A Study on the Flipped Learning Class Model in Use of MOOCs Service

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Abstract. Recently, flipped learning is attracting attention as an alternative for creative talent training. This study, accordingly, aims to examine flipped learning and design a class model in application of it. Based on the ADDIE model, the class model is designed to include the specific steps: the step of learning objective statement and analysis, the step of class strategy design and contents development, and class implementation and evaluation. The roles of each step are also discussed. A flipped learning class is to induce creative and active participation, not cramming education. To maximize the learning effect, the class should be individualized and student-centered. Based on the findings above, this study suggests to conduct a variety of quantitative and qualitative researches on the training and effectiveness of dedicated teachers for flipped learning classes so that flipped learning can be utilized in education fields more efficiently.

Keywords: Flipped Learning, MOOC, Smart Learning.

1   Introduction

As information technology advances, the channels of knowledge acquisition are more diversified than ever before. Critical thinking for creative application, problem-solving ability, communication skills, and cooperative work performance are required today. One-sided cramming education, however, is still a major feature of most contemporary education systems[1]. As an alternative for creative talent training and cost-saving at the same time, 'flipped learning (in classrooms)' is attracting attention. Flipped learning is a self-directed class method which requires students to acquire the necessary knowledge for themselves prior to the class and helps develop creativity during the class in such ways as exercise, application, discussion, etc. MOOC(Massive Open Online Course)[2] is one example. MOOC is an online open class for mutual-participative and massive education based on web-service. Prestigious universities in the U.S. such as MIT, Harvard University, and Stanford University all adopt MOOC as a way of online education experiment without exception. MOOCs services include Coursera[3], Khan Academy[4], Ted-Ed[5], Edx[6], Udacity[7], and so forth[8].

In addition to such websites, lectures of well-known universities in each country are presented domestically via the Internet free of charge, in a OCW(Open CourseWare) format[9]. Such OCW websites include MIT Open CourseWare of Massachusetts Institute of Technology and Harvard Open Courses of Harvard University. A large quantity of education materials available through such media as YouTube may also be utilized as resources for flipped learning. Thus, this study aims to develop a flipped learning class model in utilization of various Cloud materials with the ADDIE design model as the basis[10].

2   Design of a Flipped Learning Class Model

The teaching/learning design model for flipped learning consists of specific steps based on the ADDIE model: learning objective statement and analysis, class strategy design and contents selection, and class implementation and evaluation. The characteristics of each step and study methods applied are as follows:

2.1   Learning Objective Statement and Analysis

The step of learning objective statement and analysis is the beginning of flipped learning design. First of all, the learning objective is to be presented specifically and clearly.

As to learner analysis, whether the learner's computer literacy is enough for the class is to be analyzed first, and then possession of and access to learning tools also are to be analyzed in various ways. There would be little difficulty among learners in utilizing smart phones and the school would provide them with sufficient facilities even if individuals had no personal devices.

For the successful implementation of flipped learning, the ability and environment for prerequisite learning are a major element and thus they should be taken into consideration in the analysis step.

2.2   Design of Class Strategies and Development of Contents

The class contents are to be reorganized or newly selected specifically for flipped learning. the basic requirements include selection of the method for prerequisite learning, learning activities during the class, and class strategies for flipped learning.
There are a number of class materials available in the Cloud. The teacher may select the contents from the materials in the Cloud instead of making some for every class. It is noteworthy, however, that the contents need to reflect the learners' ability based on the learner analysis since the level of classes may differ depending on the school. When necessary, the teacher may have to make a 10 to 20 minute video clip or a text for himself. It is advantageous that MOOCs and OCWs make it possible to share class contents for each level with other schools.

