



Game Development: 3D Graphics

R. K. Moloo¹, Zameer Jhingut², Balaji. G³, Vignesh Karthik. M⁴

^{1,2,3,4} *B. Ssc. Artificial Intelligence & Machine Learning, Sri Krishna Arts & Science College*

ABSTRACT

One of the most effective teaching tools for enhancing students' programming abilities is a computer game. The use of a game development platform or game engine as a teaching tool benefits students. This paper observes progress in the learning process, and measures how long learners take to find solutions. The participants in the experiment were divided into two groups. The first group made use of conventional teaching methods like lectures, reading assigned readings, and programming homework. The second group, in contrast, utilised a game development platform as instructional medium to complete assigned programming assignments while attending the lectures, just like the first group. The results showed that the progressive skills of the Game Development Platform learners were higher, and the problem-solving time they spent was lower.

Keywords: Game Development Platform, Programming, Learning Media

INTRODUCTION

Many innovative educators nowadays are finding the ways to incorporate the Game Development Platform into their classrooms for helping their students to develop programming language skills. The Game Development Platform in classroom has been shown to be an effective tool for improving the students' advanced programming skills. A game engine is a software system designed to facilitate the development of computer games. As a result, a game engine offers services that gaming programmes frequently require, such as 2D/3D graphics, input devices, and event processing; timers; and object collisions. Other advanced game engines may support the networking, physics and artificial intelligence. While some game development studios use their own appropriate game engine, there is still a huge market for individual developers and even larger studios requiring for a good engine to help them create their new games. Allowing the game programmers to easily make a lot of various kinds of games, these materials are often designed to be reusable.

One of the famous game engines is "Unity" which is used for developing many types of games. The Unity is designed for handling any complicated or frequently used components in the game development. This helps simplifying a programming in the game development. Thus, the game engines present the opportunity to improve programming skills and expose the learners' potential in their advanced programming topics. From the concept and the above-mentioned reason supported to be a hypothesis, the Game Development Platform may build self-motivation for the basic programming learners from the computer games when applied in the learning media accompanying with Classroom Design. Thus, this paper specifically focuses on the improvement of the advanced programming skills. Some particular programming languages such as algorithms design and data structure are excluded.

Developed from the Unity, the Game Development Platform consisted of 25-minute theory lesson followed by 1-hour game developing practical part in each time. The last one was to find the solution of the given problem in one and a half hours. The participants in the control group studied theory lecture and the samples from traditional media; PDF or Presentation files. The same theory lecture was given to the experimental group as well, but they learned it via the Game 4 Development Platform. Both groups were measured by the time to find the solution approaches and the scores of Pre-Test and Post-Test.

1. RELATED WORK

Media education in general is a teaching and learning tool. Everything can be used to stimulate thoughts, feelings, concerns and abilities or skills of learners so as to facilitate the process of learning. This limitation is quite broad and includes in-depth understanding of the source, the environment, human beings and the method used for the purpose of learning.

1.1 GAME DEVELOPMENT PLATFORM

A set of software A game engine or game development platform are terms used to describe tools used to make video games. The tools can be anything from an integrated development environment (IDE) for a programming language (C#, JavaScript and C++), with some basic code for starting and ending a computer programme to a sophisticated software suite with full physics, graphics, network, and artificial intelligence (AI) capabilities. Because developers can use the technological resources and features that have been integrated in the game engine, gaming engines or game development platforms

enable developers and programmers to create game applications more quickly (Dan Fu, 2008). For game developers, the game engine's resources and usable features are valuable. Game engines not only make game development quicker, but they also enhance game quality and programmers' abilities. Game Development Platform is implemented by assembling many programming libraries together. Common programming library collection for 3D game engine consists of 3D graphics, physics, collision detection and multiplayer technique or network library (Unity Technologies 2015: <http://unity3d.com/>). Two of the most popular game engines today, Unreal Engine 4 and Unity Game Engine have recently adopted competitive and very appealing pricing structures for individual game developers and educational use. The Unity is developed by Unity Technologies With Mono, Microsoft's .NET frameworks are implemented in an open source manner. Unity has a unique rendering engine. When compared to Unreal Engine 4, which is used for the well-known and other gaming engines, Unity has various advantages (Pachoulakis and Pontikakis 2015). Unity uses mostly C# or JavaScript, where the learners are sufficiently apt. Choosing the game engine that provides the quickest route to a finished game is highly dependent on preference and prior knowledge.

