



Project title: Artificial intelligence through a contextual game-based learning approach to cultivating digital citizenship behaviors

โครงการ การใช้ปัญญาประดิษฐ์ผ่านแนวทางการเรียนรู้แบบเกมเชิงบริบทจริงเพื่อปลูกฝังพฤติกรรมความเป็นพลเมืองดิจิทัล

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แผนงาน : โครงการพัฒนาเครือข่ายความร่วมมือนานาชาติเพื่อการยกระดับความเป็นเลิศของมหาวิทยาลัย/สถาบันวิจัยไทย

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Project duration (ระยะเวลาการดำเนินงาน) : 3 years, from 01/11/2021 to 31/10/2024

The enhanced version of fuzzy logic and decision tree-based personalized gaming approach for enhancing digital citizenship learning



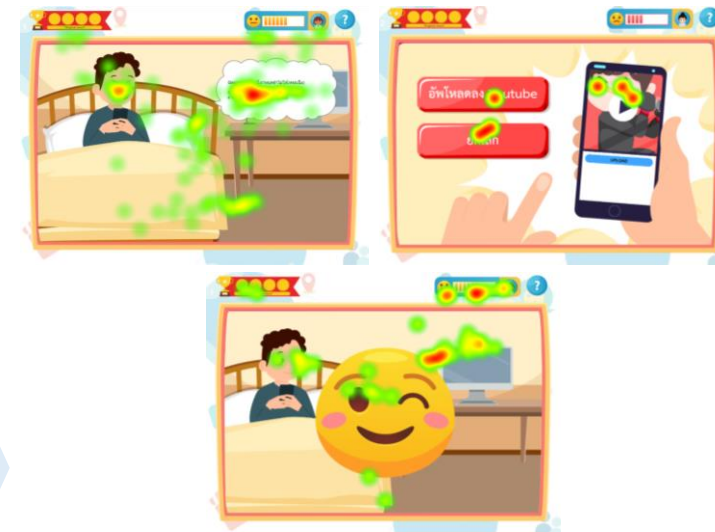
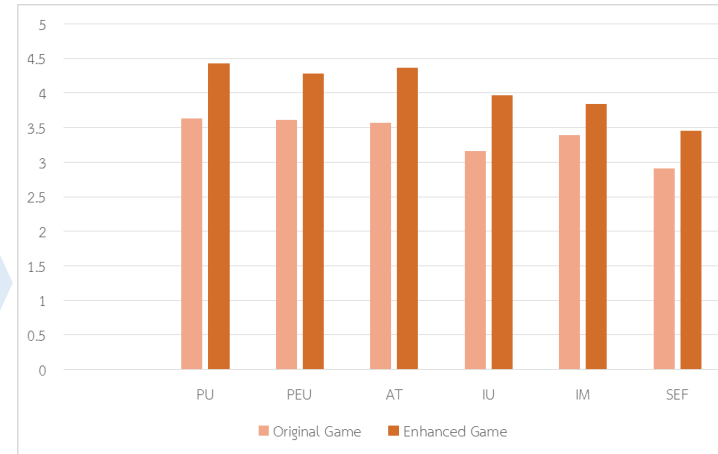
Research Objectives: To diagnose students' digital citizenship behaviors and offer individualized feedback.

Research questions:

(1) How did the fuzzy logic and decision tree-based personalized gaming approach impact students' affections compared to a previous cohort who received a formative assessment-based contextual gaming approach?

(2) How could eye-tracking data be analyzed to further understand the fuzzy logic and decision tree-based personalized gaming approach used for students' visual attention?

Progress/Findings/Results



(1) Chi-square test results:

A statistically significant association between the different cohorts and their ratings of affections regarding various constructs.

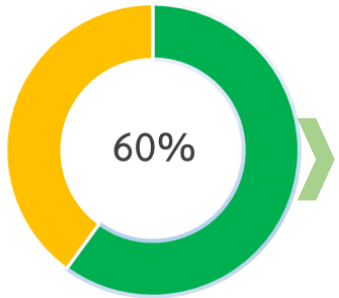
Eye-tracking Technology

The eye movement records from the four volunteer students who received the fuzzy logic and decision tree-based personalized game were further analyzed. The **Tobii eye trackers** were used to monitor students' gaze positions and eye movements during the game playing. **Tobii Pro Lab** software was also used to analyze eye movement matrices.

(2) Eye-tracking Results:

- The **storytelling** elements in the personalized game were most effective in engaging students.
- Decision-making and facial emotion** components required less visual attention.
- The balance between attention and cognitive engagement was achieved through **personalized feedback elements**.

Current progress:



■ Done ■ Future work

- The **enhanced version** of fuzzy logic and decision tree-based personalized gaming approach for enhancing digital citizenship learning
- **3 proceedings** indexed by SCOPUS
- 1 research article in-pressed in the **International Journal of Mobile Learning and Organisation**, indexed by SCOPUS (Q2) and ESCI
- 1 manuscript submitted to **Computers and Education: Artificial Intelligence** indexed by SCOPUS (Q1)
- Research connections with **11 Thai and Taiwanese researchers**

Challenges/Problems

- The study was conducted with a **sample from a school**; the results might not represent broader student populations, limiting the findings' applicability to diverse educational settings.
- The **short-term study** leaves questions about the sustainability of the effects of using AI-driven gaming environments on students' learning and motivation, leaving questions about the sustainability of these effects.

Challenges/Problems

- Future research could involve a more diverse and larger sample size to enhance the generalizability of the findings by **conducting longitudinal studies** to assess the long-term impacts of AI-driven gaming environments on learning and motivation would provide deeper insights.
- Researching how AI-driven gaming environments can be effectively integrated with traditional learning methods could provide a more holistic approach to education.
- Future studies could explore additional psychological constructs, such as social interaction, collaboration, and **long-term knowledge retention**.



Implement the game
and collecting data