THE EFFECTIVENESS OF INNOVATIVE ELEMENTARY SCHOOLS IN SEOUL ON DECREASING EDUCATIONAL GAP

By

NA, Hyejin

THESIS

Submitted to
KDI School of Public Policy and Management
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MASTER OF DEVELOPMENT POLICY

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Abstract

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By

HYEJIN NA

This research analyzed the effect of innovative schools on decreasing the educational gap caused by socioeconomic backgrounds, using a multiple regression model. The data was collected from Seoul Education Longitudinal Study in 2012 and 2013. In addition, qualitative research was conducted through in-depth interviews and case studies in order to explain the result of quantitative research. The gist of the research is as follows. First, there was no significant difference between innovative schools and general schools in terms of family backgrounds, school life and academic achievement of students. Innovative schools did not reduce the effect of socioeconomic status on academic achievement. Secondly, the qualitative research found that principles of innovative schools were not applied effectively in practice. There were many obstacles such as unprepared school staff to reform the school. Therefore, this research recommends that efforts of the school staff including teacher be made and institutional supports be provided for the success of innovative school. Furthermore, more research on the effect of innovative schools has to be done to strengthen the public education system over a long term.

Dedicated to almighty God who gives me strength

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I. INTRODUCTION

1.1 Statement of Problem

With the rise of the public school system, public schools have been considered as primary agents for better social mobility (Parsons, 1959). In the modern society based on meritocracy, school can play a crucial role in selecting and rewarding students according to their ability rather than their background. In this sense, individuals can receive equal opportunities to move up the social ladder based on their efforts. In contrast, Coleman et al. (1966) argues that socioeconomic status has a decisive effect on students' achievement and schools do not make a huge difference. Rather the school curriculum implicitly promotes the culture of the dominant class by rewarding only students who possess such socioeconomic capital. Thus, some scholars claim that the school is actually the central agent of social exclusion and reproduction (Bourdieu and Passeron, 1977).

After the IMF crisis of 1997, the issue of social inequality became more severe in South Korea. The South Korean society tried to find the cause of social inequality by looking at the educational gap. According to a recent study (Ryu and Kim, 2006), as the level of educational background of parents and household income have risen, private education fees increased accordingly. As a result, socioeconomic difference led to a gap in educational achievement. In addition, some researchers suggest that emotional bonds, parenting style, and parent's attention can be factors that influence the education gap (An, 2003). However, there are limitations to these studies. In other words, most researchers focus on the fact that the educational gap is caused by the difference of individuals or families. Functionality, aims, and teaching styles of each school and its effect were excluded from such studies on educational gap.

1.2 Purpose of the study

Therefore, this study will analyze the schools' effect on decreasing the educational gap using data from the Seoul Education Longitudinal Study. This study will focus on innovative elementary schools in Seoul, as such innovative schools have abundant social capital which provide an environment for students, parents, and teachers to actively participate in decision- making process of school operation. They have also tried to activate student-centered instruction. As a result, innovative schools are able to make the effect of socioeconomic status smaller. Through this study, we will find how innovative schools affect the education gap. If innovative schools can effectively reduce the education gap by socioeconomic differences, the South Korean government can use successful elements of innovative school to formulate policy options to raise education quality.

1.3 Development of Research Questions

The following research questions were raised for the study.

1.3.1 How are innovative schools different from general schools?

1.3.1.1 How different is the family background of students in innovative schools from that of students in general schools?

1.3.1.2 How different is students'learning stylein innovative schools from that ofstudents in general schools?

1.3.1.3 How different is the teaching method of innovative schools from that of general schools?

1.3.1.4 How different is the relationship with fellow students and teachers in innovative schools from that in general schools?

1.3.2 How have the scores in innovative schools and general schools changed?

1.3.2.1 How are scores in Korean language, mathematics and English in 2012 different between two schools?

1.3.2.2 How are scores in Korean language, mathematics and English in 2013 different between two schools?

1.3.3 Do innovative schools decrease the effect of socioeconomic status on academic achievement?

II. BACKGROUND INFORMATION AND LITERATURE REVIEW

2.1 Education Gap Definition

The "education gap" refers to a disparity in academic performance between groups of students, especially those groups defined by SES, race, and gender, caused by a lack of educational inputs and problems with educational processes (Education Research Institute of Seoul National University [ERI], 1994). In this definition, researchers have tried to find the causes of educational gap in the inputs and processes related to education. The problem is that inputs to and processes of education are strongly influenced by ascribed factors such as family backgrounds. In addition, the level of congenital differences can lead to the differences in educational outcomes. As a result, there have been many researches done so far about the educational gap caused by the difference of individuals or families.

2.2 Education Gap Caused by Input Differences

The education gap arising from differences in inputs is mainly attributed to the differing family backgrounds. For example, Kim et al. (2008) has shown that, as the level of

education of parents increased, the academic performance of their children and the educational support to their children increased as well. Particularly, in the South Korean society where there is a huge emphasis on private tutoring and education, the differing family backgrounds can lead to the gap in private education costs. This has been further shown in a study done by Namkung (2013), who showed that the gap in private education costs can affect academic performances, thus highlighting the influence of family backgrounds. Moreover, a regional disparity has become another factor of inputs, causing the education gap. Studies showed that there is a wide gap between urban and rural areas, especially in educational opportunities, teacher qualities and facilities (Ha, 2004). As a residential segregation by socioeconomic backgrounds has increased gradually, a regional disparity has emerged as the main factor causing the education gap in inputs. In conclusion, the differences of inputs such as the educational level of parents, private education costs and the residential area are leading to the widening of the education gap.

2.3 Education Gap Caused by Different Processes

Differing from the education gap caused by input differences, the education gap arising from different processes refers to an educational disparity which is caused by the practical teaching and learning process in schools or families. Coleman (1988) argued that even with a bad family background, children, whose parents have high level of expectations of their children and are able to provide proper educational support, can overcome their disadvantages. Contrary to this, some researchers state that social capital within the family, such as emotional bonds and parental involvements, does not positively impact the socioeconomic background on academic achievement (Jang & Son, 2005).

In addition to social capital, cultural capital is also regarded as the factor influencing the education gap by the processes. According to Kim and Byun (2007), when parents not

only have cultural capital (e.g., newspapers, art books and musical instruments), but also make their children watch musicals or read literature, children's school records have shown improvement. Furthermore, the education gap is also related to internal factors within the schools. Brookover et al. (1979) conceptualized a "school climate", which can be summarized as the quality of school environment and the character of student body and teachers. They claimed that the school climate is directly related to academic achievement and success. Moreover, the school climate is shown to affect to non-cognitive traits, such as self-esteem (Kim et al., 2013). Overall, the school climate based on the needs of students has a positive influence not only on students' attitudes toward learning, but also their interest in studying, self-directed learning and self-esteem (Joo et al., 2012). Therefore, a positive school climate can improve both the teacher- student relationships and the relationships between students. This can, as a result, lead to the improvement of students' academic performance (Kim, 2011).

2.4 Features of Schools Contributing to Reducing the Education Gap

Many researchers have tried to find the causes of the education gap. However, since previous studies on the education gap were based on the input-output model, there have been criticisms from the late of 1970s that educational processes, such as school activities were excluded from such studies (Edmonds, 1979). These studies on the education gap focused on differences of individuals or families, rather than considering the school effect. Accordingly, researchers have started to study the features of effective schools that can help students overcome the education gap caused by input differences.

