Advanced Science and Technology Letters
Vol.63 (NGCIT 2014), pp.107-111
http://dx.doi.org/10.14257/astl.2014.63.22

Analysis of Effectiveness of Flipped Classroom based on Smart Learning

Sang Hong Kim[1], Nam Hun Park[2], Kil Hong Joo[3*]

[1,3] Dept. of Computer Education, Gyeongin National University of Education, Korea
[2] Dept. of Computer Science, Anyang University, Korea
[1] bestteacher@gmail.com, [2] nmhnpark@anyang.ac.kr, [3] khjoo@ginue.ac.kr

Abstract. In the Flipped classroom based on smart-learning, the participants studied at home in advance with materials made by their teachers. Then, in class, they searched data instantly by using smart pads, used applications for learning or as a tool, and conducted online evaluation, etc. The normal flipped learning-based education group studied at home in advance with videos made by their teachers and, in class, they were instructed to focus on knowledge sharing among themselves and discussions. As a result, Collaborative learning ability and information use ability were found to be more improved with statistical significance in the smart-based flipped learning group than the other groups.

Keywords: Flipped learning, Smart learning, Collaboration ability, Information use ability

1 Introduction

A flipped learning-type class can be a solution to those problems above. Normally, we cannot say learning is being made just because a teacher teaches students in a knowledge delivering manner. However, in the flipped learning-type class, students can internalize knowledge as they are to preview the basic related ideas outside the school via videos and conduct diverse in-class activities such as discussion, collaboration, quiz, project, etc. Students can change tacit knowledge into explicit knowledge through peer instruction. Tacit knowledge refers to the kind of knowledge that is not expressed in a certain form but just accumulated through experience and learning. Such knowledge can be expressed in a certain format through peer instruction among diverse interaction between students. Also, while students express in speech or writing their knowledge obtained through the video, they organize and systemize the knowledge to initiate learning.

This kind of study has yet to be much frequent in South Korea. Whereas studies on the relationship between flipped learning and classes have been active abroad. From elementary school level to high school level, studies have examined the effects of flipped learning on study achievement, the effect of individualized education and

* Corresponding Author

ISSN: 2287-1233 ASTL

teachers′ satisfaction level (Baker, Celia, 2012; Bergmann, J. & Sams, A., 2012). In South Korea, there have been some studies on the effect or method of flipped learning at a high school level but studies at the elementary school level are far less than sufficient.

In this situation the present study, based on the foresaid theoretical background that the flipped learning-based education in elementary schools with a smart educational environment would have an effect on students′ collaborative ability, self-directed learning ability and study achievement, the following research themes have been identified.

2 Theoretical Background

Flipped learning educational models have garners increasing attention from teachers and researchers. The KERIS′ Smart Education Global Trend Vol. 2013 no. 17 defined flipped learning as follows (KERIS, 2013a). Flipped learning refers to flip around the conventional ways of education in order for students to listen to their teacher-generated lectures at home and participate in learning activities in class such as discussion, quiz, project, etc. to solve their tasks. The educational method turns teachers from a knowledge messenger to facilitator and is based on the thought that students′ learning takes place through their school project activities as well as discussions and debates with their colleagues, etc. With the rising personal smart device penetration in the smart education field, more smart devices are applied to teaching-learning process.

According to ″A Review of Flipped Learning (2013)″ issued by the Flipped Learning Network, the flipped learning is divided into 4 large pillars. First, flipped learning requires a flexible environment. In other words, teachers should accept it even though their class goes sometimes very confusing and noisy. And teachers need to establish a proper evaluation system to measure the level of understanding in a meaningful manner objectively for both students and teachers. Second, flipped learning requires changes in the learning culture. These classes seek to provide affluent opportunities for students to explore study themes deeper. By doing so, they try to transform the teacher-oriented class into student-oriented class intentionally. Knowledge is built by students themselves when they proactively participate and evaluate their own learning status in a meaningful manner. In addition, this teaching method supports students to examine deeper about a theme instead of challenging too many things, so that they can reach their potential development level in own zone of proximal development or, own level of preparation or areas (Vigotsky, 1978). Third, flipped learning demands intentional contents. Teachers should adopt diversified educational methods according to school years and themes such as proactive learning strategy, peer instruction method, problem-based learning or Socrates-style conversation method. In order to maximize learning with such different methods, intentional contents are used. It should be well understood that teacher-centered educational approach, if continued, would produce no gain. Forth, flipped learning

demands specialized teachers. Some critics say the preview videos would replace the main education after all. But it is not right. In such classes, teachers play a more important role than they do in unilateral lecturing while making more frequent communication with students by group or by person. In this educational system, teachers should maximize their time to contact students according to individual level, group level and performance level. They are required to be more than teachers who just watch what students are doing. Instead, teachers need to provide feedback appropriate for each moment of their watch of children continuously in class. Also, when sharing a video lecture, they need to make comments to generate rich interaction among the learners including those in their classes and beyond.

