



The Effect of Teachers' Instructional Skill on Student Achievement- Focusing on Social Learning Theory

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Abstract

Background/Objectives: The purpose of this quantitative study is to investigate the effect of teacher's instructional skill on student's achievement. Researchers set the research question: does the teacher's instructional skill affect student's achievement in mathematics? **Methods/Statistical analysis:** This research had conducted through two semesters in one urban elementary school. Student's state standards test score was collected in order to be compared according to the teacher's instructional level. The analysis of covariance was used for the method of this quantitative research. **Findings:** Mean change of students achievement in low instruction was from 210.41 to 221.82, so there was a mean difference of 11.41. In addition, mean change of students achievement in high instruction was from 210.12 to 225.47, so there was a mean difference of 15.35. Also, there was a statistically significant difference between groups after controlling the effect of pre-test. **Improvements/Applications:** Students in high quality of instruction class showed better achievement than those in low instruction class. Based on research findings, discussions and recommendations were provided for the future research.

Index Terms

Curriculum development, Instruction, mathematics, social learning theory, student achievement.

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I. INTRODUCTION

Mathematics education in the U.S. is in need of improvement. Researchers have examined how mathematics is taught in U.S. schools and how students learn best. For example, teachers' low level of content knowledge is often associated with low quality of instruction and thus students' low academic achievement and mathematical aptitude [1]. Researchers maintain that teachers should develop their contents knowledge as well as pedagogical content knowledge. There is also the opinion based on the learning theory how people can develop student's mathematical thinking. In the case of constructivist learning theory, learning with understanding, which is a complex and dynamic state where a student connects one's prior knowledge to other related knowledge is suggested [2]. In addition, there is the learning theory to have people's attention. It is social learning theory. The point of the theory is that teacher's good demonstrations in mathematics instruction influence student's achievement positively.

The effect of social learning theory has been emphasized in the field of mathematics. However, prior findings were based on student's qualitative responses instead of showing the actual description from the result of tests. If the teacher has high instruction skill, their students can show better achievement than those in lower instruction class. For the reason, we would like to examine the quantitative effect of the teacher's instructional skill on student's achievement in mathematics.

II. BACKGROUND INFORMATION

A. Social learning theory

Bandura (1977) stated that learning is not easy if people relied on the effects of their actions to order them what to do [3]. However, people tend to learn observationally through modeling. Bandura's theory explains human behavior as interaction among cognitive, affective, and behavioral influences.

Autere (2005) summarized the component processes of attention, retention, motor reproduction, and motivation [4]. First, attentional process is the first component of learning. People learn much through observation and perceive accurately the significant characteristics of the modeled behavior. For example, learners have to attend to what the person is doing to reproduce the person's behavior [5]. The second component is retention process. People must code the characteristics and information into long-term memory to reproduce the modeled behavior. Observational learning relies on the

representational mechanisms of imaginal and verbal. Through the two systems and repeated exposure, people eventually make retrievable behaviors and images of modeled performances. The third component is motor reproduction. This process makes symbolic representations into actions [3]. People can achieve behavioral reproduction by organizing their responses temporally with the modeled patterns. This process enables the observer reproduce the model's behavior. If a person learns through attention and retention, the observer can reproduce the act. The final process is motivational process. People tend to adapt modeled act if it causes results they value [6].

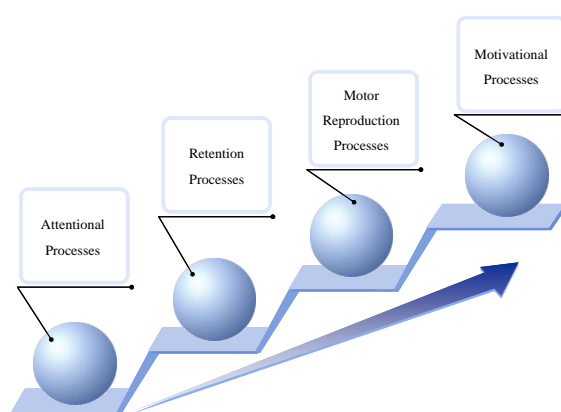


Fig. 1. Component processes in social learning theory.

B. Social learning theory and students' achievement

Researchers report the relationship between the social learning theory and the student's achievement in mathematics. According to Ormrod (1999), many human activities can be learned through modeling [7]. Students observe their parents read. They watch someone else's demonstration of mathematics problems. As children become more aggressive when they observe violent situation, students' achievement in mathematics can be advanced if they watch the teacher's good demonstrations. In addition, Wells-Wilbon and Holland (2001) reported in their research that students acknowledged that the role model teachers who make them feel good taught them academic subjects very well and the instruction was helpful [8].

III. RESEARCH DESIGN

A. Research Questions

The purpose of this quantitative study is to investigate the effect of teacher's instructional skill

on student’s achievement. The research question is:

Does the teacher’s instructional skill affect student’s achievement in mathematics?

B. Context

This research had conducted through two semesters in one urban elementary school. The team of university professors has instructed elementary teachers how to deliver mathematical knowledge to elementary students variously. Because teachers were instructed as above, most teachers’ instruction showed roughly high level at the end of this research.

C. Participant

All the people in this study belong to the one urban elementary school. Students in the class were already divided by the grade. The participating teachers and students were given anonymity to protect their identity.

