Design of a Blended Learning Environment Based on Merrill’s Principles

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Design of a Blended Learning Environment Based on Merrill's Principles

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Abstract. Designing blended learning courses requires a systematic approach, in instructional design decisions and implementations, instructional principles help educators not only to specify the elements of the course, but also to provide a solid base from which to build the technology. The blended learning course was designed based on Merrill's First Principles of Instruction with five phases. This paper helps inform educators about how to develop appropriate learning styles and preferences according to students' learning needs.

1. Introduction

Internet technology advances and computer information technology and networked learning made it possible to design and utilize new generation learning environments that are realistic, authentic, and engaging [1]. Today, blended learning technology is one of the most promising applications in education, since blended learning can be considered a sort of electronic learning or its extension; The main difference is the necessity of face-to-face communication of students with each other and with the teacher [2].

Olivier & Trigwell explains that blended learning was originally used for learning that seeks to combine face-to-face learning with online learning [3]. This mixed learning is derived from two words, blend and learning. The word blend means combining things and learning demonstrates the assimilation of new knowledge. With blended learning [4], teachers can take advantage of online resources in the learning process and this helps students become more active and effective learners, [5][6] including effort and time-saving as well as cost effectiveness. Moreover, blended learning can be associated with problem solving [7][8], learning style, and learning achievement. Blended learning can be used to support problem solving [9][10] based learning which results will give description about learning style [11][12] and learning achievement from students [13]. Online resources learning have studied by Ahmar and Rahman, from this study, they have conclusion that online resources can improve the knowledge of the students [14].

2. Methodology

There are several reasons why using blended instruction is improved pedagogy, easy access to knowledge, more interaction among learners, personal presence, cost effectiveness, and ease of revision of learning content [15]. While Singh and Reed [16] proposed there were six combinations of
blended instruction is: (a) offline and online learning, (b) self-paced, live, and collaborative learning, (c) structured and unstructured learning, (d) custom content with off-the-shelf content, (e) work and learning, and (f) ingredients blending synchronous physical formats, synchronous online formats, and self-paced, asynchronous formats.

To design effective instruction it must follow some of the principles as presented by Merrill [16], see figure 1 below.

**Figure 1.** Phases for Effective Instruction

Here is a brief explanation of these five steps:
1. Learning is promoted when learners are engaged in solving real-world problems **[PROBLEM]**.
2. Learning is promoted when existing knowledge is activated as a foundation for new knowledge **[ACTIVATION]**.
3. Learning is promoted when new knowledge is demonstrated to the learner **[DEMONSTRATION]**.
4. Learning is promoted when new knowledge is applied by the learner **[APPLICATION]**.
5. Learning is promoted when new knowledge is integrated into the learner’s world **[INTEGRATION]**.

Figure 2 is the blended learning design steps that include: problems, activation, demonstration, application, and integration with using Merrill's Principles of Instruction [17].

**Figure 2.** The design of blended learning using Merrill's Principles of Instruction is adapted from Gedik, N et all [18]
3. Result and Discussion

Blended learning designs developed through use of Merrill’s Principles of Instruction are problems, activation, demonstration, application, and integration. Figure 3 is the result of blended learning design, in blended learning teachers can upload lesson material, create project task information. Students can also comment on teacher-uploaded subject matter similar to a Facebook app. Besides, student with student, student with teacher can discuss each other through the discussion form (chat).

![Figure 3. Main page of Blended Course](image)

Tasks assigned by a teacher can be uploaded to the blended learning system, to be evaluated by teacher and to give the final assessment of each meeting, the figure 4 below is the result of teacher evaluation and progress of each student.

![Figure 4. Track student progress](image)
4. Conclusion
The focus of this study is mainly on how to design a supportive blended course as an attempt to transit from traditional (F2F) delivery methods to more advanced methods involving technology. It can be argued that designing a Blended learning is not as simple as combining an online environment with a F2F course. Beyond that basic integration, the selection of a best environment for implementation is also required.

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