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CulturaGPT: Gamified Challenge-Based Learning Pathways with AI based Peer Tutoring

[1]*Kee-Man Chuah, [2] Muhammad Kamarul Kabilan Abdullah

[1] Faculty of Education, Language and Communication, Universiti Malaysia Sarawak,
[2] School of Educational Studies, Universiti Sains Malaysia

Corresponding Author: kmchuah@unimas.my

ABSTRAK / ABSTRACT

CulturaGPT is an innovative project that replaces traditional lectures with an improvised challenge-based learning approach that embeds gamification over a 14-week semester. On the mythical island of Culturaeon, students work in teams with unique roles to solve real-world problems, guided by an AI-powered peer tutor customised with OpenAI's GPT, which provides personalised feedback and assistance. Gamification elements motivate and reward students, making learning interactive and engaging. The impact is evident through increased engagement, higher achievement levels, and positive behavioural changes. End-of-course surveys revealed that students found the course design more engaging and beneficial for self-regulated learning. Observations indicated that even reluctant learners became more proactive and effective in their roles. Video reflections provided further insights into these changes. CulturaGPT demonstrates the effectiveness of challenge-based learning and offers a compelling model for the future of education.

Keywords: Challenge-based learning, Artificial Intelligence, GPT, Gamification, Personalised Learning.

INTRODUCTION

In theory-dominated subjects such as history, law, and various branches of the humanities and social sciences, rote learning plays a significant role. Students are often required to memorise terms, definitions, and theoretical frameworks. The goal is to ingrain this information deeply enough to allow for rapid retrieval during exams or practical applications (Kang, 2016; Roediger & Butler, 2011).

The strength of rote learning lies in its simplicity and effectiveness for specific types of knowledge acquisition. It facilitates the memorisation of foundational facts, which can then be used as building blocks for more complex reasoning and problem-solving (Nuthall, 2000). However, it is often argued that this approach emphasises information retrieval at the expense of understanding and critical thinking. Students may be able to recite information but may lack a deeper comprehension of the material and the ability to apply it in different contexts (Biwer et al., 2020; Dunlosky et al., 2013).

In recent years, innovative educational approaches such as challenge-based learning and gamification have emerged to address the limitations of traditional rote learning. Challenge-based learning engages students in solving real-world problems by encouraging them to apply theoretical knowledge in practical contexts (Chuah & Kabilan 2022). This method fosters critical thinking, creativity, and collaboration, as students must navigate complex issues and devise solutions (Trinh et al., 2023). Furthermore, gamification incorporates game elements into the learning process, such as points, leaderboards, and badges, to increase motivation and engagement (Adams et al., 2021). By transforming learning into an interactive and enjoyable experience, these approaches not only enhance problem-solving skills but also promote deeper understanding and retention of the material. Combining these strategies can create a more holistic and effective learning environment, preparing students for the complexities of real-world challenges (Deterding et al., 2011).

In this project, CulturaGPT replaces traditional lectures with an improvised challenge-based learning approach embedded with gamification over a 14-week semester. On the mythical island of Culturaeon (Fig. 1), students work in teams with unique roles to solve real-world problems.

Fig. 1 The Culturaeon fantasy world created for this course

This project also leverages an AI-powered peer tutor, customised using OpenAI's GPT, to offer personalised feedback and assistance to students. The AI tutor provides tailored guidance, helping students understand complex concepts, answer questions related to the course content.

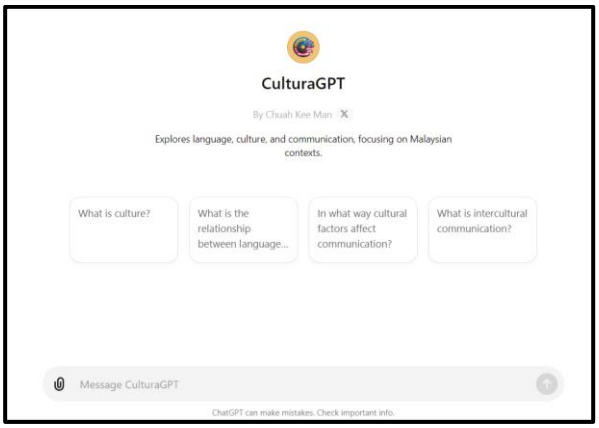

Fig. 2 The CulturaGPT build using OpenAI's custom GPT

By the end of the course, students (82 of them) were required to complete a survey that aimed to capture their opinions on various aspects of the CulturaGPT experience. The survey focused on two main areas: their perception on the immersive learning experience and active learning.

RESULTS AND DISCUSSION

Apart from the increase in learning outcome achievements, students have reported positive impact of the CulturaGPT experience.

Table 1. Mean scores and standard deviation values of four items concerning immersive learning experience.

