International Journal of Educational Research and Development
www.allinnovationjournal.com
Online ISSN: 2664-7095, Print ISSN: 2664-7087
Received: 30-08-2024, Accepted: 29-09-2024, Published: 14-10-2024
Volume 6, Issue 4, 2024, Page No. 11-15

Training model experiential learning cycle based on metaverse to improve the professional competence of lecturers

Lukman Azhari[1], Soewarto Hardhienata[2], Sri Setyaningsih[2], Andika Ramadhan[1]
[1] Department of Engineering, University of Muhammadiyah Tangerang, Tangerang, Indonesia
[2] Department of Educational Management, Postgraduate Programme Pakuan University, Indonesia

Abstract
Lukman Azhari, "Lecturers' professional competence is one of the key factors in improving the quality of higher education. However, with the development of digital technology and challenges in the era of the industrial revolution 4.0, innovative training methods are needed to support the development of these competencies. This research aims to develop and evaluate Metaverse-based Experiential Learning Cycle Training Model as an alternative interactive and immersive learning strategy. The model is designed based on the four main stages in the Experiential Learning Cycle concretization, reflection, abstract conceptualization, and active experimentation-which are integrated in the Metaverse virtual environment. The research method used was research and development (R&D) with an intervention design approach. Data were collected through observations, interviews, and questionnaires to evaluate the effectiveness of the training on improving lecturers' professional competencies. The results showed that the implementation of Experiential Learning Cycle based on Metaverse was significantly able to improve lecturers' pedagogical ability, technology adaptation, and creativity in developing learning strategies. Thus, this model can be adopted as an effective alternative lecturer training in the future, especially in the context of education.

Keywords: Lecturer professional competence, *experiential learning cycle metaverse, training

Introduction

In the era of rapid technological disruption, the professionalism and competence of lecturers in higher education is a challenge that must be faced seriously. One approach that is currently growing rapidly in the world of education is the Experiential Learning Cycle (ELC) introduced by David Kolb. This learning model emphasizes learning through direct experience, where students can feel, reflect, and apply the knowledge gained in real situations. This approach has been proven effective in improving understanding and practical skills, especially in education.

Along with the development of digital technology, Metaverse is now emerging as one of the potential platforms to support the implementation of the ELC learning model. Metaverse, as a virtual world that allows multidimensional interaction between users, is able to provide a space for lecturers to practice and develop their competencies in a simulated environment that resembles real conditions. By presenting immersive and interactive learning scenarios, Metaverse can integrate cognitive, affective and psychomotor elements in lecturer training.

Therefore, the Experiential Learning Cycle-based training in Metaverse is expected to improve the professional competence of lecturers in facing the challenges of modern education. This training not only focuses on theory, but also on practical applications that allow lecturers to continue to develop in accordance with the increasingly complex dynamics of the world of education.

Through this program, lecturers are expected to:

1. Improve technology-based pedagogical skills.
2. Understand and utilize immersive technology in the learning process.
3. Hone critical and reflective thinking skills in solving educational problems.

This Metaverse based approach in the experimental learning cycle offers great potential to enrich the quality of higher education in Indonesia, as well as ensuring lecturers are always prepared with the competencies needed to educate future generations. To improve the professional competence of lecturers, innovative and relevant training approaches are needed. One relevant model is the Experiential Learning Cycle introduced by David Kolb. This model promotes experiential learning with four main stages, namely Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. This model allows trainees, in this case lecturers, to learn actively through direct experience, deep reflection, and application of concepts in real contexts.

By combining the Experiential Learning Cycle and metaverse technology, lecturer training can be enhanced to be more effective and immersive. Through the metaverse virtual environment, lecturers can experience simulated teaching, collaborate with peers in near-real-world situations, and hone their professional skills in diverse scenarios. This immersive experience not only enables the development of technical competencies, but also soft skills such as communication, collaboration, and problem-solving in a digital context. However, with the development of digital technology, there is a new opportunity to utilize metaverse technology as an ELC-based training tool. Metaverse, which is a virtual world that enables social interaction and immersive experiences, can be a training platform that offers a dynamic and interactive learning environment. By integrating Metaverse in the experiential learning cycle, lecturer training can emphasize more on simulation, virtual collaboration, as well as hands-on practice relevant to real-world challenges.