First, schools, with abundant social capital can reduce the education gap caused by socioeconomic backgrounds. Such examples of social capital within the school include teacher-student relationship, cooperative school climate and the teacher expectation.

Rosenthal and Jacobson (1968) reported that when teachers had higher expectations, students achieved more than students, with teacher who had lower expectations. This effect was more profound in students, who had lower grades and were in lower socioeconomic brackets.

Bickel and Howley (2000) commented that student achievement was negatively related to school size. That is, smaller schools can reduce the harmful effects of poverty on student achievement and help them narrow the education gap. The reason why small schools have a positive influence on reducing the education gap is that the interaction between teachers and students and the participation in school life are more active than general schools (Kim, 1999).

Finally, According to Lee and Smith (2001), instructional methods such as project based lessons, inquiry based instruction and level based lessons are related to the education gap directly and indirectly. That means that effective instructional methods are able to reduce the education gap caused by the differences in socioeconomic backgrounds.

2.5 Seoul Innovative School

Seoul Innovative School began as a publicly financed innovative school in 2006. It was modeled on charter schools, an epitome of alternative education in the United States. In the primary form of Seoul innovative school, management rights were given to schools in order to renovate the existing education system, and later, government empowered those schools to develop their own curriculums and manage their schools autonomously (Kim, 2006). However, early innovative schools failed to reform the public education system, because it was an education reform by government from top-down. Thus, teachers tried to solve the problem of education voluntarily through new innovative schools, which gave birth to a new model of Seoul innovative schools in 2011. A new model of Seoul innovative school is implemented by teachers, parents and student through a ‘bottom-up’ approach.

According to the Seoul Metropolitan Office of Education (2012), innovative school policy is an educational movement which was started by students, teachers and parents to reform the school system in 2011. The purpose of the innovative schools was to restore public education, and to make the school climate democratic. Innovative schools focused on creating and developing six key aspects: management, curriculum, instructional methods, student evaluation methods, counseling, and education welfare. They also offered various programs, in order to advise low performing students, and prompt teachers to use a student-centered instructional method in classes.

Regarding creating a new model of Seoul innovative school, there are two ways to designate innovative elementary schools. In one model, some public schools were transformed into innovative schools after obtaining a permit from SMOE. In this case, students of previous public schools became part of an innovative school along with the school they attend. The other one is that SMOE established some brand new innovative elementary schools in Seoul. New innovative elementary schools recruited students by receiving applications from students who live near those schools. Since the innovative schools were established, students have been assigned to schools based on their addresses, not based on whether the school is innovative or general school. If teachers want to work in innovative schools, previously they could apply to the schools directly. Now vacancies are filled with teachers regardless of their preference according to current teacher transference system. There are no differences in assignment strategies between students and teachers except previously teachers could apply to innovative schools. Therefore, it is necessary to study the impact of innovative schools which have different academic goals and curriculum, because they have same assignment system of students and teachers.

2.6 Theoretical Framework

The purpose of this research is to find out 'school effect' from Seoul Innovative Schools. The figure below shows the theoretical framework which was used to measure the effect of innovative school policy in this research. Assuming that output which means academic achievement varies according to the different input, innovative school variable are attached in process to investigate whether the innovative school variables have a moderating effect. Firstly, this research will analyze 'the input-process-output' relationship on the education gap and then study the effect of innovative schools through quantitative methods. Secondly, qualitative research will be implemented to support findings of quantitative research. Case study and in-depth interviews will be used to investigate how innovative schools are applied in practice. Through both quantitative and qualitative research, this research will suggest practical policy options for improvement of innovative schools so that they could contribute to reducing the education gap.

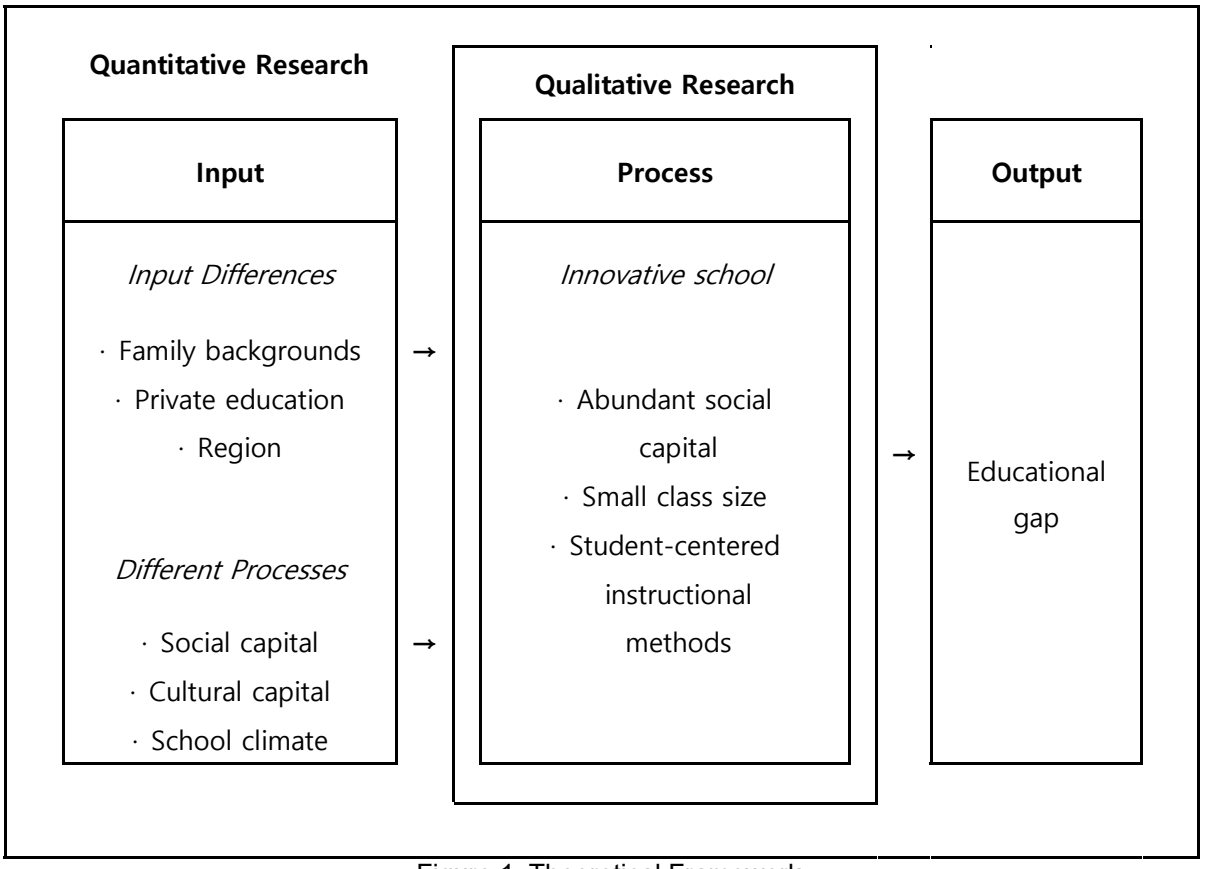


Figure 1. Theoretical Framework

III. HYPOTHESES DEVELOPMENT

3.1 There are differences between innovative schools and general schools.

School climate is linked to a wide range of academic, behavioral, and socio-emotional outcomes for students (Freiberg, 1999). In particular, the effect of each school affects students' academic achievement, and interacts with each student' individual characteristics (Mujis and Reynolds, 2003). Therefore, if innovative schools are effective, they can influence life of teachers, students and parents in many ways compared to general schools. Whether the school has been assigned as the "innovative school", students' affective and cognitive characteristics can be different gradually.

