

Transforming Graduate Teaching Assistant Training Through Blended Learning, Gamification and AI: A Case Study

Ka Hei Karina Yuen, Tsz Hei Yeung, and Beatrice Chu
Center for Education Innovation,
The Hong Kong University of Science and Technology

Abstract

Graduate Teaching Assistants (GTAs) play an integral role in undergraduate education, yet many lack formal pedagogical training. This case study examines the implementation of an innovative, technology-enhanced GTA training program at a research-intensive university in Hong Kong. The program integrates blended learning, gamification, and artificial intelligence (AI) tools, guided by Self-Determination Theory (SDT), the Mechanics-Dynamics-Aesthetics (MDA) framework, and adult learning principles, to explore how an innovative pedagogical and technological design supports student engagement, fosters collaboration, and enhances self-perceived teaching confidence in mandatory professional development at scale.

Using a mixed-methods approach, data were collected from 449 students across six course sections during Fall 2024. Quantitative metrics showed high voluntary participation (97.6% of groups engaged in optional activities) and sustained engagement (81.7%), while qualitative insights from student reflections provided rich evidence of the integrated pedagogical design driving engagement. A custom gamification platform facilitated peer collaboration, sustained participation, and efficient resource management, while AI tools provided scalable pedagogical and administrative support, effectively addressing institutional constraints through innovative pedagogical strategies.

Corresponding author: Beatrice Chu. Email: beatrice.chu@ust.hk

The findings offer valuable insights for professional development practice, particularly in aligning engagement mechanisms with learning objectives in mandatory training contexts. While acknowledging the influence of institutional constraints and the limitations of short-term outcome measures, this case study demonstrates how well-designed technology solutions can support both scalability and personalization in professional development. Patterns of resource-sharing behaviors and collaborative practices further illustrate strategies for fostering community building while addressing the practical challenges of large-scale training programs.

Keywords: Graduate Teaching Assistant (GTA) training, professional development, gamification, blended learning, artificial intelligence in education, Self-Determination Theory, student engagement