This Metaverse-based Experiential Learning Cycle approach not only provides an opportunity for lecturers to experience a more immersive and contextualized learning process, but

also helps in enhancing technical skills, adaptability, and collaborative abilities required in the digital era. This training model aims to improve lecturers' professional competencies in a more interactive, innovative and effective way, preparing them to face the increasingly complex challenges of future education. This research aims to explore and develop an Experiential Learning Cycle-based training model applied in a metaverse environment to improve lecturers' professional competencies. It is hoped that through this model, lecturers can develop the skills needed to teach and interact with students in the digital era, while preparing themselves for future educational challenges.

The results of preliminary research conducted on 30 lecturer respondents between January 22 and 28, 2024 showed that there is a need to improve the professional competence of lecturers at Universitas Muhammadiyah Tangerang (UMT). The preliminary research results highlighted a number of indicators that need further attention, namely There are 40% of lecturers who do not have the ability to make lesson plans as expected. There are 30% of lecturers who do not have the ability to make learning modules as expected. There are 20% of lecturers who do not have the ability to implement learning as expected. There are 41% of lecturers who do not have the ability to evaluate learning as expected. There are 30% of lecturers who do not have the ability to produce useful research as expected. There are 24% of lecturers who do not have the ability to apply research results to the community as expected.

Based on the above explanation, the professional competence of lecturers is an important part of achieving educational goals because it plays a role in ensuring effective and relevant teaching quality in accordance with the development of science and technology. If ignored, it can have a negative impact on the quality of teaching, reduce the effectiveness of the teaching-learning process, and hinder the development of students' skills. In addition, lecturers who do not have adequate competence can have difficulty adapting to changes in technology and learning methodologies, resulting in an inability to provide an optimal educational experience. Improving the professional competence of lecturers needs to be implemented properly. For this reason, the researchers felt challenged to develop a training model of Experiential Learning Cycle (ELC) based on Metaverse. This training model was developed using the Research and Development (RnD) research model and it is hoped that this training model will help improve the professional competence of lecturers. Based on this background, the researchers are interested in conducting development research entitled "Metaverse-based Experiential Learning Cycle Training Model to Improve Lecturers' Professional Competence".

Library study

The Research and Development (R&D) method is a systematic approach used to create new products or technologies, as well as develop existing products or technologies to make them more effective and efficient. This R&D approach originated in the industrial world, but has expanded to various fields, including education, information technology, health, and many other sectors.Another explanation was put forward by Colquitt *et al*. (2019) that organizational behavior is a field of study aimed at understanding, explaining, and ultimately improving the attitudes and behavior of individuals and groups in organizations. In more detail Colquitt *et al*. (2014) describe the mechanism of organizational behavior as follows.

In the context of education, R&D is essential for developing research-based programs, curricula, or learning methods, which are able to answer current educational challenges. For example, in the development of learning technology or digital teaching media tailored to the needs of today's students. With this R&D theoretical foundation, educational institutions can continue to innovate in providing more effective and efficient educational services and methods, while maintaining quality and relevance in the learning process. This research method refers to the Research and Development (R&D) model. According to Borg and Gall in Sugiyono (2016) this research is intended to produce a product, either in the form of an instructional model, service model, or a system and test its feasibility. To develop a particular product, it is necessary to analyze the data on the needs of the product and test the feasibility of its effectiveness so that the resulting product can benefit the wider community.

The choice of using the Borg and Gall model is because it has high validity with a larger number of stages of activity, systematic and programmatic. This model is also able to produce effective products to meet the needs in implementing programs in the field of education including improving the professional competence of lecturers. The development instrument includes a validation questionnaire by experts and a trial questionnaire used to analyze data quantitatively and qualitatively. Another reason for using this research and development approach is because it is considered appropriate to develop a Metaverse-based Experiential Learning Cycle Training Model.

