



## INCORPORATION OF PROBLEM BASED LEARNING AND TECHNOLOGY-BASED SCAFFOLDING FOR EDUCATIONAL PURPOSE

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## Abstract

The integration of Problem-based learning (PBL) and Scaffolding for instruction in various fields of education cannot be contravened. The strategy can enhance and supplement the conventional learning model accommodating the generic skills for learning in the 21<sup>st</sup> century. The main scope of this study is to review the findings and conclusions of studies about the mastery of implementation of PBL and scaffolding as a learning strategy, its effectiveness on education. The study adopts a systematic review and 11 articles from 2015 until 2019 including both peer review and full text from Scopus, Science Direct and other sources as databases. This review includes different areas of education. The results of this study reveal that PBL and Online scaffolding improved student's experience, knowledge, and ease in dealing with communication of problems in a learning setting. Scaffolding is an important component that assists students to succeed in PBL and has a reasonable effect on students' engagement.

## Research Highlights

Implementation of PBL and scaffolding using technology as a mediator has been widely utilized to support students' problem solving, effective communication, teamwork and using reasoning skills in solving educational problems (Ismail et al. 2018; Peng et al. 2017). The incorporation of the PBL and scaffolding strategy is a result of the anticipated learning outcome (Belland, 2016). Devices a reliable and consistent interdisciplinary task, frequently asses and restructure to facilitate student's engagement and academic achievement with everlasting development of education (Evans, 2016).

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## Research Objectives

This review plans to study the effectiveness of PBL and scaffolding on student's success and academic performance in different fields of education. Moreover, to guide teachers to put more effort to evaluate their teaching styles and potentials in the instructional task. To serve as a stimulating factor for shifting the teacher's traditional way of teaching to an appropriate and technological way of imparting knowledge. A supportive avenue for students to interact and fully engaged with tasks and activities to boost their academic achievements.

## Methodology

The employed model was a systematic approach in the identification of database sources. The key words applied for searching and accounting the appropriateness and suitability of these studies through inclusion and exclusion measures "PBL and online scaffolding" "problem-based learning AND scaffolding" "Online scaffolding AND problem-solving". The main data sources applied to survey articles were the Scopus, Science Direct and other data sources. A





total of 8,916 potential articles were recovered from the decided databases Scopus (5,965), Science Direct (2,889) and other sources (62). After screening to eliminate duplicates articles were rejected. The subsequent stage applied for the analysis resulted in a total of 325 articles passed for the study. A total of 77 articles were also excluded based on abstract and title analysis respectively. The following analysis stage resulted in 271 articles for subsequent analysis. A total of 132 was excluded as a result of an unclear connection with PBL. 83 articles were also excluded based on no clear connection with scaffolding and 45 were also excluded due to unclear connection with technology-based scaffolding. At the final process in this review, a total of 11 studies was allowed for in-depth study.

## Results

The question provided to commence PBL could be a hindrance to learning instead of assistance. This created a great amount of inconsistency in the implementation of PBL leading to failure and criticisms of the instructional approach (Tawfik and Kolodner, 2016). The use of technology as online scaffolding has a significant impact on PBL students' knowledge construction and academic outcome (Kim, Belland, & Walker 2018), enhances learning engagement (Serife 2016), and boosts understanding of the abstract concept (Fernando 2018). Moreover, a significant improvement in students' performance is guaranteed (Garren & Skylstad 2016), utilization of a suitable scaffolding strategy can improve student's achievement and encourages active deliberation in a PBL context (Kim & Lim 2019).

Computer spreadsheets as online scaffolding significantly yield an encouraging effect on the learning outcome of students through PBL activities (Haruehansawasin & Kiattikomol 2018). Students perceived the application of a web-based computer scaffolding in the PBL structure provides a promising result on their efforts in constructing new knowledge (Peng et al. 2017). scaffolding to stimulate PBL students optimal challenge with learning task improved their experience to communicate effectively in solving their problems in academic activities (Kim et al. 2019). Thus, understanding the need and utilization of social media as online technology to support PBL for effective student engagement and better learning outcome.

## Findings

Findings in this paper could help teachers in education to identify challenges relating to the application of PBL approaches. Understand the implementation of PBL and technology-based scaffolding framework that can be jointly utilized through diverse learning situations to attend to certain needs of students in the field of education. Scaffolding PBL in educational exercise ensures student's objectivity and working together in teamwork, with their instructor as a guide. It is a transition towards locating students at the principal heart of their learning and encourage greater engagement and learning performance.





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