3.2 Innovative schools can reduce the education gap.

The most basic principle of innovative schools is building a 'learning community', in which everyone is involved in a collective effort of understanding. In order to improve the 'learning community', teachers are required to develop their skills within their profession. Teachers are focused on student-centered instruction as a teaching method. Furthermore, schools provide supporting staff for non-teaching work and try to reduce administrative duties for teachers. If the principles of innovative schools were applied in practice effectively, teachers could have more time to prepare for class and students could help each other through a 'learning community'. And it can make fewer students who are lagging behind their peers and reduce the education gap.

3.3 Innovative schools can decrease the effect of socio-economic status on the education gap.

Innovative schools restrict the number of students per class to 25. Teachers use

various teaching methodssuch as a cooperative learning, project learning, and inquiry learning so as to make sure no students are left behind. According to Friedlaender et al (2014), they conducted research on the effect of student-centered instruction and compared student-centered schools with others. As a result, the value added to student learning in the student-centered class is even greater for students from economically disadvantaged backgrounds. These features of the innovative school will have an influence on reducing the education gap caused by socioeconomic backgrounds.

Thus this research will test on following three hypotheses: 1) there are differences in family backgrounds, students' learning style, teaching methods and school life between innovative schools and general schools, 2) innovative schools can effectively improve the test scores of students form low SES, compared to general schools. 3) innovative schools can decrease the effect of socioeconomic status on the educational gap between students form low SES and those from high SES more than general schools.

IV. RESEARCH METHOD AND DATA ANALYSIS

4.1 Variable Value Setting

This study will employ a quantitative method by using the data from the Seoul Education Longitudinal Study (2012~2013). SELS collected data on 5,200 4th graders in elementary school; 4,600 1st graders in middle school; and 6,600 1st graders in high school beginning in 2010. SELS made it possible to collect data for a period ranging from 3 years up to a potential 9 years. The purpose of SELS is to analyze the long-term effects of education policy and school activities on students' lives in order to improve these policies and school education overall.

This research used the SELS data from 2011 and 2012, following the same set of students from being 5th graders in 2011 to being 6th graders in 2012. (The students who have been surveyed in SELS are the same people in both 2011 and 2012.) The 6th graders' scores from the National Assessment of Educational Achievement (NAEA) in 2012 were used as a dependent variable. A dependent variable represented the average scores on English, mathematics, and Korean of 6th graders from NAEA. NAEA is common exams which are conducted all across the country on the same day, so it represents an index of student scores nationally.

Independent variables include Socioeconomic Status (SES), previous scores, private tutoring hours, self-studying hours, relationships with fellow students and teachers, satisfaction in classes, student-centered instruction, school average SES, and whether a school has been assigned as an innovative school.

SES was measured based on the average score of parents' educational backgrounds and monthly income. Scores for parents' educational backgrounds reflected the years of schooling they had and their income was converted according to natural logarithm. Previous scores are represented by the average scores of Korean, English, and mathematics from NAEA when students were 5th graders in 2011. The amount of time invested in private tutoring and self-study reflected the average number of hours invested in each subject.

Relationships with fellow students and teachers, satisfaction in class, and student-centered instruction were all determined based on the average scores from 5 questions on the survey. Survey questions were implemented using a 5-point Likert scale.

Furthermore, the school average SES was given by the average of students' SES for each school. The innovative school variable is a dummy variable. The value for innovative schools is '1' while general schools receive a '0'.

Table.1 Variables for the Research

Dependent variable	The average scores on English, mathematics, and Korean of 6th graders from NAEA in 2012	
Independent variables	SES(socioeconomic background)	Parents' educational backgrounds and monthly income
	Previous scores	the average scores of Korean, English, and mathematics from NAEA when students were 5th graders in 2011
	Private tutoring hours	the average number of hours invested in each subject
	Self studying hours	the average number of hours invested in each subject
	Relationship with fellow students	the average scores from 5 questions on the survey
	Level of trust in teachers	the average scores from 5 questions on the survey
	Satisfaction in classes	the average scores from 5 questions on the survey
	Student-centered instruction	the average scores from 5 questions on the survey
	Average school SES	the average of students' SES for each school.
	Innovative school	Innovative school:1 General school: 0

4.2 Methodology for Quantitative Research

First, I will investigate whether there are systematic differences between innovative schools and general schools through survey data. I will analyze such differences using 4 categories; family backgrounds, educational experiences, learning style and academic achievement. Family backgrounds consist of 2 variables; income and educational background of parents. Educational experiences include student-centered instruction, the level of satisfaction in class and the relations with fellows and teachers. Learning style includesthe amount of time invested in studying alone, and participation frequency in private education. Academic achievement includes different scores in Korean language, mathematics, and English in 2012 and 2013. Through this study, we can find how innovative schools are different from general schools

Second, this study will show how the students' scores in each school have been

changed from 2012 to 2013. The purpose of the innovative school is not to improve academic achievement. It is for all students to participate in learning. Thus, this study will compare not average scores, but distributional characteristics between two schools. As the education gap is decreasing, deviation of scores will be small. In other words, this study will analyze to what extent the dispersion of student's test scores within schools changed between 2012 and 2013 in innovative and general schools, and compare the degree of change between innovative and general schools to know the effectiveness of the innovative schools in reducing education gap, compared to general schools.

Then I will analyze whether innovative schools are effective or not in decreasing the educational gap, caused by socioeconomic backgrounds. For this experiment, I will use the 2-level model to find out the school effect. For the 2-level model analyses, the variable will be divided by the level of students and school. The students' score of Korean language, mathematics and English in 2013 will be thedependent variable. On the student level, the independent variable will include the socioeconomic background: income and the level of educational background of parents, the amount of time invested in studying alone, participation frequency in private education, relationship with fellow students and teachers, the level of satisfaction in class, the student-centered class, and the score of Korean language, mathematics and English in 2012. The independent variable on the school level includes whether the school has been assigned as the "innovative school", and average socioeconomic status of schools. Through this multilevel model, I would like to study whether the effect the socioeconomic background variables have on students can be decreased by the school variables or not. All data can be obtained from the Seoul Educational Research and Information Institute. Finally, we can discover innovative schools decrease the effect of the socioeconomic status on academic achievement.

4.2.1 Data Collection

The data of Seoul Education Longitudinal Study was collected by Seoul Metropolitan Office of Education in 2012 and 2013.The survey included 108 elementary schools in Seoul and two classes per a school were randomly selected. Among them, there were 4 innovative schools including 2 in NamBu[1], 1 in SeoBu[2], and 1 in JungBu[3]. As control groups, 8 general schools which are located in the same districts and have similar socioeconomic status as that of innovative schools were selected to conduct comparative study.

4.2.2 Data Analysis Tool

For the data analysis, the SPSS 20 program was mainly used and the Excel program was also used to sort data. To test the hypotheses, this research used t-test, box plot and hierarchical multiple regression analysis. The t-test was used to identify whether there are the significant differences or not between two schools. Thebox plot provided a visual summary of scores of two schools in 2012 and 2013. It showed the median, quartiles, and extreme values. The dependent variables were tested by using the hierarchical multiple regression analysis to measure the influence of each factoron the academic achievement. Above all, the reliability tests carried out previously as well.

4.3 Findings from your Quantitative Research

H1. There are differences between innovative schools and general schools.