The steps of the adaptation of the Borg and Gall model of Research and Development or R & D can be described as follows:

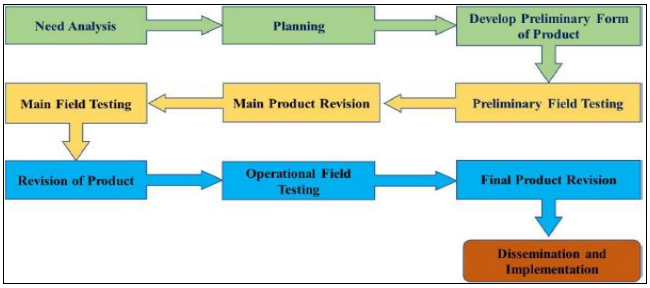

Fig 1: Stages of research and development adaptation of the Borg and Gall model (Sugiono, 2016)

In general, this research aims to find ways to improve the professional competence of lecturers at Universitas Muhammadiyah Tangerang, namely by building a Metaverse-based Experiential Learning Cycle Training Model. The results of this study are expected to be a reference and guideline in improving the professional competence of lecturers. It can be concluded from the results of several relevant research studies above that: (1) training can develop lecturers' abilities in making plans, modules, implementation, and evaluation of learning, (2) training can increase lecturers' teaching motivation, (3) training can increase lecturers' professionalism in terms of

educating, researching and contributing to society, (4) adequate time in the implementation of training can realize the objectives of training, (5) partnerships between universities and training resource centers can minimize technical difficulties in the field, (6) the Experiential Learning Cycle learning model applied in the training can improve the competence of lecturers in handling (7) training can affect the attitudes and perceptions of lecturers (8) training has not been able to change educational services that are more flexible and open to all, (9) junior lecturers have a better understanding than seniors, (10) the Experiential Learning Cycle training system in trainees was able to open up insights and activeness in exchanging knowledge, (11) Experiential Learning Cycle Training Model using Metaverse can develop lecturers' professionalism, (12) intensive implementation of training can last throughout the career.

Overall, R&D is based on the principle that innovation occurs through an iterative cycle involving idea exploration, prototype development, testing, and refinement. The success of R&D often depends on an innovative environment, support from various stakeholders, and a deep understanding of market needs as well as technological advancements. Based on the problems identified from the needs analysis, namely that lecturers need training in Metaverse learning media, especially virtual classes where there is subject matter content presented integrated with learning simulations / animations / videos, so that it can help trainees. From this, a solution is proposed, namely the Metaverse-based Experiential Learning Cycle Training Model developed through this research. This development research is concluded by conducting an effectiveness test to measure the impact of the product on improving the professional competence of lecturers.

Research Methods

The application of R & D research steps based on Borg & Gall (1983) in this study include:

1. Research and Information collection, consisting of Literature Studies and Field Studies.
2. Planning consists of Data Collection, Flowchart, Storyboard, UI/UX Design, and Graphic and 3D Design.
3. Develop Preliminary Form of Product consists of Hypothetical Design, Determination of Facilities & Infrastructure, Product Development, and Expert Validation.
4. Preliminary Field Testing where the Product Test is limited to 1-3 Faculties: 6-20 Lecturers.
5. Main Product Revision consists of Evaluation and Improvement of the internal model/design.
6. Main Field Testing where advanced Product Testing at 3-6 Faculties: 30 - 100 lecturers.
7. Operational Product Revision in the form of further model/design improvements.
8. Operational Field Testing where large-scale Product Tests at 6-9 Faculties: 100-200 lecturers.
9. Final Product Revision in the form of product improvement.
10. Dissemination and Implementation in the form of Publish Final Product. The model development stage can be described as follows:

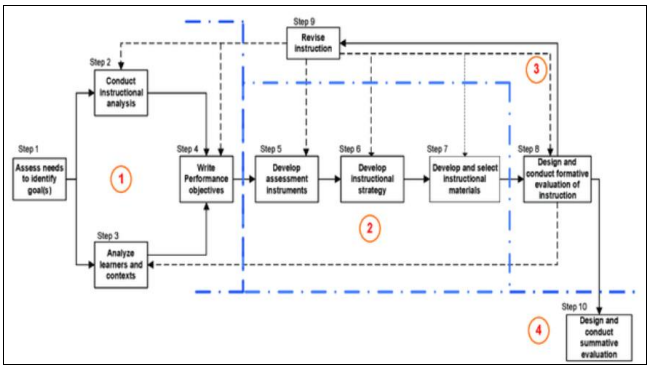

Fig 2

The Experiential Learning Cycle training model based on metaverse offers an innovative approach in improving lecturers' professional competencies. By using metaverse technology, lecturers can engage in immersive and interactive learning experiences that allow them to combine theory and practice in a hands-on manner. The model involves an experiential learning cycle, which includes four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Through this cycle, lecturers not only learn from theory, but also through simulation and practice in a virtual environment that is close to real conditions. The use of metaverse provides advantages in terms of engagement, flexibility, and increased understanding through more dynamic visualization and interaction.

The implementation results show that Experiential Learning Cycle-based training in metaverse can improve lecturers' professional competence, especially in terms of material understanding, pedagogical skills, and adaptation to new technologies relevant to the digital era. Lecturers who participated in this training also experienced improvements in critical thinking, collaboration, and creativity

Fig 3

Results and discussion

The Experiential Learning Cycle-based training model implemented in a metaverse environment provides innovation in improving lecturers' professional competencies. The use of the metaverse allows lecturers to experience more in-depth and interactive learning, by placing them in practical scenarios that approximate the real world. Through the four stages of the Experiential Learning Cycle-namely concrete experience, reflection, abstract conceptualization and active experimentation - lecturers can develop a deeper understanding of the material, as well as improve pedagogical and technical skills. The use of metaverse technology in this model is proven effective in providing a more immersive and personalized learning experience, thus enhancing lecturers' skills, creativity and adaptability in the digital era.

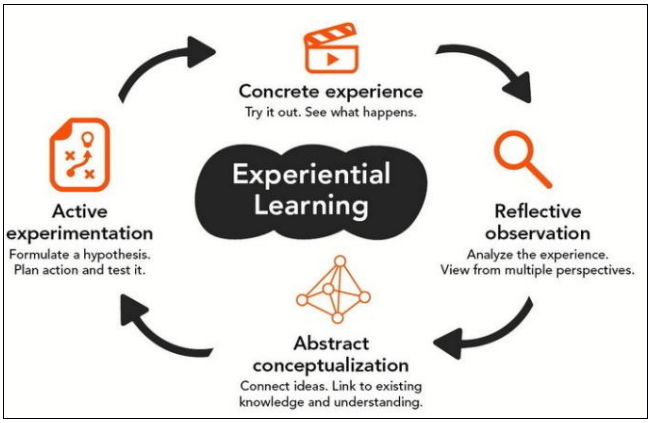

Fig 4

1. **Infrastructure Development:** Educational institutions need to ensure the availability of supporting infrastructure, such as fast internet access and appropriate VR devices, to optimize the implementation of metaverse-based training.

2. **Continuous Training:** Lecturers must receive continuous training, especially related to mastering metaverse technology, so that they can maximize the benefits of this Experiential Learning Cycle model.

3. **Collaboration and Evaluation:** Educational institutions are advised to collaborate with technology and education experts to develop relevant training programs and conduct periodic evaluations to assess the effectiveness of this training on lecturers' competencies.

4. **Adaptation to Various Disciplines:** Although this model is suitable for various disciplines, there is a need to adapt the content to better suit the specific needs of each lecturer's field.

5. **Policy Support:** Policy support from educational institutions and the government in the form of funding and pro-technology education policies are needed to facilitate the implementation of metaverse in lecturers' learning.