D. Data Sources

First of all, 14 teachers’ instructions were observed during 2 semesters. Observations took place in the classroom. Observations were conducted after the teacher gave the permission. Average observation time was between 3/4 and 1 hour. The atmosphere in the classroom was relaxed. Observation scoring sheets were used in order to analyze. Observation scoring sheets were prepared in order to figure out the teacher’s instructional level and scales. All data collected have been kept in a locked file cabinet which is located within a secure office.

Second, student’s state standards test score were collected in order to be compared according to the teacher’s instructional level.

E. Data Analysis

At the end of second semester, two teachers were randomly selected; a teacher in the low instructional group and a teacher in the high instructional skill group. Then students’ state standards score were examined. First semester’s achievement was used as a pre-test result and second semester’s achievement was used as a post-test result. That is why students take the state standards test at the beginning of the semester in the case of first semester. The possibility for students to be influenced by the teacher who participated in this research is not high, so the first semester’s score was used as a pre-test result.

The analysis of covariance (ANCOVA) was used for the method of this quantitative research. The main purpose of ANCOVA is statistical control of

variability. ANCOVA tests can explain an effect after removing the variance for which quantitative covariates account [9]. The pre-test achievement that might have an effect on the post-test was used as a covariate.

F. Research Limitations

The findings and conclusions in this study are limited by one urban elementary school. The limitations of this study are described on three main areas; the number of school, the number of samples, and other possible factors to influence student’s achievement. Further research is needed concerning them.

Regarding the number of schools, the participants in this study were restricted to one urban elementary school. One cannot make generalizations to dissimilar educational settings.

For the number of samples, students’ achievements of only two classes in mathematics were used. More samples of student’s achievements are required. For this, observations on the whole teachers in the same school will be required to collect more data on the number of teachers.

In regard to factors to influence students’ achievement, controlling other possible factors to influence student’s achievement such as their self-regulation level and family member’s assistance is required. That is why the pure effect of teachers’ instructional level could be examined after controlling these factors.

IV. FINDINGS

A. Research Question

Does the teacher’s instructional skill affect student’s achievement in mathematics?

Students’ achievements of pre-test and post-test according to their teacher’s instructional level are as below.

Table 1. MEAN DIFFERENCES OF STUDENTS IN LOW INSTRUCTION GROUP AND HIGH INSTRUCTION GROUP

	Students in low quality instruction class(n=17)		Students in high quality instruction class(n=17)	
	M	SD	M	SD
Pre-test	210.41	12.802	210.12	14.840
Post-test	221.82	7.860	225.47	12.461

Mean change of students achievement in low instruction was from 210.41 to 221.82, so there was a mean difference of 11.41. In addition, mean change

of students achievement in high instruction was from 210.12 to 225.47, so there was a mean difference of 15.35.

ANCOVA was conducted in order to verify the statistical power of above result. The pre-test achievement that might have an effect on the post-test was used as a covariate.

Table 2. RESULT OF ANCOVA

Source	df	MS	F
Covariate(pre-test)	1	2548.076	85.429
Instruction level	1	125.090	4.194 *
Error	31	29.827	

*: p < .05

There was a statistically significant difference between groups after controlling the effect of pre-test, $F(1,31) = 4.194$, $p < .05$. In other words, student's achievement in high instruction class showed better ability than those in low instruction class. So, the fact that teacher's instructional skill affects student's achievement in mathematics was affirmed after controlling the pre-test score.

V. DISCUSSION AND CONCLUSION

A. Discussion

The findings are to be discussed on the base of prior researches and reports. As presented in the literature review, some researches based on the relationship the social learning theory and student's achievement are conducted.

Students' achievement in high instruction class showed better ability than those in low instruction class, as prior researchers report the relationship between the social learning theory and the students' achievement. This result is the evidence that students who were taught by the higher instructional teacher were learning mathematics better than those taught by the lower instructional teacher. If the teacher uses various mathematical demonstrations in the class, students did learn lots of way to solve the problems.

B. Conclusion

Students have to study mathematics because of its importance to their lives [10]. Mathematics is also an important skill in the information age. For the reason, countries consider mathematics a key concept to maintain economic leadership.

This study investigated the effect of the teacher's instructional skill on student's achievement in

mathematics. The findings showed that students in high instruction class showed better achievement than those in low instruction class.

There is nobody who is strong in leaning when he/she was born. The reason why high-achievement children can do well right now at school is that they educated in advance before entering the school from the parents. But, most parents of high-poverty population tend to live from hand to mouth. They do not have enough time to pay attention to education and scarcely are interested in education of the children. So outside the school, learning and study is more difficult to the student in the condition of high-poverty.

There are some factors to determine student achievement: Intelligence [11], parents' socio-economic level [11], student's self-efficacy, student's self-fulfilling prophecy [12], teacher's preparation time for classes [13] etc. Most of these factors are innate without the student's will, but teacher's endeavor to classes is not. In this aspect, teachers' endeavor can be noteworthy and help students be interested in learning very well [13-14]. Even though they suffered from hard working and low salary, their effort and interest can make better the kids who will play an important role in future society.

C. Recommendation

Several areas emerged as demonstrating potential for future studies. Additional studies need to expand the number of schools, and the number of teachers and students. To examine the effect according to the teacher's and student's gender is also suggested. Finally, future research may explore questions how the teacher's instructional level influence students' achievement level such as basic, proficient, and advanced in mathematics.

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