[1]NamBu District Office of Education covers Guro-Gu, Geumcheon-Gu, and Yeongdeungpo-Gu.
[2]SeoBu District Office of Education covers Mapo-Gu, Seodaemun-Gu, and Enpyeong-Gu.
[3]JungBu District Office of Education covers Jongno-Gu, Jung-Gu, and Yongsan-Gu.

H1.1 There are differences in students' family backgrounds between two schools.

Table.2 Differences in Family Backgrounds

Item	School	N	M	SD	t
Household Income	Innovative Schools	159	2.46	.46	.362
	General Schools	358	2.44	.49	
Parents' educational attainment	Innovative Schools	159	3.29	1.98	-.329
	General Schools	358	3.35	1.96	

N: sample size, M: mean, SD: standard deviation, t: t value

Table.1compares socioeconomic status as defined by household income and parents' educational attainment between two schools. According to t-test, we reject the H1.1 hypothesis. There was no difference in household income or parents' educational attainment by school.

H1.2 There are differences in students' learning style between two schools.

Table. 3 Differences in Students' Type of Learning Style

Item	School	N	M	SD	t
Private tutoring hours	Innovative Schools	159	1.14	1.11	-1.306
	General Schools	358	1.29	1.19	
Self-study time	Innovative Schools	159	1.75	1.92	-2.222*
	General Schools	358	2.09	1.45	

* : P < .05 N: sample size, M: mean, SD: standard deviation, t: t value

There was no significant difference in private tutoring hours. On average, students in innovative schools spent less time studying through private tutoring. Innovative schools offer various programs such as ecological experience programs, culture and art education, and programs for creativity. As a result, parents let their children participate in the school's additional programs instead of engaging in private education.

However, there was a significant differencein the amount of time invested in studying alone. Students in general schools invested more time to study alone than students in innovative schools did. Innovative schools consider ‘learning’ as capacities which are acquired through life experiences, communicating with others. Therefore, students in innovative schools will spend less their time in studying alone.

H1.3 There are differences in teaching methods and students’ satisfaction with classes between schools.

Table.4 Differences in Teaching Methods

Item	School	N	M	SD	t
Satisfaction of Class	Innovative Schools	159	3.30	.95	-1.776
	General Schools	358	3.45	.88	
Student-Centered Instruction	Innovative Schools	159	4.15	.87	-1.502
	General Schools	358	4.31	1.23	

N: sample size, M: mean, SD: standard deviation, t: t value

According to the t-test, the H1.3 hypothesis fails. There was not enough evidence to suggest a significant difference in satisfaction with classes or student-centered instruction between two schools ($p > .05$). General schools rather scored higher on teaching methods, even though student-centered instruction is a core value of innovative schools. This means that innovative schools may have difficulty in applying their educational principles in actual practice.

H1.4 There are differences in the relationships with fellow students and teachers between schools.

Table.5 Differences in School life

Item	School	N	M	SD	t
Peer Relations	Innovative Schools	159	4.15	.85	-1.295
	General Schools	358	4.26	.86	
Teacher Trust	Innovative Schools	159	3.97	.84	-.542
	General Schools	358	4.03	1.24	

N: sample size, M: mean, SD: standard deviation, t: t value

Table.4 is about school life, which includes peer relationships and teacher-related trust. According to the t-test, we must reject the H1.4 hypothesis. Innovative schools were not different from general schools in terms of students' school life.

H2. Innovative schools can reduce the education gap.

One of the main goals of this study is to investigate whether the innovative school could reduce the academic achievement gap between students who come from different socioeconomic backgrounds. For this purpose, this research used the scores of Korean, mathematics, and English of NAEA and compared the scores of students when they were 5^{th} graders in 2012 with the scores of students when they were 6^{th} graders in 2013 in each innovative and general school. In other words, when average scores of certain school improved in comparison to the last year, it is not clear whether the cause is overall improvement of students' academic performance or mere academic improvement of the top-ranked students.

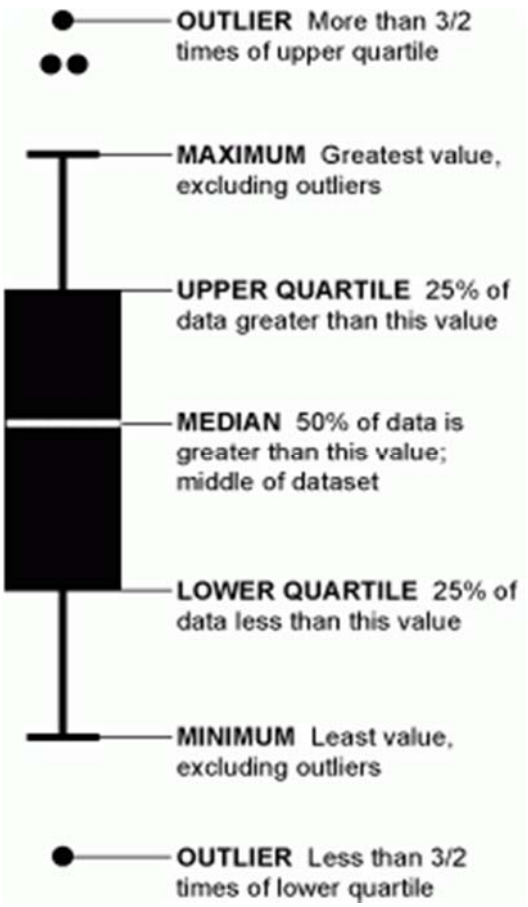


Figure 2. A Box Plot

That is the reason why this study used a box-plot to illustrate the data collected. Thebox plot makes it possible to see how distribution of the students' scores has changed over 2 years. Each box in the graph shows the distribution of scores of two different types of schools. The scores are ordered into 4 different sized groups. That is, 25% of all scores are placed in each group. The lines dividing the groups are called quartiles, and the groups are referred to as quartile groups.The upper limit and lower limit represent maximum and minimum value respectively. The median marks the mid-point of the data and is shown by the line that divides the box into two parts. Whiskers are lines extending vertically from the boxes indicating variability outside the upper and lower quartiles ("Box plot", n.d.). There are additional marks beyond the whiskers. Specifically, the additional marks beyond the whiskers depict outside values using a small "o" and far out values are indicated by asterisks (*).

This research will look at the dispersion and change of scores among students within a school for 2 years. If scores of both top and bottom ranked students improved while narrowing the dispersion of scores, it will be ideal as a result of education. Even if there is no significant difference with regards to scores between general schools and innovative schools, if the distribution of students'scores became smaller, that result will be worth studying. Therefore, the research will focus on the dispersion of scores between general schools and innovative schools for 2 years comparing the length of whiskers and boxes.