References

1. Adams TL. Professions, Knowledge, and Workplace Change: The Case of Canadian Engineers. In: Professions and proficiency. Cham: Springer International Publishing, 2023, 221-238.
2. Al Jubouri ZTK. The Role of Transformational Leadership for Human Resource Managers in Training and Development. International Journal of Professional Business Review: Int. J. Prof. Bus. Rev,2023:8(4):23.
3. Alessi SM, Trollip SR. Multimedia for Learning: Methods and Development. 3rd ed. Boston MA: Allyn and Bacon, Inc: 2001.
4. Arbazette J. Training Needs Assessment Methods, Tools, and Techniques. San Francisco: Pfeiffer: 2006.
5. Baker S. Assessing the Impact of Technology Integration on Lecturer Professional Competence. International Journal of Educational Technology and Innovation,2022.
6. Bianchi A, Carvalho L. Metaverse as a Tool for Faculty Development: A New Era for Higher Education Training. Journal of Virtual Worlds Research,2021:14(2):45-60.
7. Bogusevschi D, Muntean C, Muntean GM. Teaching and learning physics using 3D virtual learning environment: A case study of combined virtual reality and virtual laboratory in secondary school. Journal of Computers in Mathematics and Science Teaching,2020:39(1):5-18.
8. Boud D, Keogh R, Walker D. Reflection: Turning experience into learning, 2013.
9. Hardhienata S, Fauzi A. Strategi Peningkatan Produktivitas Dosen Menyongsong Indonesia Emas 2045. Rizmedia Pustaka Indonesia, 2022.
10. Hardhienata S. Teori Pengenalan Ilmiah untuk Riset Operasi di Bidang Manajemen Pendidikan (SITOREM), 2019.
11. Hardhienata S. Pengembangan Sumber Daya Manusia dalam Pendidikan Berbasis Teknologi untuk Meningkatkan Kompetensi Dosen, 2021.
12. Hardhienata S, Setyaningsih S. Kompetensi Profesional Dosen di Era Digital: Studi pada Perguruan Tinggi Indonesia. Jurnal Pendidikan Tinggi Indonesia, 2022.
13. Hatcher JA, Bringle RG, Hahn TW, eds. Research on student civic outcomes in service learning: Conceptual frameworks and methods. Taylor & Francis, 2023.
14. Hattie J. What works best in education: The politics of collaborative expertise, 2015.
15. Hines P, Netland T. Teaching a Lean masterclass in the Metaverse. International Journal of Lean Six Sigma, 2022.
16. Herrington A. Adult Educators' Authentic Use of Smartphones to Create Digital Teaching Resources. In: Hello! Where Are You in The Landscape of Educational Technology? Proceedings Ascilite Melbourne, 2008.
17. Honey P, Mumford A. The Manual of Learning Styles. Maidenhead: Peter Honey Publication, 2000.
18. Ikendi S, Retallick M, Nonnecke G. Influence of Cognitive Development Activities on Academic Learning of Global Service-Learners, 2023.
19. Kenney J, Newcombe E. Adopting a Blended Learning Approach: Challengers Encountered and Lessons Learned in an Action Research Study. Journal of Asynchronous Learning Networks,2011:15(1):45-57.
20. Kim MJ. The Metaverse: A Business Model Perspective. Journal of Business Venturing,2023:38(6):103294.
21. King SE, Arnold KC. Blended Learning environments in higher education: A case study of how professors make it happen. Mid-Western Educational Researcher,2012:25(1-2):44-59.
22. Kolb DA. On experiential learning, 2013. [online] Available from: http://www.infed.org/biblio/b-xplrn.htm.
23. Laird Dugan. Approaches to Training and Development. New York: Perseus Book Group, LLC, 2003.
24. Lau KW. Rethinking the Knowledge Transfer Process Through the Use of Metaverse: A Qualitative Study of Organizational Learning Approach for Remote Workplace. Presence: Virtual and Augmented Reality, 2023, 1-16.
25. Mitchell A, Torrance D, Harvie J, Forde C, McMahon M. The changing role of the headteacher in Scottish

