Chapter 16
Digitalizing PBL to Transition Learning Into the Real World

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ABSTRACT

This chapter is on how the concept of teach less, learn more is envisioned in the perspective of the problem-based learning (PBL) approach. It includes a brief introduction of the problem-based learning design and its relevance to learning in the 21st century as well as strategies for implementing the processes and assessments in PBL, not in a manner of merely digitalizing the tradition but to re-establish how PBL can be strategized to transition learning experience into the real world. The chapter also discusses the effects of digitizing the PBL approach, which include highlighting how it can improve students' learning as well as cautioning teachers on the common challenges of digitizing this approach.

THE PROBLEM-BASED LEARNING DESIGN

Learning in the 21st century is about knowing to adapt, strategize and deal with real-world problems. The educational reform that centers around problem-solving has been an agenda in the age of knowledge-based economy where its key component is the reliance on intellectual capabilities with productive use of knowledge that is driven by the emergence of new technologies. The implication of this is that we need to reexamine our assumptions of knowledge acquisition and involvement in learning. If the focus is on learning to solve problems, then knowledge is not only acquired but created and transformed. This means that learning has to extend beyond the physical boundaries of the classrooms, and teachers need to become designers of an adaptive learning environment. The roles of teachers as disseminators of information or even facilitators will gradually erode.

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The problem-based learning (PBL) design is an instructional model that is based on the constructivist theory. This approach has been widely practiced to enhance students' learning experience and to link their experience to the world by solving real problems. The foundation of constructivism in the problem-based learning (PBL) design emphasizes on practical experience in learning, decision making and the development of dynamic thinking and dialogue. Active participation and intellectual engagement of students in a PBL design are the basis for the generation and development of knowledge in this student-centered cyclical process. Tan (2003) posits that, in the PBL approach, *"understanding is derived from interaction with the problem scenario and the learning environment"*. Hence the emphasis in this design is in *"organising the curricular content around problem scenarios rather than subjects or disciplines"* (Savin-Baden, 2000). Students engage with the problem and *"the problem inquiry process creates a cognitive dissonance that stimulates learning"* (Tan, 2003). In the process, knowledge develops through collaboration which involves the social negotiation and evaluation of the feasibility of one's perspectives. The evolution of this experiential process closes the gap between the students' existing knowledge and the new knowledge.

One of the key proponents of the PBL approach is Cindy Hmelo-Silver who proposes the following characteristics of a PBL model:

- Learning centers on a complex real-world problem that does not have a single correct answer (an open-ended question),
- Students work collaboratively to identify what they need to learn in order to solve the problem (the learning gap),
- They engage in self-directed learning and then apply their new knowledge to the problem, and
- They reflect on what they learned and the effectiveness of the strategies employed, and that
- The teacher acts to facilitate the learning process rather than to provide knowledge. (Hmelo-Silver, 2004)

The Hmelo-Silver PBL learning cycle (2009) is depicted in Figure 1.

Within the PBL environment, the problem is a catalyst that initiates the learning process. In this process, the students are introduced to a problem scenario that is related to their lives to encourage interest and motivation. The problem is designed to be unstructured or ill-defined but authentic in nature. This triggers the starting point of learning after which the students will need to problematize the scenario by identifying their existing knowledge and acquiring new areas of learning which will lead them to a proposed solution. Self-directed learning is crucial in PBL where students assume a vital role in the acquisition of new information through research and evaluation. One of the key features of the PBL design is that students work in small groups with high level of interaction, inquiry and integration of knowledge to address the problem. During this process, the teacher facilitates and assesses through questioning, probing and cognitive guidance. At the end of the PBL process a synthesis and integration of learning where the highest level of Bloom's Taxonomy of the cognitive domain is applied. In doing so, students consider the consequences of each solution and select the most viable approach through metacognition. The PBL process is supported by continuous reflection on the content and the processes involved. This is improved on an ongoing basis by inputs from multiple sources and perspectives of assessment. Finally, the PBL process concludes with an evaluation of the student's experience and the learning process by the teacher.