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Analysis of Game Development Training Participants Satisfaction with 3D Unity at the Faculty of Visual Communication Design

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Abstract

This research aims to analyze the level of satisfaction of game development training participants with 3D Unity in higher education. Unity 3D is one of the important applications in the game development and visualization industry. Therefore, lecturers in the field of visual communication design should be able to use and apply this software. In order to improve the quality of learning, software use training is carried out internally. Quantitative descriptive method with 13 lecturers as participants. The training method is via zoom using lecture methods, demonstrations, use of software, direct practice. Training was carried out for 2 weeks via zoom class. Data collection uses a satisfaction scale with six statements which reveal the level of participant satisfaction with the quality of the training, the material taught, the training methodology, and the support provided by the instructor. The results of the study concluded that the level of participant satisfaction was in the satisfied category. Thus, it is necessary to develop collaborative training so that innovative games can be created by uniting the creative and programming worlds.

Keywords: *Participant Satisfaction; Training; Software; Unity 3D; Higher Education*

Introduction

Along with the rapid development of technology applications, games and simulations have been widely integrated in the education process (Yang et al., 2010; Chiang et al., 2011). In recent years, digital or web-based games have increasingly supported learning. In the context of online education, this field of research attracts a lot of interest from the scientific and educational community, for example, tutors, students, and game designers.

The professionalism of university lecturers, especially in updating their skills in applying unity, is a must to improve the quality of higher education. Lecturers who are skilled in using Unity 3D can create a more interactive and engaging learning experience for students. By utilizing Unity 3D features such as animation, physics and 3D visualization, lecturers can present clearer and more interesting concepts and learning materials, thus helping students to understand better. In addition, it is relevant to the industry. The gaming and virtual reality/augmentation industries are growing rapidly. Lecturers who are proficient in using 3D can present content and learning methods that are relevant to industry needs. This helps

students to be ready to face competition in the world of work and acquire skills that suit the needs of the industry. Therefore, it is necessary to conduct internal training on the use of the Unity 3D application to lecturers in universities.

The growth of the gaming industry has become a significant global trend in recent decades. In this context, education and training in the field of game development has a crucial role in preparing future professionals who can contribute to the industry effectively. The Faculty of Visual Communication Design is often an educational center that offers courses and training in game development, one of which is by using Unity's well-known 3D platform. In this context, the assessment of trainee satisfaction is an important aspect that needs to be explored thoroughly. An analysis of trainees' satisfaction in game development using 3D Unity at the Faculty of Visual Communication Design is an important step to understand the effectiveness of this training program, as well as to identify areas that need improvement.

Previous research has shown that trainee satisfaction has a significant impact on learning outcomes and the overall learning experience. As such, understanding the factors that influence trainee satisfaction in the context of game development with 3D Unity can provide valuable insights for curriculum developers, instructors, and other stakeholders in the field of game education. By delving deeper into the aspects that affect trainee satisfaction, such as the quality of training materials, instructional experience, accessibility of resources, and support provided, this study aims to provide a better understanding of how to improve the effectiveness of game training with 3D Unity in the Faculty of Visual Communication Design.

Thus, this research is expected to make a valuable contribution to the development of education and training in the field of game development, as well as strengthen the position of the Faculty of Visual Communication Design as a quality educational institution that is responsive to the needs of the ever-growing game industry.

Software Unity 3D

Unity 3D is a very popular game development software or platform. This software is able to provide a complete integrated development environment *(Integration Development Environment / IDE).* This IDE includes various tools and features such as: visual editor, script builder, animation system, physics simulation. So that it can help develop an efficient way of playing. One of the main advantages is support for various platforms such as: *VR (visual reality), MR (Mixed Reality)* and *AR (Augmented Reality).*

Compared to Virtual Reality (VR) games, *3D Augmented Reality* games are a better choice for training because players feel more grounded when they are in an immersive, active learning environment (Stutzman et al., 2009; Gillis A. S., 2022; Hakkarainen et al., 2008). In addition, 3D games encourage active learning with a guided instructional games approach, personnel can learn how to manage crises in a controlled environment, resulting in faster decision-making when real problems arise (Sharifzadeh et al., 2020).