2.3 Class Implementation and Evaluation

In flipped learning, learners are required to complete prerequisite learning, online or offline, prior to the class. They may sum up the points through preliminary classes or collect topics to discuss. The instructor presents problems in such ways as quiz and discussion topic based on the contents of prerequisite learning in the actual class. In the step of planning how to carry out assignments, learners collect data for discussions or exercises in each team and solve the problems. Once the problems are solved, each summarizes his own assignment points and presents them in the step of assignment implementation. The instructor may become an explorer for learners or direct the discussions so that learners can solve the problems for themselves. He may also provide appropriate feedbacks according to the level of learners that did not fulfill the class objective.

In the step of class implementation, the condition may be far from that in an ordinary, silent classroom. There needs to be a trained, professional teacher who can help learners develop creative thinking through free activities.

As for evaluation, the focus is to be on whether there have been supplementary or in-depth learning programs in addition to the preliminary learning. The valuation on the results of classes mainly touches whether the results fulfill the class objective. The evaluation process helps reflect on the implemented class and come up with improvements for future classes.

Lastly, whether the class objective has been fulfilled properly is confirmed based on the investigation on class procedures and results. When some problem is found, which of the steps of the flipped learning/teaching design caused the problem is to be analyzed to find out ways to enhance the class.

The components of each step of the flipped learning model examined above are presented in <Fig 1> below:

3 Conclusion & Suggestion

Recently, a process is in progress to found a theory that has been merely thought of. It has been common so far that a teacher teaches students sets of knowledge and understanding in the whole process from knowledge acquisition, understanding, application, analysis, generalization, and evaluation while students try to apply, analyze, generalize, and evaluate the steps at home according to individual capabilities. In most of the recent knowledge acquisition processes, however, a teacher is little involved. As a large quantity of excellent contents are available in Cloud and Big Data environments, teachers are asked to act as a coordinator and operate the system and help students develop and apply learned contents rather than deliver their own knowledge. In addition, the way of conducting classes also needs to be changed accordingly since the future society will expect the talents to apply learned contents creatively rather than merely acquiring knowledge.
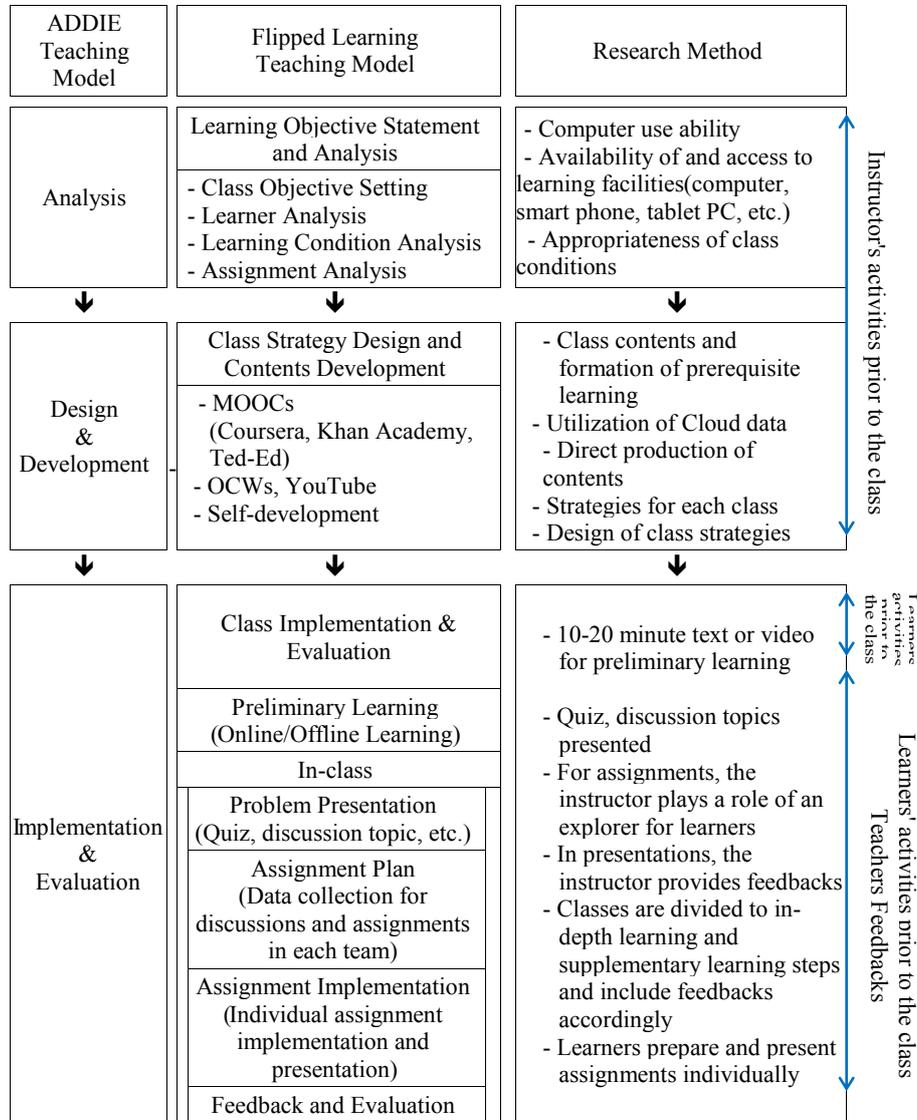
ADDIE Teaching Model	Flipped Learning Teaching Model	Research Method	
Analysis	**Learning Objective Statement and Analysis** - Class Objective Setting - Learner Analysis - Learning Condition Analysis - Assignment Analysis	- Computer use ability - Availability of and access to learning facilities(computer, smart phone, tablet PC, etc.) - Appropriateness of class conditions	Instructor's activities prior to the class
Design & Development	**Class Strategy Design and Contents Development** - MOOCs (Coursera, Khan Academy, Ted-Ed) - OCWs, YouTube - Self-development	- Class contents and formation of prerequisite learning - Utilization of Cloud data - Direct production of contents - Strategies for each class - Design of class strategies	
Implementation & Evaluation	**Class Implementation & Evaluation** Preliminary Learning (Online/Offline Learning) In-class Problem Presentation (Quiz, discussion topic, etc.) Assignment Plan (Data collection for discussions and assignments in each team) Assignment Implementation (Individual assignment implementation and presentation) Feedback and Evaluation	- 10-20 minute text or video for preliminary learning - Quiz, discussion topics presented - For assignments, the instructor plays a role of an explorer for learners - In presentations, the instructor provides feedbacks - Classes are divided to in-depth learning and supplementary learning steps and include feedbacks accordingly - Learners prepare and present assignments individually	Learners activities prior to the class / Learners' activities prior to the class Teachers Feedbacks