Table.6 Korean Language Score in 2012 and 2013

Item	School	N	M	SD	t
Korean Language Score in 2012	Innovative Schools	158	72.03	16.24	-.296
	General Schools	355	72.49	16.15	
Korean Language Score in 2013	Innovative Schools	159	60.28	21.87	-2.369*
	General Schools	357	64.82	19.23	

* : P < .05 N: sample size, M: mean, SD: standard deviation, t: t value

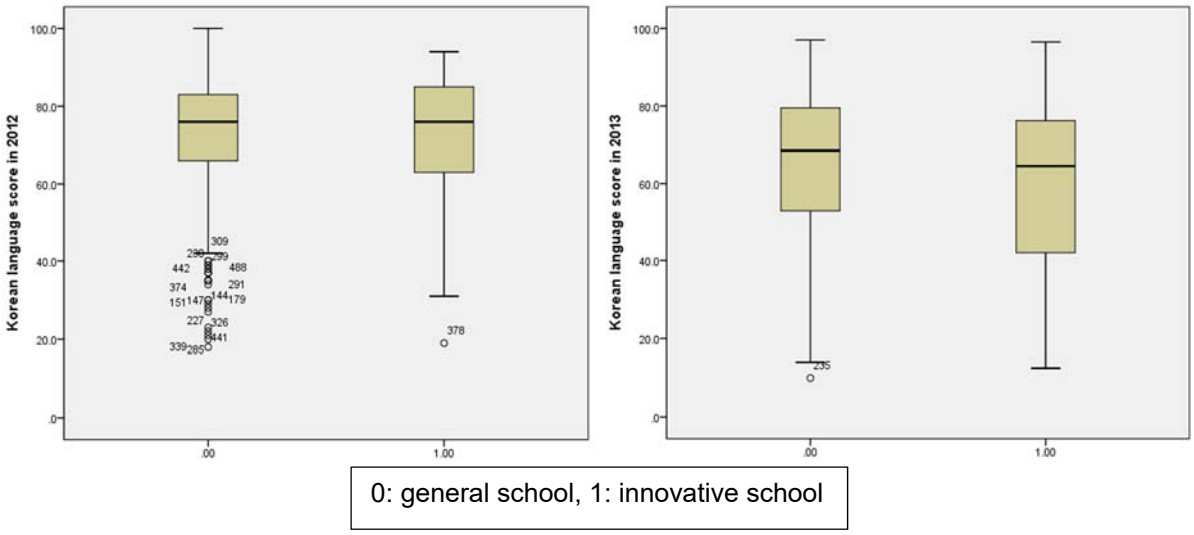


Figure 3. Distribution of Korean Language Score

There was no significant difference on Korean language score in 2012. However, the difference between two schools in 2013 was statistically significant, $p < .05$. In 2013, average Korean language score in general schools was 64.815 (SD=19.23), while average score in innovative schools was 60.28 (SD=21.87). The average score for general schools was higher, and its corresponding standard deviation was smaller than that of innovative schools. This box plot showed that innovative schools did not reduce the academic achievement gap in Korean language as students advance through school.

Table.7 Mathematics Score in 2012 and 2013

Item	School	N	M	SD	t
Mathematics Score in 2012	Innovative Schools	158	61.62	21.68	-.296
	General Schools	355	61.75	21.58	
Mathematics Score in 2013	Innovative Schools	159	59.98	22.07	-2.369*
	General Schools	358	64.34	21.57	

* : P < .05 N: sample size, M: mean, SD: standard deviation, t: t value

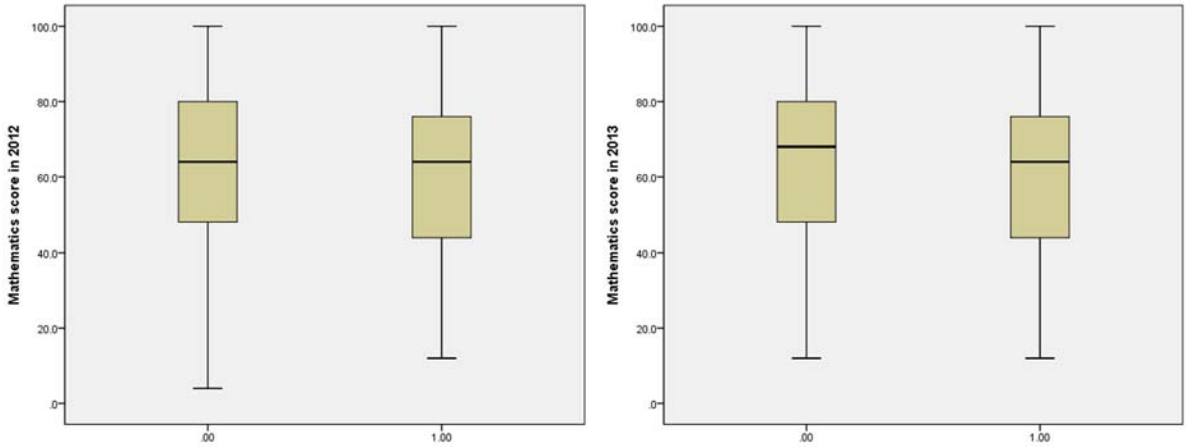


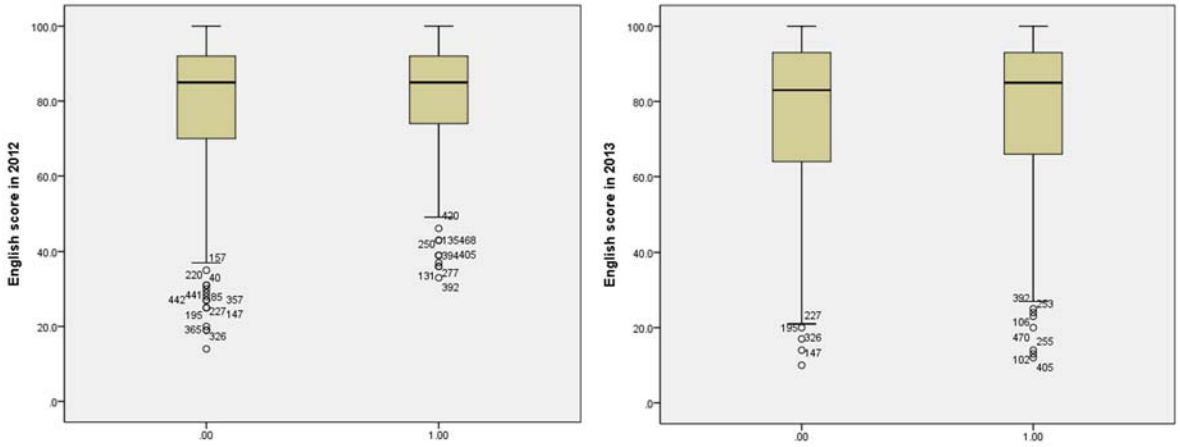
Figure 4. Distribution of Mathematics Scores

In the case of mathematics in 2013, the box plot showed a similar pattern to that in 2012. However, 1 year later, there was a significant difference between two schools, P<.05. The average math score of innovative schools fell from 61.62 (SD=21.68) to 59.98 (SD=22.07), while general schools' score went up from 61.75 (SD=21.58) to 64.34 (SD=21.57). The gap in mathematics scores has widened in innovative schools a little more than in general schools.

Table.8 English Score in 2012 and 2013

Item	School	N	M	SD	t
English Score in 2012	Innovative Schools	158	79.68	17.01	.606
	General Schools	355	78.61	19.18	
English Score in 2013	Innovative Schools	159	77.27	21.56	.483
	General Schools	357	76.31	20.41	

N: sample size, M: mean, SD: standard deviation, t: t value



0: general school, 1: innovative school

Figure 5. Distribution of English Scores

There was no significant difference in English score for 2 years. Interestingly, students from innovative schools scored a little bit higher on Englishthan students from general schools did, unlike the cases of Korean language and mathematics. However, although the average score of English in innovative schools was higher than that of general schools, the corresponding standard deviation was larger than that of general schools. This empirical evidence proves that the education gap in English has not been narrowed.

H3. Innovative Schools Can Decrease the Effect of Socio-economic Status on the Education gap.

