have several branch as follows; Home , Surveys Video Lectures , Homework , Syllabus, Grading Policy Further Reading , Discussion Forums , About Us, Help Articles Movie clip, Technical Issues, Quizzes and Google Hangout.

The students will begin studies by demonstration method from multimedia and online media.(e-Learning), Then expand knowledge to imagine online game them concept. Finally, the development online multiplayer games by modify Game Online Template.

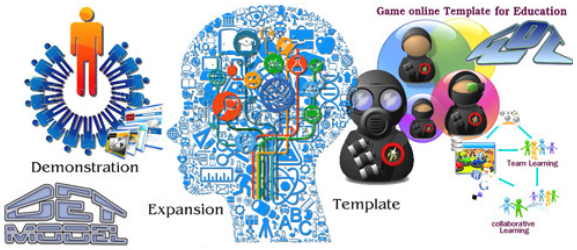


**Figure 4**. Concept of development with DET model (Copyright@ 2014)

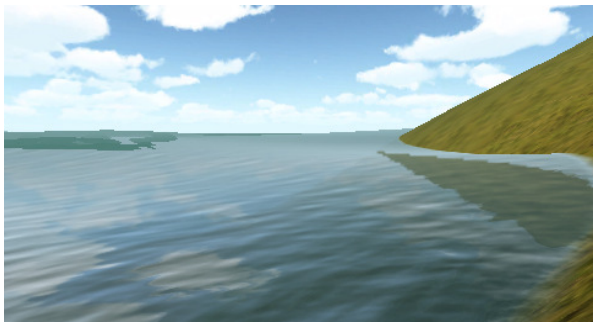

**Figure 5**. Virtual Terrain of Game Online Template

Game Online Template covers the management of characters, geography, effect and virtual terrain which are very beautiful. Although who do not have knowledge of graphic design. It supports accelerates learning and DET

**Figure 6.** Show knowledge objects and Knowledge items

*E. Framework & learning Game Object Template model.*

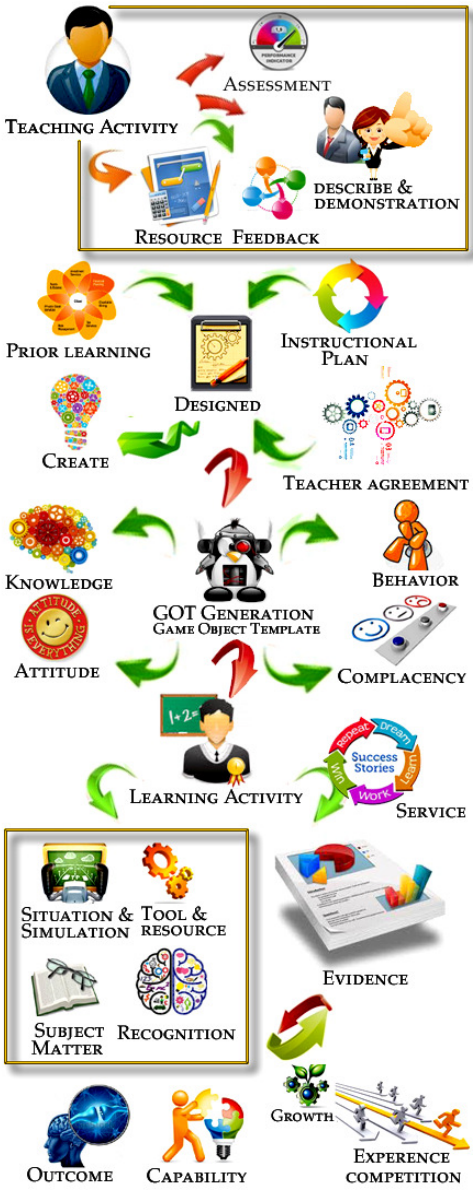


**Figure 7.** Keen-Khammapun Conceptual instructional model (Copyright@ 2014)

*F. Instructional Model with Online Multiplayer Game*

These twelve steps fit nicely within events one through seven of Gagne's Events, expanding to our method for creating designed choices thus:

1. Create a situation that will gain the player's attention dramatic elements through the various features of the character and beautiful sceneries.

2. Describe the upcoming choice in detail to ensure that the objective of a learning component which is robust.

3. Know the state of the game at the asset of the instructional options; ensure that the placement of this option is properly scaffold with other event simulation. Appropriate and novelty of stimuli is enough to motivate learning in prior time.

4. Determine how the didactic choice will be presented in the context of the game and determine the learning objectives that will be satisfied by this instructional (KMP conceptual instructional model).

5. Extrapolate how the player will arrive at his team and provide learner guidance during the course of the guide information to assist in the brief matter, synthesis, and create a new perception.

6. Determine the consequences of each scene and their impact on the instruction, including attitudes to play in each scene for design and create a new scene (new plug-in) or new releasing.

7. Determine how to best assist the player in attribution of the outcomes of these didactic media and how to assist the player in learning from mistakes in decision process.

8.Describe how the choice affects assessment with regard to learning objectives and describe of subjects, how this assessment will be communicated to the learner.

9. Describe the linkage of this components relation to best learning style that will reinforce the lesson and test the transfer instructional resource to knowledge.

