



Transformative experiences of teaching biochemistry to dental undergraduates using the gamified module

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ABSTRACT

Teaching biochemistry to dental students requires a specific approach to facilitate student engagement, for better understanding and application in clinical practices. However, the immediate switch to online learning during the pandemic situation revealed a huge potential for the practical integration of knowledge in digital literacy and pedagogy, for an effective learning experience in basic science. Hence, it is extremely crucial to have feasible techniques in transforming conventional face-to-face teaching into online sessions. This study attempted to design and evaluate an effective model of gamed-based challenge in replacing the traditional, unattractive small group discussion session for biochemistry subjects.

The gamed-based method was tested prior to the pandemic, in a face-to-face session, whereby the evaluation was performed in the form of questionnaires and examination results. Throughout the pandemic, however, the delivery of similar game-based methods was proven to be easily transformed into an engaging online learning experience with a careful selection of appropriate learning platforms. The feedback gathered suggested that the model could effectively be used to enhance student's learning experience, improve their collaborative effort, and help them to retain knowledge effectively. Hence, this paper provides practical guidance for an implementation of a gamified learning module, which can reform the current teaching modes related to cultivating knowledge and interest in learning biochemistry among dental or medical students.

OBJECTIVE

- To gamify the learning process of biochemistry subject for dental undergraduates by adhering to a specific learning taxonomy.
- To ensure that the gamified learning session successfully achieve the learning objectives and fulfill the learning outcome.
- To assess the effectiveness of the gamified biochemistry lesson in terms of student learning experiences and engagement.
- To evaluate the practicality and feasibility of conducting gamified learning session in both face-to-face and synchronous online session.

METHODOLOGY

- Challenges
- Quest
- Quiz
- Leaderboard
- Peer review
- Self-reflect
- Badges
- Point System
- Avatar/Role Playing
- Game card

ADDED VALUES

The implementation of gamified models in biochemistry lesson has substantially improved students engagement and learning experiences. Overall, students demonstrated positive responses towards the gamified module, which increase their interest in challenging topics in biochemistry. Gamification also improved students interaction with peers during the session, which leads to better understanding on the subjects.

USEFULNESS

A gamified biochemistry module that has been carefully designed and executed according to plan may assist in developing students interest in learning. The different method used in the gamification strategies also encourage active participation from various styles of learning, such as Visual, Audio, Verbal and Kinesthetic.

COMMERCIALISATION POTENTIAL

The gamified modules may potentially be used for commercialisation, with assistance of third party or experts in software engineering and digital applications development. It will fill the existing gap in development of virtual game-based biochemistry applications.

RECOGNITIONS

- **Publication in indexed journal:** NAHA Satar, KBAA Noordin, A Ahmad, SA Zainal, **N Yusop.** (2022). Assessing the Effectiveness of Gamified Biochemistry Learning for Undergraduate Dental Students in Universiti Sains Malaysia. *Malaysian Journal of Education* 46 (2) 2022), 1-10.
- **National conference:** NAHA Satar, KBAA Noordin, A Ahmad, SA Zainal, **N Yusop.** (2021). 13th National Dental Students Scientific Conference 2021. Faculty of Dentistry SEGi University.
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