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Effects of Digital Flipped Classroom Teaching Method Integrated Cooperative Learning Model on Learning Motivation and Outcome

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ABSTRACT

Along with the time change and promotion of 12-year compulsory education, traditional didactic instruction can no longer satisfy all students. The reform wave in education is therefore emerged in past years, where the "flipped classroom" model strikes a chord and becomes a trend. Applying nonequivalent pretest posttest control group design to the experimental research, 242 students of Xuchang University in Henan Province are proceeded the 2×2 experiment integrating flipped classroom teaching method with cooperative learning for 15 weeks, 3hrs per week. The research results show significant effects of 1. flipped classroom teaching method on learning motivation, 2. flipped classroom teaching method on learning outcome, 3. cooperative learning on learning motivation, 4. cooperative learning on learning outcome, 5. flipped classroom teaching method integrated cooperative learning on the promotion of learning motivation, and 6. flipped classroom teaching method integrated cooperative learning on the promotion of learning outcome. Finally, suggestions are proposed according to the results, expecting to assist domestic education in promoting students' learning motivation and outcome as well as teaching methods.

Keywords: flipped classroom teaching method, cooperative learning, learning motivation, learning outcome

INTRODUCTION

In the past decade, new innovation and improvement emerged in the field of information technology. The emergence of network, cheaper storage space, advanced computer efficacy, new equipment, e.g. smart phones and tablet PC, and the breakthrough of other mobile devices explained the provision of new digital experience for students and led the new generation to change the daily life and learning habits. Students in the millennial depend more on information technology and reduce the tolerance of didactic teaching styles. In other words, students appear distinct needs and expectation on education systems that the way of thinking should be changed. In such a situation, above technological tools allow people thinking about education from the beginning and change the past habitual and inherent ideas. Such a thought needs to be changed from traditional teachers' teaching and learning to students' active learning and help students more actively participate in learning. Individualized instruction is required for students' adaptive learning in modern education. Nonetheless, teachers could hardly satisfy each student's needs in school education, due to teaching time and schedule. Generally, a teacher could merely teach students with the average standards. Some low-achievement students present low learning motivation and appear helplessness to become "guests" in the class. On the other hand, those with excellent academic performance might be familiar with most contents in textbooks to become "systematically demotivated" as they consider the lessons in classes being too easy.

As a result, differentiated instruction should be practiced in classes in order to achieve each child. In this case, teachers, when designing lessons, should change the traditional didactic instruction model according to the characteristics of subjects and students' characters and differences, induce students' active learning, and cultivate the transferable skills and applicable knowledge. In comparison with other learning methods, flipped classroom teaching method is student-centered and can better induce students applying the learned knowledge to high-level

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Contribution of this paper to the literature

- Teachers could guide students, in classes, how to learn by viewing films to cultivate students' reading, thinking, and comprehension abilities step by step, and then increase the length of films.
- Teachers could make suitable teaching films for low-, medium-, and high-level students. Different films emphasize suitable points for students so that each student could understand the lesson contents before classes and reduce the learning load in classes.
- For long-term team cooperative learning, the team members could be regularly changed so that students have more interaction and learning opportunities.

thinking. The application of flipped classroom teaching method could help students understand the learning conditions, create student-centered learning environments, and provide opportunities for students cultivating learning motivation. Accordingly, the effect of digital flipped classroom teaching method integrated cooperative learning model on learning motivation and outcome is discussed in this study in order to achieve the outcome of flipped classroom instruction and allow students being more successful.

