Chapter 13

Hybrid Inquiry-Based Learning

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ABSTRACT

This chapter proposes the hybrid inquiry-based learning (HIBL) model, a novel pedagogical model based on inquiry-based learning (IBL). In IBL, learning is achieved by questioning and learners are encouraged to invent new hypotheses instead of investigating questions posed by the instructor. This chapter first provides a holistic description of IBL. It begins with a brief history and survey on learning perspectives, pedagogical background of IBL is also provided. The IBL model, its implementations and variations, as well as the comparison of its pedagogical features against traditional teaching approaches are also given. This chapter further contributes the hybrid inquiry-based learning (HIBL) model, a new IBL model that integrates traditional and ICT-based implementations of IBL. By leveraging on the advantages of both classroom-based and web-based learning, the best sides of IBL can be elicited. A detailed example in Information Security education is also provided to illustrate the HIBL model.

INTRODUCTION

Advances in information and communication technology (ICT) bring much change in the way we teach and learn; they also nurture hybrid learning (Buzzetto-More & Sweat-Guy, 2006; Wang & Fong, 2008). Hybrid learning, which also referred to as blended learning (Garrison & Kanuka, 2004), is a novel pedagogical mode which combines the advantages of both traditional classroom environment and the cyberspace. The rapid development of ICT also greatly enhances knowledge sharing...
and building, and cultivates a pleasant supporting environment for inquiry-based learning (IBL). IBL is a constructivist pedagogy that emphasizes on the quest of truth, information, and knowledge through self-discoveries and peers collaborations. It can be achieved in traditional classroom environment, over the Internet, or a hybrid of the two.

This chapter centred on IBL. It first gives the definition of IBL, followed by a brief history and survey. Comparison of the pedagogical features between traditional and IBL teaching approaches is also given. An IBL model is provided to introduce its three essential steps, namely the initiation of inquiry, coaching of the inquiry process, and the assessment of the learning. Implementation examples of IBL in various environments, including those in traditional classroom-based instructions, as well as Web-based learning mode such as WebQuest, are also given. The chapter proposes the hybrid inquiry-based learning (HIBL) and provide its implementation details. It also contributes an HIBL exemplar to illustrate how IBL can be implemented in a hybrid learning mode.

The key objectives of this chapter are to introduce IBL as a whole and discuss how it can be implemented in hybrid learning environments. It aims at providing a foundational reference for future work in this area.

BACKGROUND

In this section, we provide the theoretical background for IBL and HIBL. We begin with a review on learning perspectives, namely Behaviorism, Cognitivism, and Constructivism. These perspectives contribute the theoretical background of IBL to various extent. In particular, IBL realizes most constructivist principles such as scaffolding and collaborative learning. We also provide literature review on learning theories related to IBL, and discuss their relationships with hybrid learning. We encourage readers to refer to other chapters of this handbook for literature review on hybrid learning.

A Review on Learning Perspectives

Psychologists began to study the nature of cognition and learning in late 1800s (Ormrod, 2006). Since then, the mainstream perspective of teaching and learning has been migrating. Starting from Behaviorism in the 50s, to Cognitivism in 70s and 80s, we are now in the era of Constructivist teaching and learning. In this section, we review the evolvement of the mainstream learning perspectives. We also introduce the related learning theories involved in subsequent sections.

1. Behaviorism

In early days of educational research, most researchers focused on response (learners' behavior) and stimuli (environmental events), which later evolved into Behaviorism in 1950s, a theoretical perspective in which learning and behaviors are described and explained in terms of stimulus-response relationships. Seminal behaviorist works include Pavlov’s classical conditioning (Pavlov, 1927) and Skinner’s operant conditioning (Skinner, 1954). The behaviorist principle being applied most frequently in teaching and learning is reinforcement: a response that is followed by a reinforcing stimulus is more likely to occur again. This principle is often applied in computer-assisted instruction (CAI) and early educational games.

2. Cognitivism

In around 1960s, researchers began to realize that the mechanism of how learning occurs could not be completely explained at the behavioral level. Instead, they proposed to consider thinking in additional to behavior. Gradually, their focus shifted from detail analysis of the stimuli-response relationship to the study of the processes involved