Fig. 1. Flipped Learning Class Model

MOOC and OCW services are examples in this regard. To make use of such services, the classes are changing in a way that adopts flipped learning. Accordingly, this study is to investigate the flipped learning class model that utilizes materials available in a Cloud environment.

For flipped learning to be properly utilized in classes, the following suggestions should be taken into consideration:

First, flipped learning classes should be conducted in a way that maximizes creativity and efficiency rather than merely apply cramming methods of teaching. Since prerequisite learning precedes the main class, learners' understanding of class materials is enhanced. In addition, the effects of a class are maximized since flipped learning facilitates communication with the teacher and among classmates as well as self-directed learning.

Second, a flipped learning method needs to be utilized in a way of student-centered individualized classes to maximize the learning effects. Students are to be provided with environments where they can learn better, and those who need supplementary help are to be given individual feedbacks and opportunities of group discussion. The key factor is the teacher's role. A teacher needs to provide feedbacks constantly in discussions and presentations so that learners can enhance their performance through such interactions.

Third, a number of studies are to be involved in the class design of flipped learning. Since this teaching method is still in its early stage, there are few studies on flipped learning. To take advantage of flipped learning more efficiently, diversified quantitative and qualitative studies on effectiveness should be conducted. In addition to that, more quality video materials are to be developed and shared so that learners can utilize them in flipped learning.

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