LITERATURE AND HYPOTHESIS

Flipped Classroom Teaching Method

Baytiyeh (2017) described flipped classroom as a relatively new education model, mainly focused on student-centered instruction. Things done in traditional classes, e.g. didactic instruction, were transferred to homework, and traditional homework and program activity were transferred into class activity. In this case, students had to view teaching films at home and do homework in classes, with the assistance of classmates and the guidance of teachers (Kim et al., 2015). Chen, Wang, Kinshuk, and Chen (2014) advocated four major points of flipped classroom that FLIP was the flexible environment, could benefit the creation of meaningful learning culture, could achieve intentional content, and require professional educators' growth. Flipped classroom was initiated by two senior high school teachers in 2007. Both of them recorded the class contents and explained that absent students could catch up with other classmates. Video software and PowerPoint were used for recording lessons, allowing students downloading through YouTube. Later on, they observed surprising changes in the class activity that both absent students and others would learn with recorded films (Moran & Milsom, 2015). The process helped them comprehend and guide students' learning and assignments as well as changed the role of teacher. Now, they do not simply concentrate on lecturing, but start to observe students in groups and make sure of the students who required more explanations and guidance (Dass, Head, & Rushton, 2015). Being a learning model, flipped classroom induced a lot of concerns of Salman Khan, who promoted the idea through TED speeches (Sletten, 2017) and provided more teaching films of subjects. Under fixed curricula, students were taught to view lesson films at home and do homework in schools (Flynn, 2015). Subject teaching films now have become the major resource for teachers practicing flipped classroom; teachers do not need to make teaching films, but make plans to practice flipped classroom with the assistance of such films (Rui et al., 2017). Resources similar to flipped classroom teaching method in domestic education platforms freely provide "equal and excellent" education opportunities (lessons) for each person through cloud platform (Hsu et al., 2016). Flipped classroom releases the time in classrooms and present potential and extraordinary learning methods to enhance students' application of learned knowledge and high-level thinking. Wanner and Palmer (2015) indicated that teachers, in the learning activity, enhanced students applying learned knowledge through practice, making plans, discussion, and problem solving and students could control the learning steps and be responsible for the learning processes.

Cooperative Learning

Choi, Hand, and Norton-Meier (2014) mentioned that cooperative learning boomed since 1970; cooperative learning referred to more than two people achieving the common learning goals through mutual interaction and assistance as well as responsible sharing. The cooperation aimed to develop the effect of 1+1>2. The basic concept of "team cooperative learning" was that students were willing to see the team successfully achieving the learning goals, would encourage other classmates to pursue excellent performance, and even assist other classmates in the realization. Cooperative learning was a kind of group learning to enhance the learning outcome of individuals and other members in the team (Kong, 2015). In the cooperative learning environment, the teaching model appeared major changes from "teacher centered" to "student centered"; teachers were learning guides, while students were active learners (Huang & Hong, 2016). In this case, cooperative learning was a structured and systematic teaching strategy to precede learning with heterogeneous grouping, team discussion and interaction, and peer assistance and to cultivate students more cooperation skills to achieve common learning goals. Cooperative learning was not

a single teaching strategy, but all teaching strategies for enhancing team cooperation and student interaction (Baepler, Walker, & Driessen, 2014). In comparison with competitive learning or individual learning, it could better promote students' learning motivation, learning outcome, and cooperation skills and was a teaching strategy worth of application to instruction (Sarantos, 2016). Nichols, Gillies, and Hedberg (2016) pointed out cooperative learning as the teaching method to enhance individual and team members' learning with team grouping, but not to have students chat together but do individual assignments, not to independently complete assignments but have others sign the names, nor to complete assignments individually and then help slower ones. Demirbag and Gunel (2014) regarded cooperative learning as a structured and systematic teaching strategy; in cooperative learning, teachers allocated 4-6 students with different capabilities in a heterogeneous team to learn together, share experiences in the same team, and accept affirmation and rewards. Accordingly, cooperative learning was the learner-centered learning process; each member in the team was responsible for the performance (Porcaro, Jackson, McLaughlin, & O'Malley, 2016). Regarding the learning environment, a teacher had to face many students and could not take care of individual development. Cooperative learning therefore had team members cooperate with each and mutually support for learning as well as created team contests to enhance learning motivation (Wang, Guo, & Jou, 2015). Gilboy, Heinerichs, and Pazzaglia (2015) emphasized that cooperative learning allowed students working together to achieve common goals which were beneficial to oneself as well as others.