education: Implications for career-long teacher education. In: Teacher Education as an Ongoing Professional Trajectory: Implications for Policy and Practice. Cham: Springer International Publishing, 2023, 181-204.
26. Pan HLW, Cheng SH. Examining the Impact of Teacher Learning Communities on Self-Efficacy and Professional Learning: An Application of the Theory-Driven Evaluation. Sustainability,2023:15(6):4771.
27. Parise S, Crosina E. How a Mobile Social Media Game Can Enhance the Educational Experience. MERLOT Journal of Online Learning and Teaching,2012:8(3):209-222.
28. Park YJ. The Metaverse: A Customer Relationship Management Perspective. Journal of Interactive Marketing,2023:47(5):408-420.
29. Passarelli AM, Kolb DA. Experiential Learning Theory. Student Learning Abroad: What Our Students Are Learning, What they're not, and What we can do about it: 2023.
30. Patel GH. The Metaverse: A Manufacturing Perspective. International Journal of Production Research,2023:61(12):3615-3630.
31. Patel SK. The Metaverse: A Learning and Development Perspective. International Journal of Educational Technology in Higher Education,2023:20(1):1-10.
32. Quinn Clark N. Academy: Mlearning For Higher Education. Quinnovation: Clark blogs at learnlets.com, 2000.
33. Rahman A. Digital Literacy and Professional Competence among University Lecturers: A Case Study. Journal of Educational Digital Transformation, 2023.
34. Rahman K, Shitol S, Islam M, Iftekhar K, Saha P. Use of Metaverse Technology in Education Domain. Journal of Metaverse, 2023: https://doi.org/10.57019/jmv.1223704.
35. Ren H, Guo Q. Flexible learning tree augmented naïve classifier and its application. Knowledge-Based Systems,2023:260:110140.
36. Robinson DG, Robinson JC. Performance consulting: Moving beyond training. San Francisco: Berrett-Koehler, 1995.
37. Rothwell WJ, Kazanas HC. Planning and Managing Human Resources Strategic Planning for Human Resources Management. Massachusetts: Human Resource Development Press, Inc, 2003, 22 Amherst Road Amherst.
38. Buckley R, Caple J. The Theory and Practice of Training. UK: Kogan Page: 2004.
39. Setyaningsih S. Pengembangan Kompetensi Dosen Melalui Pemberdayaan dan Budaya Akademik. Jurnal Pendidikan, Universitas Pakuan, 2020.
40. Setyaningsih S. Peningkatan Kompetensi Pedagogik Dosen Melalui Pelatihan dan Pengembangan Profesional. Seminar Nasional Pendidikan, Universitas Pakuan: 2018.
41. Setyaningsih S, Rekan. Evaluasi Kompetensi Dosen dalam Perspektif Pendidikan Tinggi. Prosiding Konferensi Nasional, Universitas Pakuan, 2021.
42. Sharma SK, Kitchens FL. Web Services Architecture for M- Learning. Electronic Journal on eLearning,2004:2(1):203-216.
43. Smith IJ. The Metaverse: A Construction Perspective. Journal of Construction Engineering and Management,2023:149(6):04023041.
44. Smith K, Johnson D. Enhancing Professional Development through Metaverse-based Training Modules. Journal of Educational Technology Systems,2019:48(1):109-125.
45. Sugiyono. Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D). Bandung: Alfabeta, 2013, 407.
46. Soria KM, Mitchell TD, Roberts BJ. Leading change to ensure a better world: College students' participation in community service. Journal of Higher Education Outreach and Engagement, 2023, 27(2).
47. Tan L, Kocsis A, Burry J. Advancing Donald Schön's Reflective Practitioner: Where to Next? Design Issues,2023:39(3):3-18.
48. Von Fircks EF. Reasoning with Vygotsky: Semiosis Between Everyday and Scientific Concepts. Human Arenas, 2023, 1-17.
49. Wang DB. The Metaverse: A Learning and Development Perspective. Educational Technology & Society,2023:26(1):1-10.
50. Wang J. Logical Innovation of Metaverse Empowerment Ideological and Political Education: Reconstruction Based on People, Things and Scenes. Academic Journal of Humanities & Social Sciences, 2022: https://doi.org/10.25236/ajhss.2022.051816.
51. Wang P, Liu Y. Metaverse as a Platform for Professional Development of University Faculty: Case Studies from Asia. Asian Journal of Educational Technology,2021:15(4):256-272.
52. Weinberger M. What Is Metaverse? - A Definition Based on Qualitative Meta-Synthesis. Future Internet,2022:14:310.