10. Determine how interactive design appropriately, between the teaching learning media and the response of the learner.

11. Determine the process using learning media combine with lesson plans.

12. Follow and improving the learning media to the new version for next generation. When the instructional media has the ability to stimulate learning decreased in over time.

*G. Activity learning using Game Omline Template*

In the three-dimensional virtual world, application will contain the knowledge object distribution within online games. A several size of knowledge blocks will appear in the three-dimensional world. It allows the user to change these images by the subjects user wants. Including knowledge items opened and connects to knowledge card at various positions of the scene. We can arrange activities within the virtual world as following; Instructor can be implement knowledge from training course in least two instructional patterns.

First, cases single team find knowledge objects. Beginning, each person will be randomly selected for occurrence position within the virtual world. Everyone must find of knowledge objects and interactive with its. Knowledge objects discovered already will replaced by billboards. Addition, they have to find the whole members

of team. They have to go meeting point and test, at podium test of each learner.

Second, case multiple team find knowledge objects. It is a competition between teams find to knowledge objects both direct and connect through knowledge items. Knowledge item will open knowledge cards that it is hidden distributed in the virtual terrain. Knowledge cards will open only one times same as knowledge items. Imagine and fantasy will makes games more interesting as well as increases the efficiency of team learning.

## IV. RESULT OF EXPERIMENTAL

Performance of curriculum has been average score duration training to after training KW#1 as 90.21/91.16which was higher than the threshold criteria at 80/80. It show that the students' competencies corresponding with the objectives of the courses. The achievement of learners measured with score in before training (Pretest) at average score 14.60 percent and after training (Posttest) at average score 57.46 percent at significantly .05 .They reported high satisfaction on the training course. The survey found that median value of complacency level by trainees at 4.17 which are within the range high level. It represents that trainees have attitudes very good to our training course. It has high performances to play and learn as a team. The results showed that DAT model is appropriate for create learning media in 3D online multiplayer games. It is startup version 4.0 which can be expansion plug-in to the future. Instructors can be applied to work effectively. Especially, we can use this instructional media in the higher education.

## V. CONCLUSION

Expansion for the training to educator and education organizations, include development organization in the exchange modern media in the education and Joint develop educational game in several pattern such as CAI , tablet Game , Online game , Multiplayer game , Multi platform game. They are factory of the education products in the future. Building for training package in offline location. Promote to use Game Online Template, create a library or catalog of knowledge object in the several subjects, include share or exchange knowledge object, and creating a new function to the Extension Plug-in (EPP) the Next generation. Promote to development edutainment game continues and promote to the public policy by government.

## VI. CURRICULUM DETEIL

*Name Curriculum:* About the Create Three Dimensions Online Game for Instructor in Higher Education.

*E-Learning:* Online Training Course

*Knowledge Tool:* Extension Plug-in (EPP) V. 4.0 Moodle open source learning platform, Photon database cloud computing.

*The aim of a learning course:* Instructors in the higher education is able to create online multiplayer games for educational and use instruction media in their course.

*Criteria for curriculum:* Properties of learners

1)The least of education are Bachelor's Degree.

2)Basic skill in use computer.

*Online Instructional Package : asynchronize*

Multimedia steaming, document, flash slide, e-book

*Online Instructional Package : synchronize*

Google hangout cloud computing

*The participants of learning by online course:* 20 learners

*Control for Learning Behavior:* exercises and quiz for each unit.

*During in online class:* 40 hour

*Training topics:* 11 topics

*Evaluation Criteria:* 80 percentage of full time.

*Equipment in the learning:* Computer machine, Internet system, high graphic performance.

*Software requirement:* OS windows 7.0 Unity 4.x, browser software , Photon database cloud computing, Internet signal.

*Content presentation:* Linear and branching pattern.

*Online Course description:*

Study about structure of educational games,cooperative learning, Include structural analysis of an online multiplayer game. Introduction to Game, Unity UI Basics Essential Concepts of Unity. The management for 3D model, character animation, texture and shade, terrain and terrain 3D. Study about script by C# and JavaScript and programming concepts, define several perspective of camera in game, collision detection technique, sound FX, physics dynamic and artificial intelligent , inserting knowledge content and exercises in the game, control by player and multiplayer , connecting with database server of photon cloud computing , menu and GUI design. Finally, technique of research about performance of edutainment product. Include instructional model of online multiplayer game.

*The complexity of the course:* high

*Effectiveness of the course:* high

*Risk to use:* high

*External factors affecting to success:* Basic knowledge in computer skill.

## REFERENCE

[1] Alessi, S. M. (2000). Simulation design for training and assessment. in O'Neill, H. F. Jr, & Andrews, D. H. (Eds.), Aircrew training and assessment (pp. 197–222). Mahwah, NJ: Lawrence Erlbaum Associates.

[2] Allison, M. T., & Duncan, M. C. (1988). Women, work, and flow in Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (Eds.), Optimal experience: Psychological studies of flow in consciousness (pp. 118–137). New York:

[3] Cambridge University Press. American Association for the Advancement of Science. (2001). Atlas of science literacy. Washington, DC: American Association for the Advancement of Scienceand National Science Teachers Association.

[4] St. Paul, MN: American Public Media. Amory, A. (2007). Game object model version II: A theoretical framework for educational game development. Educational Technology Research and Development, 55(1), 51–77. doi:10.1007/s11423-006-9001