Learning Motivation

Lin et al. (2017) regarded motivation as the essential condition for individuals proceeding long-term effective and meaningful learning. Learning motivation was a kind of motivation. Clark (2015) pointed out motivation to learn as the psychological process to induce students' learning, maintain learning, and have the learning activity approach to the goal set by teachers. González-Gómez, Jeong, Airado Rodríguez, and Cañada-Cañada (2016) regarded learning motivation as the inner belief in leading individual learning goals, inducing learning behavior and continuous efforts, reinforcing cognition process, and enhancing and improving learning results. Demircioglu and Ucar (2015) proposed that learning motivation was the psychological factor in encouraging students' learning activity. It was an internal drive directly promoting students' learning as well as the initiation and awakening of learning behavior. According to the value-expectation model proposed by Hwang and Tsai (2015), it is considered in this study that ability belief, expectation of success, and work value are the key factors of learning motivation in students' self-adjustment learning process. Ability belief refers to students' perceived personal capability when engaging in learning. Expectation of success refers to students' expectation of personal success in the learning. Such expectation is efficacy expectation, not outcome expectancies, i.e. learners' perceived learning performance and selection, rather than expected results. Learning motivation is a mediator between stimuli and responses. That is, learning motivation is a learner's personal opinions, and learners would appear distinct knowledge needs because of different opinions. According to the research of Chen, Hand, and Park (2016), students' learning motivation is measured with single dimensions in this study, including in favor of challenging lessons and regarding learning as interests, hobby, others' affirmation, acquisition of better performance, passing examinations or evaluation, showing off to others, competing with classmates, acquiring appreciation and notice from the elderly or the opposite gender, not being punished and blamed, not having the shame of failure, and getting into ideal schools in the future.

Learning Outcome

Learning outcome is generally regarded as various evaluations of learners' completion of certain learning activity and the achievement of learning activity to the expected effect (Fakari et al., 2015), i.e. the changes of learners' knowledge, skills and behaviors, and attitudes after the end of instruction (Novak, Kensington-Miller, & Evans, 2017). Chen et al. (2016) indicated that learning outcome, an indicator to evaluate students' learning outcome and teaching quality, would be affected by curriculum design, teaching methods, and learning behaviors. Students' learning aimed to monitor self-learning, reflect learned knowledge, and learn to learn that learning outcome was the most direct presentation of learning results. Students' learning results was one of major indicators to measure learning outcome as well as the main item to evaluate teaching quality (Joanne & Lateef, 2014). For this reason, outcome also aimed to test the achievement of learning or teaching goals and could be revised for the reference of next curriculum improvement. Makransky et al. (2016) regarded it as students' affirmation of personal learning ability in the teachers' teaching processes. Learning outcome was the guidance to measure instructors' results and teaching quality as well as the indicator of learners' learning results. Cohen (2016) pointed it out as the indicator to evaluate students' learning results and the major item to evaluate teaching quality. Learning outcome would be affected by curriculum design, teaching methods, and learning behaviors. Students' learning aimed to monitor self-learning, reflect learned knowledge, and learn to learn that learning outcome was the most direct presentation of learning results. According to Hsu et al. (2015), learning outcome is measured with single dimensions in this study, covering test performance, time for schedule completion, and term scores.

Research Hypothesis

Chen et al. (2015) flipped 53 students majoring in statistics, largely reduced the time for lecturing, and increased the proportion of interaction in classes. Online reading test was preceded before each class to encourage students completing reading assignment as well as encourage students searching network resources to respond to the questions on reading. Traditional lecturing is reduced to the least, and knowledge delivery occurred outside classrooms to successfully enhance students' learning motivation and outcomes. Baytiyeh (2017) indicated that students, in flipped classrooms, had to complete knowledge learning before the class and proceed cooperative learning with teachers and classmates in schools (Sletten, 2017) that a class became the place for the interaction between teachers and students and among students. Lin et al. (2017) mentioned that students could enhance the learning interests by the mutual teaching among students in classes to enhance the absorption and internalization of knowledge, i.e. enhancing students' learning interests through cooperation among students. The following hypothesis is therefore proposed in this study.

H1: Flipped classroom teaching method presents significant effects on learning motivation.

Chen et al. (2014) flipped the problem-solving activity of didactic instruction (e.g. team practice and computer simulation) and enhanced several interactive activities (e.g. responding to tests with the real-time response system of Clicker). Both two positive lessons combined flipped and mixed learning (Clark, 2015). Two flipped/mixed lessons had students' learning performance exceed the performance with traditional didactic methods. Besides, students with flipped lessons presented higher satisfaction in the learning process. González-Gómez et al. (2016) discovered that most students presented skills required for lessons and showed affirmation to flipped learning; peer learning and structured learning activity obviously enhanced the test of learning outcome. Hwang and Tsai (2015) provided specific methods for readers' reference through flipped classroom and understood that flipped classroom could reduce the time for teachers interpreting knowledge to increase more time for explaining students' learning problems. It would enhance teaching efficacy as well as promote students' learning outcome. Accordingly, the following hypothesis is proposed in this study.