Further, Creighton (2011) Unity is a *Game engine* developed by Unity Technologies. Unity is a game development tool with integrated rendering capabilities. *Unity* is a new form of technology that eases and makes it easier for game developers to create games. Unity 3D software has various components that play a role in the development of 3D games and applications, including: (1) Game Object: a basic component in Unity that represents objects in the game world. A game object is an entity that can be placed within a scene and can have various components that provide certain behaviors and functions; (2) Transform: The transformation component determines the position, rotation, and scale of a game object in 3D space. (3) Mesh Renderer: A Game Object component to display using a 3D model or mesh. The Mesh Renderer organizes the lighting, texture, and visual materials of objects; (4) Collider: A component that determines the shape and size of the physical area of objects in the game world, Collider

is used to detect collisions and physical interactions between objects in the game; (5) Rigid boy: A component that provides a physics simulation of an object. Rigid bodies are used to provide movement and physical responses such as gravity, friction and velocity against objects; (6) Animator: A component used to control the animation of a character or game object. Animator allows playback of animations set by the developer; (7) Audio Source: The playback component of sound effects or music in the game; (8) Camera: A component that regulates the display of the player's view in the game world. The components mentioned above are common examples or features that can be used in 3D game development.

Refers to Kim et al., (2014), found that Unity 3D comes with several benefits including helping in processing, asset tracking, and scripting are some of the Unity game development that reduces game development costs and time and offers elasticity when implementing projects on more than one platform. According to Craighead et al., (2008) Reveal powerful cross-platform allows the development of game apps for 27 diverse platforms and devices in a user-friendly development environment. The survey was conducted by (Blackman, 2013), Unity 3D has a global market share of around 45%, while gaming is 47%. Developers prefer Unity as a smart game development tool. The application process developed and implemented through Unity can be easily shared across PC, mobile, and web platforms.

Game Development Concept

Game development includes a number of aspects that need to be understood and applied in the game development process. Game development is a complex process that involves various aspects and coordinated teams. The following are important concepts in game development including: 1) Game Design: designing game concepts, rules, and mechanics. It includes level creation, system controls, unique features, and other interactive elements; 2) Graphics and Animation: The visual aspects in the game are essential to create an engaging virtual world, this includes character essay, visual effects environment, animation; 3) Audio and music: Sound and music can provide atmosphere and support the gaming experience; 4) Programs and scripts: To develop a working game, programming and the use of scripts are required; 5) Physics and simulation: Physics is used to create realistic game environments and provide appropriate responses to player interactions; 6) Testing and *Debugging*: Game testing is important to ensure that the game runs smoothly, is free of bugs and provides the desired experience; 7) Monetization and Distribution: This concept is related to how to monetize a game and distribute it to the public. Understanding and mastering the concepts above is very important to create a game that succeeds and satisfies players.

Training Design

The purpose of training on the use of the Unity 3D Plugin Visual Scripting BOLT software is to provide the knowledge and skills needed to become a professional lecturer. Specifically, it includes: 1) Gaining new knowledge about interactive games using Unity software; 2) Able to make strategies for learning methods in the classroom with existing materials. The training was carried out for 2 weeks via zoom with lecture methods, demonstrations, the use of Software, and hands-on practice. Furthermore, the material is as follows.

Table 1. Training Materials

No	Materials	Source
1.	Introduction and benefits of Unity software	Tutorial
2.	Introduction of Unity 3D's latest features	Tutorial
3.	Practice using Unity Software	Power Point
4.	Create a learning program based on the material	Task

Training Attitude and Satisfaction

An important element in achieving learning objectives is the relationship between motivation processing and outcome processing (satisfaction), especially in training (Huang et al., 2010). Satisfaction is strongly correlated with participants' motivation and attitudes during the training as well as the quality of the instructor/facilitator (Mayer et al., 2013). In particular, trainees are motivated and have higher learning expectations, as well as feel greater satisfaction in participation during training activities. In general, most studies reported that participants developed positive attitudes towards pedagogical games and simulations in education (Divjak & Tomić, 2011; Bekebrede et al., 2011; Ibrahim et al., 2011; Beckem, 2012; Tanner et al., 2012; von Wangenheim et al., 2012; Halpern et al., 2012; Terzidou et al., 2012; Hannig et al., 2013; Giovanello et al., 2013; Cvetić et al., 2013; Kovalik & Kuo, 2012; Li & Tsai, 2013; Hainey et al., 2011; Boeker et al., 2013; Nkhoma et al., 2014; Costa et al., 2014; Chaves et al., 2015; Riemer & Schrader, 2015; Angelini, 2016; Geithner & Menzel, 2016).

According to Dudzinski et al., (2013), The trainees who responded positively during the training described an interesting, stimulating and useful experience, and were a valuable addition to the curriculum in a faculty. In another study, the majority of participants showed a positive attitude towards training activities to be more enjoyable and provide more opportunities to learn (Ibrahim et al., 2011). For participants, satisfaction is a determining factor in the decision to continue training activities regularly (Liao et al., 2015; Liao & Wang, 2011).