The table below is a hierarchical regression model[4] for academic achievement in 2013. First of all, model1 showed how input variables such as scores in 2012, socioeconomic status (SES) and private tutoring hours affected scores in 2013. The hierarchical multiple regression revealed that at stage one, scores in 2012 ($t=19.322$, $p<0.01$), SES ($t=3.069$, $p<0.05$), and private tutoring hours ($t=3.605$, $p<0.01$) contributed significantly to the regression model and accounted for 50.3% of the variation in scores in 2013.

At stage two, introducing the attachment variables such as self-study time, peerrelations, teacher trust, satisfaction with class, and student-centered instruction explained an additional 1.4% of the variation in scores in 2013. Satisfaction with class ($t=3.710$, $p<0.01$) was a significant predictor of a dependent variable while self-study time, peer relations, teacher trust, and student-centered instruction were not. When the attachment variables (process variables) were entered at stage two, predictive power of scores in 2012, SES, and private tutoring hours were declined by1.6%, 0.4%, and 0.9%respectively.

Adding a school average SES to the regression model at stage three was not significant. Predictive power of scores in 2012, SES, and private tutoring hours declined while that of satisfaction with class increased slightly.

Finally, the addition of innovative school to the regression model explained 51.8% of the variation in the dependent variables, which is equivalent to an increase by 0.2%. Innovative school was not significant and it showed that innovative school did not reduce the effect of students' SES. The most important predictor of the scores in 2013 was the scores in 2012 ($t=18.616$, $p<0.01$) which uniquely explained 62.2% of the variation in thescores in

[4] Hierarchical regression adds terms to the regression model in stages. At each stage, an additional term or terms are added to the model and the change in R^2 is calculated. An hypothesis test is done to test whether the change in R^2 is significantly different from zero.

2013. The second predictor was satisfaction with class (t=3.642, p<0.01) which explained 12.5% and the third one was private tutoring hours (t=3.189, p<0.05) which explained 10.5%.

According to tolerance and VIF results, the tolerance value was more than 0.1 for all variables. Thus, it indicates that the multicollinearity assumption was not violated. The value of the Durbin-Watson is 1.915, approximately equal to 2, indicating no serial correlation. Therefore, this regression model is fit for this research.

Table.9 Factors That Affect Academic Achievement in 2013

	model 1			model 2			model 3			model 4		
	SE	β	t	SE	β	t	SE	β	t	SE	β	t
Scores in 2012	.034	.637	19.322**	.035	.621	18.644**	.035	.619	18.510**	.035	.622	18.616**
SES	.548	.099	3.069*	.542	.095	2.960*	.551	.092	2.825*	.549	.092	2.837*
Private tutoring hours	.504	.117	3.605**	.513	.108	3.258*	.513	.107	3.241*	.513	.105	3.189*
Self-study time				.359	-.025	-.766	.359	-.025	-.770	.359	-.029	-.916
Peer relations				.704	-.004	-.116	.706	-.005	-.154	.706	-.008	-.238
Teacher-trust				.558	.054	1.551	.559	.055	1.566	.558	.056	1.609
Satisfaction of class				.687	.127	3.710**	.689	.129	3.734**	.688	.125	3.642**
Student-centered instruction				.555	-.034	-.971	.558	-.035	-1.012	.557	-.037	-1.075
School SES							2.703	.017	.528	2.700	.014	.444
innovative school										1.212	-.055	-1.776
constant		13.740			6.381			2.628			4.384	
F		174.990			69.955			62.125			56.465	
Adjusted R^2		.503			.517			.516			.518	
R change²		.503			.014			-.001			.002	

*:p<0.05, **:p<0.01

V. QUALITATIVE RESEARCH

Since the existing quantitative research showed that the innovative school has no influence on reducing the effect of socioeconomic status, this qualitative research mainly focuses on finding the reason why innovative schools were not effective on decreasing the education gap caused by the socioeconomic status.

5.1 Methodology for Qualitative Research

Interviews were held with teachers of innovative schools to understand the characteristics of the schools deeply. Two schools which have been classified as innovative schools for three years were selected as research subjects. Interviews were conducted with teachers who currently work in innovative schools. I investigated general school life in relation to the education gap such aspeer relations, relationship between teachers and students, teacher-teacher relations, teaching method, curriculum, principal leadership and school administration system.

5.2 In-Depth Interviews

5.2.1 Seoul Cheonwang Elementary School

In the interviews with teachers who work in Seoul Cheonwang elementary school, there was mention of an administrative support system. These teachers said that if the administrative support system was not organized well, it would lead to an overload of work for teachers, causing confusion.

> Teacher A: In principle, the innovative school should reduce administrative duties for teachers so that they can concentrate on preparing classes. However, it's not been long since innovative schools started and innovative schools are now in a period of transition from general schools to innovative schools. So, there are still many additional tasks in order to establish cohesive school management. In addition, supporting staffhave not received proper training in order to efficiently take on the teacher's work. Therefore, the administrative support system has not been established well enough. Teachers have an excessive amount of non-teaching administrative work, and cannot concentrate on preparing and implementing innovative classes.

In addition, teacher B pointed out the problem of class size as a reason why the

education gap was not reduced. In most cases, there was no difference on the number of students per class between general schools and innovative schools, although innovative schools are small school oriented.

> Teacher B: Innovative schools pursue a small school status which has less than 25 students per class. However, many innovative schools have more than 25 students per class. If the size of classes is large, it makes it impossible to build the learning community that innovative schools pursue. Moreover, it would negatively affect students' academic achievement as it is difficult to implement classes tailored to each student's abilities in overcrowded classes. As a result, there is no difference in instruction method between innovative schools and general schools.

Teacher C had a different view on the result of the quantitative research which showed the ineffectiveness of innovative schools to reduce the education gap. She said that the notion of academic achievement was very different between innovative schools and general schools. This research was based on the concept of general academic achievement such as grades, and therefore, could not be applied to innovative schools.

> Teacher C: A new understanding is necessary regarding academic achievement prior to conducting a research on the educational gap. The Korean society is still dominated by academic achievement that focuses on the test score and segregation of students as a result. But academic achievement in innovative schools means future oriented academic ability that consists of creativity, inquiry and cooperative knowledge. And furthermore, learning progression and life competencies are considered academic achievement in innovative schools. So the education gap which is determined by the test score could not be applied to the study on innovation schools. In other words, there is a need fora new method to measure the new concept of academic achievement that innovative schools pursue.

5.2.2 Seoul Sanghyun Elementary School

Teachers who work in Sanghyun elementary school attributed the cause of the lack of fruitful outcomes of innovative schools to the government's mistaken policy, not school itself. They argued that the government merely focused on expansion in the volume of innovative schools. Even if increasing the number of innovative schools may be desirable, the dissemination of unprepared innovative schools cannot help but lead to degrading quality of education

> Teacher D: There are not many innovative schools which are achieving their educational goal. The reason why innovative schools are not doing their job properly is for voluntary and agreement between members of school. Innovative school could be successful when they are based on self-motivation and voluntary participation of teachers. Innovative schools require a lot of dedication and ability of members within the schools. If the schoolsare designated as innovative schools without a mutual consent, it is natural for innovative schools not to function effectively. In fact, teachers move from a school to the other school every 5 years. As a result, teachers who don't have passion for educational innovation could get together in innovative schools. Moreover, if the principal could not understand in depth the purpose and philosophy of education, innovative schools cannot help but lower the quality of education and widen the educational gap between students.

Through the interview, some school members raised their voices against the government education policy which has been focused only on the quantitative expansion of innovative schools. They projected their opinions that it is the time to adapt a policy that enriches the substance of innovative education. According to them, innovative schools are still struggling with the school management based on the participation of teachers, students and parents, cooperation with community and innovative strategies on education. Therefore, the government should investigate substantive problems and provide a supportive system to

make up for the lack of innovative schools.

