

The Development Process of Innovation of Accounting Cycle Simulation

Eka Wirajuang Daurrohmah¹

¹Accounting Department, Universitas Terbuka, Tangerang Selatan, Indonesia

Corresponding email: ekawirajuang@ecampus.ut.ac.id

Article history:

Received: January 1st, 2023 Accepted: June 4th, 2023 Published: June 30th, 2023

Abstract *Basic accounting learning is about the accounting cycle. One of the competency achievements of undergraduate accounting students is to be able to understand the accounting cycle and make financial reports. However, not a few accounting students who when they graduate from the course still do not understand the accounting cycle and make financial reports, especially with the open distance learning system. This paper aims to create learning innovations about the accounting cycle so that students easily understand the accounting cycle and can make financial reports. This learning innovation uses virtual reality and gamification technology. The methods used in this study is research and development study and ADDIE model used to the development model. The result of this study is the development of innovation of accounting cycle simulation can make more interesting and easier to understand about accounting cycle learning for student.*

Keywords accounting cycle simulation; accounting learning; virtual reality; gamification

INTRODUCTION

Gamification has been applied in various fields in the last decade (Aini et al, 2019). The phenomenon of gamification has spread so widely that it affects media, commerce, workplace, education, health, etc (Koivisto & Hämeenlinna, 2020). Gamification itself is the use of game elements in non-game contexts (Huang et al, 2020). Gamification can also be interpreted as the process of improving services with game experiences in supporting the creation of user value. Gamification in organizational theory has been used as a behavioral and learning lens and conceptualized as a source of creativity and innovation (Vesa & Harviainen, 2019). More narrowly, gamification can be intended to modify and regulate predetermined behavior. The current focus of digital gamification application innovation is to increase efficiency (Stroud et al, 2020).

Gamification is increasingly being used in learning environments to increase student motivation and consequent learning outcomes (Legaki et al, 2020). Gamification has been used in the education sector (Huang et al, 2020; Kasurinen and Knutas, 2018). The study showed that gamification had a positive effect on learning

but with similar results to training using a non-gamified learning design (Cechellaa et al., 2021; Alcivar & Abad, 2016; Hamari et al., 2016). Generally, there are three categories of gamification types and types of game design horizontally, namely achievement/challenge, immersion, and social-based (Koivisto & Hamari, 2019; Xi & Hamari, 2019).

The Accounting undergraduate study program is one of the study programs whose demand is still high due to high market demand. The demand for accounting study program graduates will continue to exist if the company still exists and its competence is in accordance with market needs (Fauzia et al, 2021). This is evidenced by the increasing trend of students from the Accounting Study Program Universitas Terbuka (UT) from 2019, a number of 12.283 increased to 24.250 in 2022 (Universitas Terbuka, 2022).

One of the graduate standard competences of accounting undergraduate study program is being able to prepare financial reports, including consolidated financial statements, in accordance with International Financial Reporting Standards (IFRS) or other relevant standards (International Accounting Education Standards Board, 2019). The national standard for higher education also states that graduates of accounting study programs must be able to master the theoretical concepts of accounting in depth and have the skills to prepare and interpret financial statements. This graduate standard competence is the basis for course learning outcomes. Basic courses in the Accounting Study Program are an introduction to accounting with course learning outcome mastering the basic concepts of accounting. Accounting itself has experienced the development of meaning, which was previously only bookkeeping become wider, which is fundamental to the central process of governance, strategy formulation, control, and accountability, not only in the corporate/profit sector but also includes the non-profit sector and the government or public sector (Carniege et al. al, 2020). However, students still need to understand the basic of accounting before mastering other competencies. These basic concepts include basic accounting principles, accounting cycles, and financial statements.

Learn about accounting becomes a scourge for some people because it is difficult to understand even after taking a basic accounting laboratory course. This is because the learning provided by students is passive learning and students find it difficult to imagine the use of accounting in the real life. Therefore, it is necessary to have technology that can help learning accounting with an active learning system (Zainudinna, 2020). Gamification and virtual reality technology can be an alternative in accounting learning because it offers fun, interesting, immersive, and experiential learning (Zainudinna, 2020; McGovern et al., 2019).

Game designs based immersive can provide experiential learning by entering players into stories, role-playing games and audiovisual richness will be more memorable (Legaki et al, 2020). This can be answered with the existence of virtual reality technology. Virtual reality (VR) is a technology that allows us to immerse ourselves in an artificial world; this world can be a completely imaginary universe or just a reproduction of the real world. The experience can be visual, auditory, and

sometimes haptic (Elmqaddem, 2019). The adoption of virtual reality in education and learning can enhance and facilitate learning, increase memory capacity, increase enjoyment, and interest in learning, and increase engagement in learning activities (Lee et al., 2017; Elmqaddem, 2019).