Item	Mean	Standard Deviation
The gamified challenges significantly increased my engagement in the learning process.	4.53	0.55
The use of Culturaeon made the learning content more engaging and interesting.	4.63	0.67
The Culturaeon storyline allows me to be immersed in the role I played.	4.45	0.43
I felt fully immersed and present in the learning environment created through the challenges.	4.51	0.68

Table 1 showcases students' perceptions of the immersive learning experience facilitated by CulturaGPT. Students overwhelmingly agreed that the gamified challenges significantly boosted their engagement, with a high mean score of 4.53 and a relatively low standard deviation of 0.55, indicating consistent responses. This finding aligns with previous research that emphasizes the benefits of gamification in education, which often leads to increased motivation and participation among students (Hamari et al., 2014). The use of Culturaeon to present the learning content was particularly well-received, earning the highest mean score of 4.63. This suggests that the integration of Culturaeon made the learning process more captivating and enjoyable for students. The Culturaeon storyline played a crucial role in helping students immerse themselves in their roles, as evidenced by a mean score of 4.45 and a low standard deviation of 0.43, pointing to a shared positive experience among participants. This is consistent with studies showing that storytelling can enhance learning by making content more relatable and engaging (Rayan & Aasetre, 2021). Besides that, students felt a strong sense of presence in the learning environment created through the challenges, reflected in a mean score of 4.51. This high level of immersion indicates that the gamified and narrative-driven approach of CulturaGPT was effective in engaging students deeply in the learning process.

Table 2. Mean scores and standard deviation values of four items concerning active learning experience.

Item	Mean	Standard Deviation
I frequently participate in class discussions and activities.	4.62	0.35
I often engage in group work or collaborative projects with my peers.	4.71	0.52
I am regularly encouraged to apply theoretical concepts to practical scenarios or real-world examples.	4.34	0.49
The challenges allowed me to analyse and evaluate information in depth.	4.03	0.74

Table 2 highlights students' active learning experiences within the CulturaGPT course. Students reported frequent participation in class discussions and activities, with a mean score of 4.62 and a low standard deviation of 0.35, suggesting that most students actively engaged in these aspects. Group work and collaborative projects also saw high levels of engagement, as indicated by a mean score of 4.71. These results suggest that the course's emphasis on teamwork and peer interaction was well-received, supporting the notion that collaborative learning can significantly enhance educational outcomes (Laal & Ghodsi, 2012). Furthermore, students felt regularly encouraged to apply theoretical concepts to practical scenarios, with a mean score of 4.34. Although the challenges received a slightly lower mean score of 4.03 for allowing students to analyse and evaluate information in depth, this still indicates a positive reception, albeit with room for further enhancement in this area.

CONCLUSION

In conclusion, the CulturaGPT project has demonstrated significant success in enhancing both immersive and active learning experiences for students through its innovative approach of combining challenge-based learning and gamification. The overwhelmingly positive feedback from students, as reflected in the high mean

scores for engagement, immersion, and participation, highlights the effectiveness of this educational model. By creating an engaging and interactive environment on the mythical island of Culturaeon, students were able to deeply immerse themselves in the learning process, thereby increasing their motivation and enjoyment.

Furthermore, the AI-powered peer tutor provided personalised support, which help students in comprehending complex concepts while foster a deeper understanding of the material. The findings suggest that integrating gamified, narrative-driven challenges with collaborative and practical applications not only boosts engagement but also promotes critical thinking and knowledge retention. While there is room for further improvement in areas such as in-depth analysis and evaluation, the overall positive reception of CulturaGPT highlights its potential as a transformative tool in equipping students with the adaptive and innovative skills necessary to thrive in an ever-evolving world.

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REFERENCES

Adams, D., Chuah, K. M., Mohamed, A., & Sumintono, B. (2021). Bricks to clicks: Students' engagement in e-learning during the COVID-19 pandemic. *Asia Pacific Journal of Educators and Education, 36*(2), 99-117.

Biwer, F., de Bruin, A. B., Schreurs, S., & oude Egbrink, M. G. (2020). Future steps in teaching desirably difficult learning strategies: Reflections from the Study Smart Program. *Journal of Applied Research in Memory and Cognition, 9*(4), 439-446. https://doi.org/10.1016/j.jarmac.2020.07.006

Chuah, K. M., & Kabilan, M. K. (2022). The development of mobile applications for language learning: A systematic review of theoretical frameworks. International Journal of Learning, Teaching and Educational Research, 21(8), 253-270.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining" gamification". In Proceedings of the *15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15).

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public interest, 14*(1), 4-58. https://www.jstor.org/stable/23484712

Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work?--a literature review of empirical studies on gamification. In 2014 *47th Hawaii international conference on system sciences* (pp. 3025-3034). IEEE.

Kang, S. H. (2016). The benefits of interleaved practice for learning. In J. Horvath, J. Lodge, & J. Hattie (Eds.), *From the laboratory to the classroom* (pp. 79-90). Routledge. https://doi.org/10.4324/9781315625737

Laal, M., & Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia-social and Behavioural Sciences, 31*, 486-490.

Roediger, H. L., & Butler, A. C. (2011). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Sciences*, *15*(1), 20-27. https://doi.org/10.1016/j.tics.2010.09.003

Ryan, A. W., & Aasetre, J. (2021). Digital storytelling, student engagement and deep learning in Geography. Journal of Geography in Higher Education, 45(3), 380-396.

Trinh, M. P., Chico, R. J., & Reed, R. M. (2023). How Fun Overcame Fear: The Gamification of a Graduate-Level Statistics Course. *Journal of Management Education*, https://doi.org/10.1177/1052562923118112

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