H2: Flipped classroom teaching method shows remarkable effects on learning outcome.

Chen et al. (2016) indicated that the popularity of tablet devices in higher education allowed instruction tending to students previewing at home. In this case, students could achieve better learning effects with the learning speed and the class time could be saved for further dialogues and interaction. Such a dialogue and interaction method was a kind of cooperative learning. Nichols et al. (2016) indicated that, under many research results and analyses of cooperative learning, the application to math teaching could enhance students' learning achievement and interests, and students could more actively learn and face problems as well as enhance the learning motivation of math. Regardless the cooperative learning with teachers or peers, it could be observed in education sites that students were gradually interested in learning (Huang & Hong, 2016). As a result, a lot of teachers started to flip the classroom, especially cooperative learning, to enhance students' learning motivation and not to escape from learning (Gilboy et al., 2015). The following research hypothesis is further proposed in this study.

H3: Cooperative learning reveals notable effects on learning motivation.

Makransky et al. (2016) stated that students were emphasized as the learning body in the cooperative learning process to collect data, study problems, and further solve problems according to students' problems. It was the idea to stress on active learning (Demirbag & Gunel, 2014), where students had opportunities to enhance learning effects with learned knowledge and skills through discussion with classmates in the same teams, manual operation, or teaching others in the class. Cohen (2016) pointed out the content of cooperative learning as students organizing and analyzing problems through classmate discussion. Hsu et al. (2015) explained cooperative learning as teachers indirectly helping and guiding students and inducing peers' active participation and interaction. Students' intrinsic learning motivation could be induced in interpersonal interaction. Mutually encouragement among peers in classrooms was the largest push of learning motivation to enhance learning outcome. Accordingly, the following hypotheses are proposed in this study.

H4: Cooperative learning appears significant effects on learning outcome.

H5: Flipped classroom teaching method integrated cooperative learning presents remarkable effects on the promotion of learning motivation.

H6: Flipped classroom teaching method integrated cooperative learning shows notable effects on the promotion of learning outcome.

Table 1. Difference analysis of flipped classroom teaching method

Variable		F	P	Scheffe post hoc
Flipped Classroom Teaching Method	Learning Motivation	9.632	0.000**	flipped classroom teaching method>traditional didactic instruction
	Learning Outcome	10.153	0.000**	flipped classroom teaching method>traditional didactic instruction

* stands for p<0.05, ** for p<0.01

Table 2. Difference analysis of flipped classroom teaching method

Variable		F	P	Scheffe post hoc
Cooperative Learning	Learning Motivation	8.768	0.000**	cooperative learning>traditional didactic instruction
	Learning Outcome	9.526	0.000**	cooperative learning>traditional didactic instruction

* stands for p<0.05, ** for p<0.01

RESEARCH METHOD

Research Object and Research Design

To effectively achieve the research objective and test research hypotheses, nonequivalent pretest posttest control group design is utilized for the experimental research in this study. Total 242 students of Xuchang University in Henan Province, as the research object, are proceeded flipped classroom teaching method integrated cooperative learning2╳2 experiment. The experiment is grouped cooperative learning (cooperative learning, traditional didactic instruction) ╳flipped classroom teaching method (flipped classroom teaching method, traditional didactic instruction) for the 15-week (3hrs per week) experimental instruction.

Analysis Method

Analysis of Variance is applied in this study to discuss the effects of flipped classroom teaching method and cooperative learning on learning motivation and learning outcome and further understand the effects of flipped classroom teaching method integrated cooperative learning on learning motivation and learning outcome.

RESULT AND ANALYSIS

Difference Analysis of Flipped Classroom Teaching Method in Learning Motivation and Learning Outcome

According to Analysis of Variance, the difference of flipped classroom teaching method in learning motivation and learning outcome is discussed. Flipped classroom teaching method appears significant differences from traditional didactic instruction in learning motivation and learning outcome which are higher with flipped classroom teaching method than with traditional didactic instruction that H1 and H2 are supported.