METHOD

This research used research and development study. The development model used ADDIE model. The ADDIE model is one of the learning model designs used by many researchers to develop software or applications related to the field of education (Stapa & Mohammad, 2019). The ADDIE model consists of five phases, there are analysis, design, development or production, implementation or delivery, and evaluation (Maydiantoro, 2021).

The first stage of ADDIE development model is to analyze the need for new product development based on problems that arise due to irrelevance with needs. The second stage is design which is a systematic conceptual process in the form of concept design and product content. The development stage is the development stage of the conceptual framework that has been developed in the previous stage. The development process of innovation of accounting cycle simulation used the Game Development Life Cycle (GDLC) method (Ramadan & Widyani, 2013). There are three key phases in game development namely design and prototype, production, and testing. Meanwhile, the GDLC stage consists of six phases, namely: Initiation, Pre-production, Production, Testing, Beta, and Release (Ramadan & Widyani, 2013; Wahyu, 2022).

The next stage is implementation, namely the implementation of the product that has been developed. The last stage of ADDIE development model is evaluation, which is the activity of testing the product, evaluating, and making product improvements. The testing of implementation and evaluation is carried out on accounting students and accounting lecturers as experts in the field of accounting qualitatively.

RESULT AND DISCUSSION

Needs analysis begins with identifying problems based on student needs. The needs of students are reflected in the competence of graduates so that later they can be accepted by the market (Murtanto et al, 2022). The main competency of the accounting undergraduate study program is being able to prepare financial reports (International Accounting Education Standards Board, 2019). Prepare financial report means understanding accounting cycle. Based on the results of interviews with lecturers supporting the subject, it was stated that in class many students had difficulty understanding cycle accounting even though they had taken theory courses.

A basic understanding of the accounting cycle is given in introductory accounting courses and students will usually be given practical exercises either embedded with theoretical courses or separated into practical courses. Some

universities even provide introductory accounting courses in 2 semesters. This shows that the importance of basic competencies regarding the accounting cycle and knowledge sharing to students takes a long time.

Second stage is designing concept and content of product. To facilitate understanding of the accounting cycle and reduce time for sharing knowledge to students, it is necessary to have learning media that are interesting, easy to understand and can be accessed repeatedly according to student needs. Therefore, the development of a gamification-based accounting cycle simulation application can be an alternative to answer this problem. The accounting cycle content is taken from introductory accounting books that comply with IFRS accounting standards which include journals, ledgers, trial balances, adjusting journals, trial balance after adjustments, worksheets, and financial reports (Kimmel et al, 2020).

The development process of the accounting cycle simulation game uses the GDLC method which includes 6 stages:

1. Initiation

The initiation stage is the stage of generating game ideas and concepts. The idea and concept of the accounting cycle simulation game departs from the problem that conventional accounting learning is passive and there is no experiential learning. Therefore, there is a need for active and immersive learning so that it can provide experiential learning. The target user is accounting study program students, especially UT students who are famous for distance learning.

2. Pre-production

The pre-production stage contains an explanation of each game design element, such as game description, characters, storyline, controls, features, and concept art, documentation in the form of game design documents (GDD), prototyping and pre-production. In this stage, the researcher designs several game elements. Some of these elements include:

- a. The genre of this game is educational.
- b. The game storyline was created by the team and then revised by experts from the public accounting firm.
- c. The game is made from a first-person perspective, namely the player as an accountant.
- d. Every transaction that is the basis of journaling is created by simulation
- e. This game feature has 3 levels based on the level of difficulty and competence in accounting learning, namely the level of merchandising, service companies, and manufacturing. The concept of gamification is included starting from making journals, general ledgers, trial balances, and worksheets with drag and drop and dropdown techniques. At the end of the game session, an information feature is given which part of the cycle is still not working properly.
- f. The game is produced in two versions, namely Windows and Mac.

The following is a flowchart of the accounting cycle simulation game design:

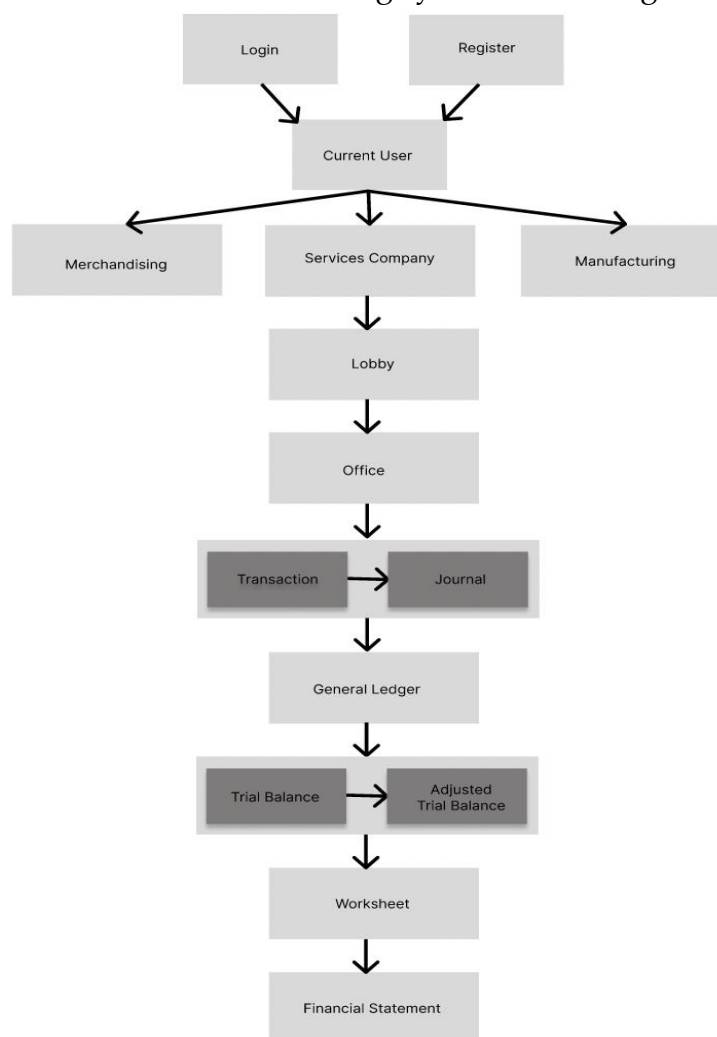


Figure 1. Flowchart Design

3. Production

The production stage focuses on programming and asset creation. The components in this accounting cycle simulation game include 2D assets, 3D assets, audio, and programming. Each component uses different tools in its creating. Making 2D assets using photoshop tools. Setting the user interface (UI) in this game using figma tools. Making 3D assets using blender and unity tools. Making audio (sound effects, background music, narration) using studio one and adobe audition tools. Making tables in games using laravel and vuejs tools. While programming uses unity tools. The game is produced according to the storyline that has been made and brainstorming is carried out between researchers who are also accounting experts and developers so that developers understand the games.

4. Testing

The testing stage provides testing methods related to each quality criterion at each prototype stage. There are several types of testing that the quality assurance team

should also perform such as functional testing, interrupt testing, module testing, performance testing, load testing, memory testing, compatibility testing, compliance testing, behavior testing, end user experience testing, network testing, etc. In this research, game testing is done by making sure the game fits the storyline, network testing, performance testing, testing, and making sure there are no bugs in the test. Tests have been carried out on both the windows version and the mac version.

5. Beta

The beta stage is the last stage of testing, which means there are no errors and can be accepted by users and developers. The beta stage is a good way to know the user experience and user acceptance regarding the product. In this testing phase, the game has been tested several times by several users so that the game is more ready to be accepted by users.

6. Release

The release stage is the final stage after the beta testing stage and is made in the form of an application release. At this stage, the game installer is released which has been embedded with VR technology and is ready to be used by the user.

The next stage is implementation. The implementation was tested on accounting students by means of students using the accounting cycle simulation game and providing feedback to researchers. Student A mentioned that the existence of the accounting cycle simulation game made students more able to imagine the use of the accounting cycle in the field, especially with the VR technology used to make it seem real. This was added by student B who stated that learning accounting simulations was more interesting and easier to understand than just learning from a textbook.

The last evaluation stage of this research was carried out to evaluate and improve the accounting cycle simulation game. The purpose of evaluation is to measure achievement of development goals. Formative evaluation is carried out by means of assessment from experts, in this case, accounting lecturers. Meanwhile, summative evaluation is carried out by comparing the feedback from the implementation results to students with development goals. The results of the expert's evaluation show that the product has been developed according to the accounting cycle competencies, has been tested and is in accordance with the real. For further development, experts suggest adding or creating more varied content so that student knowledge becomes broader. Based on the feedback given by students, the feedback is accordance with development goals, that are more interesting and easier to understand about accounting cycle learning.

CONCLUSION

Accounting cycle simulation is a learning game based on gamification and virtual reality that create to provide a learning experience for students based on need analysis. Accounting cycle simulation make accounting learning more active and

immersive, so students more easily understand the accounting cycle and how to make financial reports than no games. The GDLC method is used in creating accounting cycle simulation games by going through 6 stages. The game is designed into 3 levels, namely merchandising, service companies, and manufacturing for each cycle. This game can make more interesting and easier to understand about accounting cycle learning for student. The implication of this study is learning about accounting cycle will more interesting and easier to understand to accounting student. The student can repeat the accounting cycle simulation till they understand, and they will easier achieve accounting undergraduate competence.

ACKNOWLEDGEMENTS

We thank Universitas Terbuka for funding this research and the research team so that the research and writing of this article can be carried out.