The Unity engine comes with thorough instructions and examples for all one of its APIs. This is the benefit of Unity, to increase productivity when compared to other engines such as Unreal Engine 4 or another free game development platform (Paradox, Cry Engine, Scratch and Game Salad). The Unity is developed by Unity Technologies. The open source implementation of Microsoft's .NET frameworks, Mono, merges a custom rendering engine with Unity. The benefits of using Unity are much more when compared to Unreal Engine 4, which is used for the popular and other game engines. Unity uses mostly C# or JavaScript, where the learners are sufficiently apt. This game engine offers the shortest path to finish a game depending on the developers' personal preference and experiences (Pachoulakis and Pontikakis 2015). The Unity engine comes with complete documentation and examples for its entire APIs system. This is the benefit of Unity to increase productivity when compared to other engines such as Unreal Engine 4 or another free game development platform.

2. Problem-based Learning

With the help of a real-world problem, students are challenged to learn in problem-based learning (PBL).. Problem-based learning was firstly developed in medical field in the 1950s. It's a powerful classroom process, which uses daily-basis problems to motivate learners identifying and applying research concepts and information, working collaboratively and communicating effectively. In a problem-based learning environment, students gain information and abilities by analysing and resolving challenging or regular issues. Learners are engaged in rigorous, extended process by asking questions, finding resources, and applying information. from the left side of the screen to the right to meet an objective. A term of 2.5D side-scrolling game that can refer to either games which feature 3D polygonal graphics but typically restrict gameplay and camera control to a 2D plane (Sharp 2014), or earlier games that attempted to simulate three-dimensional 6 graphics without the use of 3D polygons. 2.5D is used where the world layout allows for viewing only the fronts of objects. placing the objects into a 3D world, but the world objects present a single pre-rendered texture face to the camera. Because the image is prerendered before it goes into the game, it can be made photorealistic, looking like the real object. Sample snapshots of 2.5D side-scrolling game appear in Figure.

3. METHODOLOGY

This experiment would test via the analysis of the learners in the two sample groups who have similar scores. Each class had 15 students, who were randomised into experimental (E) and control (C) groups at random. The first would study using conventional teaching methods such lectures, citing nine examples in document file formats, problem-solving, and completing post-tests. The other group was in the lecture session and used the Game Development Platform to obtain the answers in 9 hours over the course of 3 weeks. While the average times to solve each problem were concluded, the average pre and post test scores were gathered at the same time

The 30 freshman students, the third-year students majoring from the Department of "Interactive Design" The 30 freshman students, the third-year students majoring from the Department of "Interactive Design."

The "Pre-and-Post-Test Control Group Design" framework is able to effectively compare the scores of the learners better than other options which the experimental process is the below method: experimental group research using the Game Development Platform; CR: monitored group research using conventional techniques; Pre-test measurement or observation in O1; post-test measurement or observation in O2. and the period of the solution finding. In the experiment, the 30 participants were randomly divided into two groups, which are groups with labeled "A" and "B". "A" is the experimental group and "B" is the controlled group. For the pre-test before the experiment (O1), both participants would receive the same test format in the same surrounding.

Conclusion

In conclusion, this journal has explored the process of developing a 3D game from start to finish. We have discussed the challenges we faced and how we overcame them. Through this experience, we have learned valuable lessons about teamwork, communication, and problem-solving. Overall, this project has been an exciting and rewarding journey that has taught us many valuable skills."

References

Game Engines 2010, Wikipedia. Retrieved November 24, 2016 (http://en.wikipedia.org/wiki/List_of_game_engines)

H.Pe-hi and M. Chung, "A Computer Adventure Game Applied in ELearning", International Conference on Intelligent Pervasive Computing, IEEE, 2007, pp. 446-451

Unity Technologies. Retrieved November 19, 2016 (<http://unity3d.com/>).

Yariv, E. 2013. Teachers' professional experience: Solving simple and complex problems. International Journal of Educational Research, 60, 19-26. <https://doi.org/10.1016/j.ijer.2013.03.009>

Petridis, P., I. Dunwell, S. De Freitas, and D. Panzoli. 2010. An engine selection methodology for high fidelity serious games. In Games and Virtual Worlds for Serious Applications (VSGAMES), 2010 Second International Conference on (pp. 27- 34). IEEE. <https://doi.org/10.1109/vs-games.2010.26>