5.3 Policy Implication through In-Depth Interviews

This research could find out problems within innovative schools and policy implication for the success of innovative schools through in-depth interview. First, administrative support system which is to reduce the overload of work for teachers was not organized well. In addition supporting staff have not received proper training in order to take on the teacher's work. Therefore, policies which are to make administrative support system effective are necessary so that teacher can concentrate on preparing their classes.

Secondly, there were some innovative schools which have more than 25 students per class. As a result, it made it difficult to implement classes tailored to each student's abilities.

Thirdly, the notion of academic achievement was very different between innovative schools and general schools. Thus, this research could not measure academic achievement of students from innovative schools exactly. There is a need for a new agreed concept of academic achievement for innovative schools.

Finally, government's mistaken policy which focused only on expansion in the volume of innovative schools led to the dissemination of unprepared innovative schools. Therefore government should provide a supportive system to improve the quality of innovative schools.

5.4 Case Study

5.4.1 Futurum School in Sweden

Futurum school started in 1999 with the aim to promote the growth of every student. There are students from six to sixteen of age. And the average number of students per teacher has to be less than 10 students.

5.4.1.1 Autonomy of School

Sweden government led to an expansion of public education for an equal educational opportunity until 1985. After that, they weakened state's authority which is to control the management of schools, while strengthened welfare system in education sector.As a result, government supervision in the matter of school management disappeared. Schools are funded by the municipal authority and school committee decides their curriculum autonomously on the basis of national curriculum. Education reform especially in autonomy is completed.

5.4.1.2 Status of Teacher

Teachers are recognized specialists in Futurum school. The regulation of this school shows the status of teacher very well.

> Weekly working time is limited to 45.5 hours and 10.5 hours of them have been spent to do confidence-working anywhere outside the school. Teachers work in the school for 35 hours per week which include 18 hours for teaching, 16 hours for class preparation and 1 hour for counseling with parents (Ahlenius, 2012).

Since the government supervision disappeared, there are no public documents to address. Teachers can concentrate on preparing lesson instead of non-teaching work.

5.4.1.3 School Administration

Just because there are no government supervision and public document to address does not mean that there is no school administration. In Futurum school, there is also school administration abide by the following rule.

School principal runs the school as a chairman of the school operating committee. In the school, there are departments for administration, student welfare, multicultural education and student council. School's administration consists of principal, vice principal and 3 school secretary (Ahlenius, 2012).

A school secretary undertakes an administrative work as a full timejob. As school secretaries take on teacher's administrative work, not only can the administrative work be handled efficiently, but teachers can improve their professionalism in teaching.

5.4.1.4 Teaching Method

A class consists of different graders. Students who are different grade make a team and study together. This is called 'flexible working group' which is a key feature of the school. A team which includes 150 students is separated into smaller groups again, then small groups participate in debate and project based classes. Members in the small group not only decide a topic of their project through discussions, but also complete the project voluntarily.

5.4.2 Helene-Lange-School in Germany

The Helene-Lange-School is a comprehensive school in Wiesbaden, Germany ("Helene-Lange-School in Wiesbaden," n.d.). In this school, there are 600 students aged from 11 to 16 who are from 5^{th} to 10^{th} grades. There are 4 classes in each grade and each class consists of 25 students. The Helene-Lange-School tried to change a discipline centered paradigm in education which is based on industrialization. In other words, the Helene-Lange-School focuses on communication, project class and curriculum convergence.

5.4.2.1 Small School in a School: team by grade

The Helene-Lange-School has 6 teams and each team is made up of same graders. Through the team, students can interact and communicate with other students or teachers. Space that each team uses is designed as a small school to promote a closer relationship between team members. Teachers have a meeting once a week regularly where they can decide important issues which are related to their teams. Teachers use great discretion and manage the annual budget.

5.4.2.2 Internal Differentiation in the Class

Students are grouped by not their test grades, but their potential and needs.Each group has a different level of coursework and learning materials. It means that each student can have proper lessons according to their abilities and needs in a class at the same time. There are two stages: integration and segregation in a class. Students acquire common basic knowledge about a subjectin the integration stage and do their different learning activities in the segregation stage.

5.4.2.3 School as a Community

The Helene-Lange-School places the most importance on living and working together in order to develop a respect, regard and responsibility. There are programs such as‘Monday morning meetings’ and‘Friday student councils’to achieve the school’s goal. In ‘Monday morning meetings’, a teacher and students talk about what happened last weekend or anything they want. At the end of the meeting, each student makes a plan for a week with a homeroom teacher. In ‘Friday student councils’, students raise issues of class for a week and resolve problems among class students through discussions. As a result, students can learn to

accept criticism, express their feelings, and practice to be a good listener and communicator. Through these activities, students can grow as democratic citizens who communicate well and care for each other. Moreover, teachers including a principal are trained in advance to form a successful school community, studying educational psychology, developmental psychology, and counseling. Then, teachers become experts on counseling and communication, taking the initiative in building a school community

.

5.4.2.4 Education for Development of Competency

Individual competency is considered very important due to uncertain future nowadays. Different scholars give different concepts of competency, but this word is commonly defined as an ability to solve problems people face efficiently. According to OECD DeSeCo (Defining and Selecting Key Competencies) project (OECD, 2005), key competencies are classified into three categories: using tools interactively such as language and technology, interacting in heterogeneous groups and acting autonomously. To achieve these competencies, this school provides opportunities for students to make a plan and carry out it through project lesson, group activities and various classes. In the school, academic achievement means not test scores, but students' competencies for their life.

5.4.3 Japan Gakuyo Junior High School

Educational reformation in Japan is changing from 'equal' to 'free,' from 'standardization' to 'diversity,' from 'career' to 'ability.' Recently, the reformation concentrates on the general education and the education of mind as teaching to 'survive' – to be intellectual, ethical, and physical – which is new career. Moreover, the concept of school is changed from 'place for teaching' to 'place for learning,' and the boundary of the reformation is enlarged to enhance the connection between schools, families and local communities. For

teachers, the reformation heavily requires openness and rich humanity in their attitude and even in school management ‘free and responsibility’ than ‘regulation and security.’

The best example is ‘Gakuyo’ public school. The school is at stake because of violence, refusal to attend school, unregulated classes, low achievements, and so on. Gakuyo public school is a large rural school over 821 students in Shizuoka Prefecture on Mountain Fuji. The school has 24 classes involving 2 special classes. The reformation in the school is started when Mr. Sato Masaaki was appointed as the principal in April, 2001. Mr. Sato projected the vision of school as ‘pursuit of active and collaborative learning.’

Especially, in Gakuyo public school, four projects were set to construct ‘community for learning’ and then carried out through training step by step. The first project was to improve the relationship between students and teachers. In other words, teachers turned the relationship with students or their parents in positive way. Specifically, the project changed the way of teaching from discipline to ‘caring’ by sympathizing the feeling of students. The second project was to set lectures, centered on ‘learning.’ The reformation changed educational style from lecture, a passive teaching way forcing to remember by efficient delivery of knowledge, to seminar, an active way of learning to scrutinize and to discuss with friends about ‘persons, materials or events’. The third project was to create teacher groups like fellowship to learn each other. Exclusive teachers who did not want to show their works to other, tried to be reflective teachers by hearing colleagues and self-examining their own teaching methods. For the project, all teachers held demonstrative classes and then improved the methods through the training according to whole school or grades. The fourth project was to urge ‘participation of the parents,’ joining their students’ leaning. The project released distrust between the parents and the teachers, and built new community of school, as discussing about educational issues of their students between the parents or local residents.