REFERENCES

- Aini, Q., Hariguna, T., Putra, P. O., & Rahardja, U. (2019). Understanding How Gamification Influences Behaviour in Education. *International Journal of Advanced Trends in Computer Science and Engineering*, 8(1.5), 269-274.
- Alcivar, I., & Abad, A. G. (2016). Design and evaluation of a gamified system for ERP training. *Computers in Human Behavior*, 58, 109-118.
- Carnegie, G., Parker, L., & Tsahuridu, E. (2020). It's 2020: What is Accounting Today? *Australian Accounting Review*, 31(96), 65-73.
- Cechella, F., Abbad, G., & Wagner, R. (2021). Leveraging learning with gamification: An experimental case study with bank managers. *Computers in Human Behavior Reports*, 3(100044), 1-9.
- Elmqaddem, N. (2019). Augmented Reality and Virtual Reality in Education. Myth or Reality? *International Journal of Emerging Technologies in Learning (IJET)*, 14(3), 234-242.
- Fauzia, T., Afni, Z., & Santi, E. (2021). Konten Kurikulum Akuntansi Perguruan Tinggi Dan Kesesuaiannya Dengan Standar Kompetensi Lulusan. *Jurnal Akuntansi dan Manajemen*, 16(2), 168-190.
- Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, 54, 170-179.
- Huang, R., Ritzhaupt, A. D., Sommer, M., Zhu, J., Stephen, A., Valle, N., . . . Li, J. (2020). The impact of gamification in educational settings on student learning outcomes: a meta-analysis. *Education Tech Research Dev*, 68, 1875-1901.
- International Accounting Education Standards Board. (2019). *Handbook of International Education Pronouncements*. New York: International Federation of Accountants.
- Kasurinen, J., & Knutas, A. (2018). Publication trends in gamification: A systematic mapping study. *Computer Science Review*, 27, 33-44.
- Kimmel, P. D., Weygand, J. J., Kieso, D. E., Trenholm, B., Irvine, W. & Burnley, C. D. (2020). *Financial Accounting: Tools for Business Decision-Making*. Canada: Wiley.

- Koivisto, J. & Hämeenlinna. (2020). Digital Simulations in Healthcare Education. *Encyclopedia of Education and Information Technologies*, 564-573.
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, 45, 191-210.
- Lee, S. H., Sergueeva, K., Catangui, M., & Kandaurova, M. (2017). Assessing Google Cardboard virtual reality as a content delivery system in business classrooms. *Journal of Education for Business*, 92(4), 153-160.
- Legaki, N.-Z., Xi, N., Hamari, J., Karpouzis, K., & Assimakopoulos, V. (2020). The effect of challenge-based gamification on learning: An experiment in the context of statistics education. *International Journal of Human-Computer Studies*, 144(102496), 1-14.
- Maydiantoro, A. (2021). *Model-Model Penelitian Pengembangan (Research and Development)*. FKIP Universitas Lampung.
- McGovern, E., Moreira, G., & Luna-Nevarez, C. (2019). An application of virtual reality in education: Can this technology enhance the quality of students' learning experience? *Journal of Education for Business*, 95, 1-7.
- Murtanto, Astuti, C. D., Yanti, H. B. & Noor, I. N. (2022). Kepuasan Pengguna Jasa Lulusan. *Jurnal Akuntansi Trisakti*, 9(2), 269-282.
- Ramadan, R., & Widyani, Y. (2013). Game development life cycle guidelines. *2013 International Conference on Advanced Computer Science and Information Systems (ICACSIS)*, (pages 95-100).
- Stapa, M. A. & Mohammad, N. 2019. The Use of ADDIE Model for Designing Blended Learning Application at Vocational Colleges in Malaysia. 2019. *Asia-Pacific Journal of Information Technology and Multimedia Jurnal Teknologi Maklumat dan Multimedia Asia-Pasifik*, 8(1), 49 – 62.
- Stroud, D., Evans, C. & Weinel, M. 2020. Innovating for Energy Efficiency: Digital Gamification in The European Steel Industry. *European Journal of Industrial Relations*, 26(4), 419-437.
- Universitas Terbuka. (2022, November 4). *Data Mahasiswa per semester*. Retrieved from sipelapor.ut.ac.id
- Wahyu, S. (2022). Penerapan Metode Game Development Life Cycle Pada Pengembangan Aplikasi Game Pembelajaran Budi Pekerti. *SKANIKA: Sistem Komputer Dan Teknik Informatika*, 5(1), 82-91.
- Vesa, M. & Harviainen, J. T. (2019). Gamification: Concepts, Consequences, and Critiques. *Journal of Management Inquiry*, 28(2), 128–130.
- Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, 46, 210-221.
- Zainuddin, Z., Chu, S. K., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review*, 30(100326), 1-23.