3 Research results and interpretation

This study analyzed if there had been any significant difference in collaboration ability according to the flipped learning methods (smart-based flipped learning, normal flipped learning, and conventional learning method). As a result, the average was 4.52, 4.14 and 3.63, respectively. The one-way ANOVA results shows statistically significant differences ($F=17.077$, $p<.05$).
And as a result of the post-test results of the collaboration ability averages, as in <Table 6>, no statistical difference was found depending upon the flipped learning types but statistically significant differences were found between the flipped learning types and ICT-using classes.

As shown in the results of <Table 1>, depending upon the types of flipped learning, no statistically significant results were found in collaboration ability. This finding indicates that in the flipped learning classes, students had more opportunities to express their thoughts in speeches or writing, became able to make themselves clearer to friends while carefully listening to others′ opinions for interaction and better understanding of the meaning behind and came to share the necessary knowledge, skills, etc. for the achievement of the team goals.

Table 1. Scheffé test results of collaboration ability according to flipped learning methods

	Smart flipped learning	*normal flipped learning*	*ICT-using class*
smart-based flipped learning(M=4.49)	-	.117	.000***
normal flipped learning(M=3.94)		-	.007**
ICT-using class(M=3.65)			-

**p<.01

This study seeks to examine the effects of the smart-based flipped learning and normal flipped learning and conventional ICT-using classes on learners′ study achievement, self-directed learning, collaboration ability, and information use ability. Based on these study findings, the following discussion can be made: the flipped

learning activities were found to increase students′ collaboration ability. No difference in collaboration ability was found according to the types of flipped learning activities whereas differences were found between smart-based flipped learning and conventional ICT-using class as well as between normal flipped learning and conventional ICT-using class. This cannot be said it′s thanks to the smart education but it′s the effect of the flipped learning. It is of course, true that the smart education does help increase opportunities of students′ opinion expression or online collaboration activities but in the flipped learning, student collaboration increases during activities such as group-specific quiz, discussion, debate and project tasks. That is, students can find more opportunities to express own opinions in speeches or writing through peer instruction to make themselves clearer to friends while listening to others′ opinions carefully to grasp the meaning inside through interaction and came able to share knowledge and skills necessary to achieve their team goals. Such a series of activities are deemed to have promoted students′ collaboration ability. In the flipped learning, competitive study or individual study strategies can be applied to a certain limited extent but generally it organizes all classes collectively by the unit of small groups to perform activities regarding study themes and practices. Knowledge creation, the basis for collaborative study, is formed through the dynamic interaction between collaborative knowledge creation and individual knowledge creation. The former and the latter are deemed to be in a paralleled relationship (Kang & Byun, 2001; Sthal. 2000)′. Through such a process, students experience the process of making and listening to a public statement of their tacit knowledge to undergo the argumentation phase and share understanding and create collaborative knowledge in order to objectify and formalize their knowledge (Heebae Kim, 2013).

Acknowledgement. This research was supported by Basic Science Research Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Education, Science Technology(NRF-2011-0025300 and NRF-2014R1A1A1008524).

References

1. Bak Seon ah, (A) study on the development of collaborative knowledge construction precedural model in blended learning, Graduate School of Hanyang Univ, (2011)
2. Bang SeonHee, A Study on Strategies of Self-directed Learning to Promote Smart Learning, The
3. Journal of Korean Society for the study of Lifelong Education, 8(1), 93-112, (2012)
4. Bergmann, J. & Sams, A. Flip Your Classroom: Reach Every Student in Every Class Every Day. International Society for Technology in Education, (2012)

5. Han JungSun, Kim Dong Sik, The Effects of Collaboration Supporting Types on Collaborative Knowledge Construction in CSCL Environment. The Journal of Korean Association for Information & Media, 15(4), 203-229, (2009)
6. Research on Developing Instructional Design Models for Flipped Learning, The Journal of Korean Society of Disital Policy & Management, 11(12), 83-92, (2014).
7. Olmscheid & Carey, The Efectivenes of Peer Tutoring in the Elementary Grades, EDEL 695 CSU Long Beach. (1999)
8. Sugata Mitra & Ritu Dangwal, Limits to self-organising systems of learning—the Kalikuppam experiment, Volume 41, Issue 5, pages 672–688 (2010)