The insight from educational reformation in Japan, which has the similar problems

with us, is to carry out long-term plan consistently. Moreover, another feature is that the school accepts the requirements from local community because of its enhanced relationship between the school and the communities.

5.5 Policy Implication through Case Study

Case studies looked at the features innovative schools in other countries have and policy implication which can be applied in practice. First, teachers did not undertake administrative works. Teachers could concentrate on preparing lesson instead of non-teaching work and improve their professionalism in teaching. For example, there were school secretaries who undertake an administrative work as a full time job. Through this system, administrative work could be handled efficiently.

Secondly, there were various types of classes and classes consist of many small groups. Small groups participate in project based lessons cooperatively. In addition, each group has a different level of course work and learning materials. Through group activities, student can have proper lessons according to their abilities and needs.

Thirdly, teachers including a principal are trained in advance to form a successful school community. They studied educational psychology, teaching methods, and counseling. Trained teachers promoted school reform effectively.

Finally, innovative schools constructed ‘community for learning’ with parents and local community. School’ curriculum reflected the requirements from local community and students could learn practical skills for their lives. The learning community between schools and communities improved the quality of innovative schools and increase the level of satisfaction of students and parents in their school life.

VI. CONCLUSION

6.1 Discussion and Limitation of the Study

Socioeconomic inequality became an urgent problem since the 1997 IMF crisis in South Korea. Becauseit can lead to serious threats to social stability and sustainability if the situation in which the middle class crumbled continues. Along with the crisis, Korean society became interested in a function of education to reduce the inequality gap.

As a result, SMOE has promoted the innovative school policy in order to solve the real problems in public education in South Korea. The innovative school policy emphasized forming an effective learning community and democratic community,making every student grow and thus ensuring noneare left behind in the learning.

Following this trend, this research analyzed how the educational gap is different between general school and the innovative school, and whether innovative schools can reduce the effect of socioeconomic backgrounds on the education gap or not. The gist of the research is as follows.

First, analysis of the educational gap in two different types of school showed that there was no significant difference between general and innovative schools, except in the case of ‘self-study time’. Students of general schools had more time to study alone and they spent a little more time on private tutoring than that of innovative schools. Self-study time is a very critical variable which might affect the test scores of students. It can also have influence on the educational gap in schools. The interesting thing was that there was no difference in the student centered-instruction and the level of satisfaction in classes which should have been prioritized in innovative schools. Innovative schools were not different in peer relationship and teacher trust in comparison with general schools either. These results showed that there were some problems to solve regarding to teaching methods, peer relationship and teacher

trust etc. It is necessary to find some practical ways to improve and restore the education effect of innovative schools.

Secondly, this research investigated how the students'scores in each school have changed from 2012 to 2013.With regard to the scores of Korean language and mathematics for 2 years, average scores in general schools were higher while the corresponding standard deviation became smaller than those of innovative schools. By contrast, although it is not significant, average scores of English in innovative schools were higher, but the corresponding standard deviation was larger. Thus innovative schools were not effective to narrow the deviation of test scores among students which represent the educational gap.

Thirdly, using the multiple regression model, this research analyzed whether innovative schools can reduce the effect of socioeconomic backgrounds on academic achievement and how much each independent variable affects academic achievement. The effect of SES was significant but the innovative school variable did not reduce the effect of SES on academic achievement. The satisfaction of class significantly affected academic achievement a large amount except the input variables such as SES. It showed that innovative schools did not minimize the effect of SES on academic achievement.

Additional qualitative research was implemented to find some reasons why innovative schools did not have an effect on decreasing the educational gap. According to the literature review, features that innovative schools have can contribute to reduce the educational gap, because innovative schools pursue good relationships with fellow students and teachers, and a 'small school' using student-centered instructions. It can develop each student's ability while helping students who are lagging behind their peers and strengthen the public education. However, Seoul innovative schools were not different significantlyfrom general schools in practice in regards to reducing the educational gap. Therefore, in-depth interviews and case studies were conducted in order to explain the results of the quantitative

research.

First of all, the fundamental principles of innovative schools are not actually being applied. For instance, innovative schools should convey the administration works of teachers to the administrative staff to allow the teachers to focus on teaching only. Also, the number of students per class should be lessened to aim for small schools. However, in reality, the teacher is in charge of much administration work, and classes with 25 students or more exist as well.

Secondly, the innovative school policy started in top-down command form. The members of innovation schools, such as the teachers and the parents should create the learning-oriented school culture and participate actively. However, as the most of the teachers including the principal operated school without full understanding of innovation school, it was not differentiated from general schools. Processes for understanding and learning the traits and the principles of innovation school are needed.

Thirdly, concepts regarding academic achievement are different. The academic achievement promoted by innovative school is actual competencies to live. Therefore, there are difficulties of measuring and comparing level of education through generally used examination scores and achievement of goals. As a result, the academic achievement in innovative schools may not have been expressed well in this research.

The qualitative research found many successful cases of innovation in other countries and a few in the South Korea. It showed that the ideas and the education philosophies of innovative schools are effective in forming educational communities of students, and help them to grow together. However, awareness of the teachers is not high enough to operate innovative school, and there are many hindrances in the educational environment. Therefore, efforts of the teaching staff and institutional supports are needed for innovative schools to be successful.

6.2 Further Research and Suggestions

Educational philosophies and directions of Innovative schools are similar to features of ‘effective school’ which have been studied in Western societies. In these schools, teachers have high expectations of students and their passions in order to form a learning-orientated school culture. Moreover, they pursue a relationship based on mutual respect and trust as well as a small school community.If those ideas that innovate schools pursue are applied in practice effectively, innovative schools can increase the satisfaction of students, teachers and parents, and contribute to decreasing the education gap caused by the SES. Unfortunately, this research showed that theprinciples of innovative schools were not being implemented properly.Thus, there is a need for fundamental changes in the policy of innovative schools, because innovative schools have the potential to reduce the educational inequalities and reform the public education system.

First of all, the working environment of school should be changed so that teachers can concentrate on preparing their lessons. The government has to provide trained supporting staff who can take on non-teaching work. Furthermore, the number of students per class should be lowered to less than 25 students per class. Thiswill result in teachers being an able to reform their teaching methods.

Secondly, the members of innovative schools such as a principal, teachers, and parents should get trainings in the management of their schools prior to being designated as an innovative school. Participations, communications, and commitments of members are crucial elements for successful innovative schools. However, teachers move from a school to the other one every 5 years and some school administrators are not familiar with the system of innovative schools. Thus, they should learn the principles, teaching methods, and learning goals innovative schools pursue so that school system can be organized properly.

Thirdly, there should be an agreed concept of academic achievement in our society

for the future. This research has limitations in measuring academic achievement, becausethe concept ofacademic achievement in innovative schools was different from that in general schools. Competencies for students' life as well as the test scores have to be included to evaluate students'achievement for a further research.

Furthermore, a discussion on the standards used to designate the innovative schools is needed. Unconditional expansion in the volume of innovative schools must not be encouraged and schools which are well prepared to make a learning community must be designated as the innovative school. In closing, the result of education cannot be measured in a short-term period. Thus, further research should be conducted on how innovative schools affect growth and development of students over a long period of time. More qualitative research is needed to find out if innovative schools are being applied effectively in practice.

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