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# Intention to Continue Adopting Online Problem-Based Learning After the COVID-19 Pandemic: Perception Analysis Using a Structural Equation Modelling Approach

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## ABSTRACT

Due to the COVID-19 pandemic, conventional face-to-face problem-based learning (PBL) had to be transitioned into online PBL. However, it was largely unknown how likely would medical students continue to adopt this form of hastily implemented remote learning solution after the pandemic ends. Using a two-stage partial least squares structural equation modelling approach, a study was conducted to develop a set of questionnaires to measure this intention and determine the influence of perceived benefits (5 items) and perceived ease of use (7 items) on the behavioural intention to continue adopting online PBL. The technology acceptance model was adopted as the conceptual framework of this study. Environment factors (11 items derived from PEST analysis, where P = policy, E = economic, S = social, and T = technology factors) were incorporated as the third independent construct in our model. A total of 149 Year 2 medical students participated in this study. Overall, the mean score for behavioural intention to continue adopting online PBL was 3.42 out of 5 (where 1 = most unlikely and 5 = most likely). Only the construct perceived ease of use had significant influence on the behavioural intention to continue adopting online PBL (path coefficient standardised  $\beta = 0.312$ ;  $t$ -statistics = 2.960;  $p = 0.003$ ). Perceived benefits and environment factors were not shown to have significant influence. In conclusion, as no strong intention to continue adopting online PBL was demonstrated in this study, conventional face-to-face PBL should be resumed until clear benefits of a carefully designed online PBL can be demonstrated.

**Keywords:** *Problem-based learning, Online platform, COVIDs-19, Technology acceptance model, PEST analysis*

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## INTRODUCTION

Problem-based learning (PBL) is a pedagogy with three fundamental characteristics: (a) it uses authentic, ill-structured problems to trigger learning; (b) it is self-directed; and (c) it is student-oriented (1–2). Conventionally, PBL occurs in small groups (1). Through social interactions with peers, students learn to acquire knowledge and to apply different thinking strategies to solve different sets of problems. Underpinning this social constructivism learning philosophy is the notion that cognitive load of learning can be distributed among group members (3–4). Although traditionally associated with individual learning, the concept of cognitive load has now been expanded to collaborative learning. This is postulated to be due to the construction of a collective working memory where the complexity of a learning task can be reduced and mutual scaffolding among group members can occur (4). In PBL, students generally divide the learning tasks. By doing so, they leverage each other's distributed knowledge to solve complex problems (5–6) and through different forms of social interactions such as elaborations and verbalisations, activation of prior knowledge occurs (7–8). In this regard, it is theorised that learning of new knowledge is facilitated when students are able to connect the new knowledge with what they have already known (6–7).

Unfortunately, the COVID-19 has disrupted education in an unprecedented manner. Following the declaration by World Health Organization that COVID-19 is a worldwide pandemic, many countries (including Malaysia) implemented quarantine orders or *cordon sanitaire* as an effort to curb the spread of the infection. In Malaysia, all forms of face-to-face teaching and learning activities (including PBL) in universities had to be transitioned to emergency remote teaching and learning (9). According to Khlaif et al. (10), there is a stark difference between “emergency remote teaching and learning” and the properly designed

“online teaching and learning”. Emergency remote teaching and learning refers to the temporary, unplanned sudden shift of instructional delivery to a fully online solution due to a crisis. Online teaching and learning, on the other hand, is a deliberately planned instructional delivery with careful consideration of how various design decisions (e.g., modality, synchronicity of communication, pacing, etc.) influence educational effectiveness.

Given that PBL had always been conducted in the conventional face-to-face format, it is largely unknown how acceptable this form of hastily implemented online PBL was and moving forward, how likely would our medical students continue to adopt this method as the COVID-19 pandemic gradually transitions into the endemic recovery phase (11). According to Davis (12), our attitude towards any new system or technology (in this instance, online PBL) is dependent on two fundamental factors: (a) the perceived benefits – the extent to which one believes that the system (online PBL) will help them with their tasks (i.e., learning task), and (b) the perceived ease of use – the extent to which one believes that this new system (i.e., conducting online PBL) is easy enough to adopt. This framework is known as the technology acceptance model (TAM) (12).

Using TAM as part of our conceptual framework, we embarked on a study with the overarching objectives to develop a set of questionnaires to measure this intention, and determine the influence of perceived benefits and perceived ease of use on the behavioural intention to continue adopting online platforms to conduct PBL. In addition, as the pedagogy of PBL is built upon socio-constructivism learning philosophy (13), we had also incorporated the influence of environment factors in the conceptual framework. Items in the construct environment factors were derived using a popular management tool for risk factor analysis, that is, the PEST analysis (14). PEST is an acronym for four sources