Methods

The research method uses a survey. The respondents were training participants who had participated in the full session totaling 13 lecturers. The participant satisfaction survey was conducted using a quantitative descriptive method. Data collection uses a satisfaction scale of six statements that reveal the level of satisfaction of participants with the quality of training, the materials taught, training methodologies, and the support provided by instructors.

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Table 2. Scale Calibration

Answer Categories	**Average**	**Interpretation**
Strongly Agree	6	Highly satisfied
Agree	5 – 5,9	Satisfied
Tend to agree	4 – 4,9	Quite satisfied
Tend to disagree	3 – 3,9	Quite dissatisfied
Disagree	2 – 2,9	Dissatisfied
Strongly disagree	1 – 1,9	Very Dissatisfied

Finding and Discussion

In this study, an analysis of the satisfaction of game development trainees using the 3D Unity platform at the Faculty of Visual Communication Design was carried out. The main purpose of this study was to evaluate the extent to which the trainees were satisfied with the training program they attended, as well as to identify the factors that affect the level of satisfaction of the participants.

The characteristics of the trainees are permanent lecturers who teach in the Faculty of Visual Communication Design which is not programmer-based. During the training, 85% of the participants attended and participated in each session. Based on the observation and evaluation of Unity 3D Software, the training went smoothly, participants actively asked questions, filled in features, and developed games using the Unity 3D application. Based on the evaluation sheet, the average result was 5.45. As in the research (Jones & Bursens, 2015), assessment feedback is needed to support an active learning environment, where teachers play more of a role as a facilitator than an instructor. Thus, the satisfaction of participants in the satisfied category. In detail, it can be described in the table as follows.

Table 3. Attitude Scale Value

No	Aspects	Grade Point Average
1.	Training objectives are in line with expectations	5,7
2.	Training materials are very applicable to work	5,6
3.	The facilitator is very helpful to understand the material	5,5
4.	The training process got me directly involved in mastering Unity software	5,3
5.	Study time is used effectively	5,1
6.	It is very easy to access training materials	5,5
Average		**5,45**

Based on the table above, it can be concluded that the average overall satisfaction score of 5.45 is included in the satisfied category. Trainees felt that the training objectives were in line with expectations (5.7), as well as the training materials (5.6), and the facilitators provided support to access the materials (5.5) and help understand the Unity 3D application (5.5). Furthermore, the training method encourages participants to practice directly (5,3). So that the use of time is effective (5.1). The results of the study are in line with previous research which states that the benefits of training are to acquire skills or knowledge, and the right application (Bachvarova et al., 2012; Sanzana et al., 2022).

The participants then commented that the training was good, the participants thanked the instructors and the committee for making a team for the implementation of the training. In addition, participants stated that training materials were only received for the first time and were scarcely available. The material is in the form of visual scripting prepared for DKV lecturers who are not programmer-based. Therefore, it is necessary to continue training by concocting materials that unite the creative world and the world of programming. Meaningful feedback is a key factor for participants to achieve goals, as well as being encouraged to reflect and transfer learning to new educational contexts (Swanson et al., 2011).

The results of the above study show that most of the trainees expressed high satisfaction with the game development training program with 3D Unity at the Faculty of Visual Communication Design. Factors that contribute to trainee satisfaction include the quality of training materials, instructional experience, ease of access to resources, and support provided by instructors. Further analysis also revealed several areas that could be improved to improve trainee satisfaction. For example, some participants expressed a desire for more practical practice in game development using 3D Unity, while others felt that some of the training materials were presented in a more engaging and interactive way. These results are in accordance with the research (Riemer & Schrader, 2015) where the application of understanding and knowledge transfer is best achieved by using simulation.

Overall, this study makes a significant contribution to the understanding of the factors that affect the satisfaction of game development trainees using 3D Unity at the Faculty of Visual Communication Design. The implications of these findings can help improve the quality of education and training in the field of game development, as well as strengthen the position of the Faculty of Visual Communication Design as a quality educational institution in the ever-growing game industry.

Conclusion

The level of satisfaction of participants with the quality of training, the materials taught, the training methodology, and the support provided by the instructors. The results of the study concluded that the level of satisfaction of participants in the satisfied category. Trainees felt that the training objectives were in line with expectations, as well as the training materials and facilitators provided support to access the materials and help them understand the Unity application. Furthermore, the training method encourages participants to practice directly. So that the use of time is effective. Therefore, it is necessary to continue the training by concocting materials that unite the creative world and the world of programming. Thus, it is necessary to develop collaborative training so that it can create innovative games.

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