Difference Analysis of Cooperative Learning in Learning Motivation and Learning Outcome

According to Analysis of Variance, the difference of cooperative learning in learning motivation and learning outcome is discussed. From **Table 2**, cooperative learning shows remarkable difference from traditional didactic instruction in learning motivation and learning outcome, which are higher with cooperative learning than with traditional didactic instruction that H3 and H4 are supported.

Effect Analysis of Flipped Classroom Teaching Method Integrated Cooperative Learning

According to Analysis of Variance, the difference of flipped classroom teaching method integrated cooperative learning in learning motivation and learning outcome is discussion. With Two-way Analysis of Variance, the interaction of flipped classroom teaching method and cooperative learning is used for testing the promotion of learning motivation and learning outcome. From **Table 3**, both learning motivation and learning outcome appear the highest on flipped classroom teaching method integrated cooperative learning that H5 and H6 are supported.

Table 3. Difference analysis of flipped classroom teaching method integrated cooperative learning in learning motivation and learning outcome

Variable	Learning motivation			Learning outcome		
	F	P	Scheffe post hoc	F	P	Scheffe post hoc
Flipped Classroom Teaching Method	9.632	0.000**	flipped classroom teaching method>traditional didactic instruction	10.153	0.000**	flipped classroom teaching method>traditional didactic instruction
Cooperative Learning	8.768	0.000**	cooperative learning>traditional didactic instruction	9.526	0.000**	cooperative learning>traditional didactic instruction
Flipped classroom teaching method*Cooperative learning	16.733	0.000**	11>21>12>22	19.275	0.000**	11>21>12>22

* stands for p<0.05, ** for p<0.01

CONCLUSION

This experimental research discusses the effect of flipped classroom teaching method integrated cooperative learning on students' learning motivation and learning outcome. The results reveal that, in comparison with traditional didactic instruction, almost all students are in favor of flipped classroom instruction and completing homework in class activity. Students would actively ask questions when encountering difficulties in classes and express personal opinions in the interaction process; classmates with better capabilities would actively help lower-level classmates so that almost all students participate in the class activity. Flipped classroom teaching method allows students preview lessons before classes to reduce students' pressure of direct lessons in traditional learning. The class activity enhance students' reading, thinking, and comprehension opportunities, teachers merely need to timely provide guidance to reduce the load, and students enhance the learning motivation and efficiency in the practical learning. Flipped classroom could cultivate children' attitudes towards autonomous learning, induce children's learning motivation, and allow teachers' individualized instruction to further enhance learning outcome. Teachers are the success key in flipped classroom. When teachers are willing to make changes, the new appearance of education would be seen. Nevertheless, flipped classroom might spend more time than traditional didactic instruction that teachers' curriculum design and preparation are important. Detailed lesson plans before classes allow smooth lessons and easy achievement of teaching goals. Cooperative learning could have instruction become diversified, and students could enhance the lesson participation and learning interests to promote learning outcome through peers and teacher-student interaction. The key success factors in cooperative learning include teachers' teaching preparation and activity design, mutual dependency among team members, and skilled interpersonal interaction skills. For this reason, teachers have to stress on class management and students' good interaction and harmonious atmosphere in class to assist in proceeding cooperative learning.

SUGGESTION

According to research conclusions, the following suggestions are proposed in this study.

1. It has been the difficulty in the practice of flipped classroom teaching method to confirm that students really seriously view teaching films before classes. Even though such students really view teaching films, they would not necessarily learn the points. It is therefore suggested that the practice of flipped classroom teaching method is the earlier the best. Teaching films with shorter time could be selected in this beginning; meanwhile, teachers could guide students, in classes, how to learn by viewing films to cultivate students' reading, thinking, and comprehension abilities step by step, and then increase the length of films.
2. Teachers could make suitable teaching films for low-, medium-, and high-level students. Different films emphasize suitable points for students so that each student could understand the lesson contents before classes and reduce the learning load in classes. Even though the teaching films are existing ones on the Internet, the films could be post-produced for different-level students paying attention to the learning points. It is expected to reduce the drawbacks of traditional flipped classroom instruction, but merely few high-level students would learn with teaching films before classes.
3. For long-term team cooperative learning, the team members could be regularly changed so that students have more interaction and learning opportunities. When guiding discussions, teachers could participate in team discussion when necessary to thoroughly understand students' learning conditions and have high-

level students lead low-level students' learning. It could assist in the practice of flipped classroom teaching method integrated cooperative learning.

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