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The Significance of Investing in School Facilities and Measures for Reform*

Sungmin Han, Fellow at KDI

“Voices are being raised over the need to improve Korea’s educational environment for the health and safety of our students. And despite the fact that the educational environment plays a vital role in both learning and teaching, investment in school facilities has been given low priority. In response, the new government has laid out plans to reform neglected and aged school facilities,¹⁾ emphasizing the duty of the nation with respect to education investment. In this context, relevant policies should focus on the importance of investment in school facilities.”

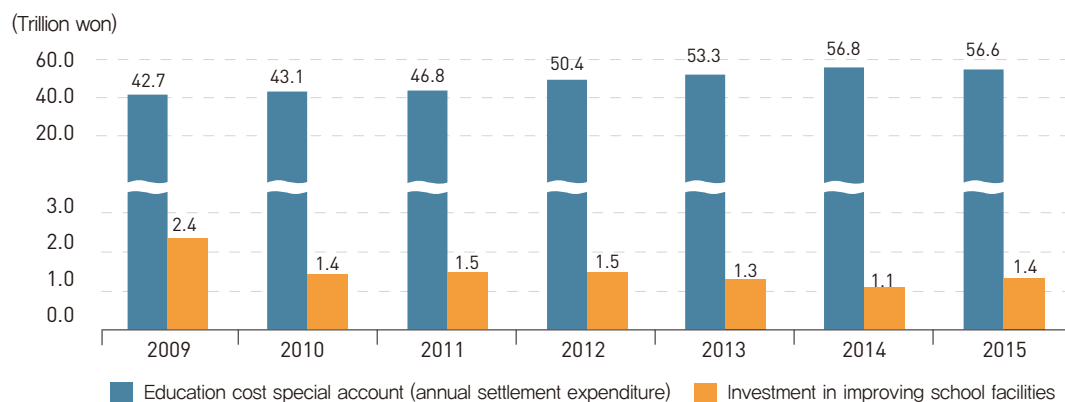
I . Introduction

Embarking on its first year, the Korean government launched a new education policy that aims to transform run-down, unsafe schools into protected, congenial and positive education facilities—action plans include renovating facilities over 40-years-old, removing asbestos and improving seismic resistance and climate control in classrooms. This is a positive step forward from previous inclinations to focus on tangible objectives such as adding new buildings or extensions to accommodate increasing student numbers rather than on enhancing the quality of existing facilities. Indeed, inadequate conditions in elementary and secondary schools, in particular, threaten the health and

* Based on Han, Sungmin, *Enhancing Value of Investment on Education Infrastructure*, Policy Study 2015-04, Korea Development Institute, 2015 (in Korean).

1) The Democratic Party of Korea, “Reinforcing the Nation’s Accountability in Education,” *Policy Pledge Booklet for the 19th Presidential Election Campaign*, Apr. 2017, p.213 (in Korean).

[Figure 1] Education Costs and Investment Expenditure in Improving School Facilities in Elementary and Secondary Schools



Source: Local Educational Finance Info (<http://www.eduinfo.go.kr>), Comprehensive Report on Local Educational Finance, yearly.

safety of students, thus making investment and renovation crucial.

Investment in school facilities has been a low priority due to policy decisions and a shift in the distribution of financial resources.

As to why there have been no active discussions regarding such investments hitherto, two fundamental reasons were found. First, the issue did not place high on the list of priorities for the former government in terms of education policy. On September 1, 2016, the National Assembly passed a 200 billion won supplementary budget, adding to a reserve fund of 300 billion won previously appropriated for the purpose of improving the educational environment. However, the Ministry of Education prioritized support for local educational offices who previously planned for a Nuri curriculum budget. The policy to improve the educational environment could not be implemented independently, and instead was used as a means for other educational policies. That is, the policy related to the investment in school facilities was again placed at the back of the priority list.

Second, government efforts were primarily directed at keeping pace with the mounting welfare demand. From 2009 to 2015, the expenditure for elementary and secondary school education climbed 32.6% from 42.7 trillion won to 56.6 trillion won while that for educational infrastructure investment (improving teaching conditions and school facilities) dropped from 2.4 trillion won in 2009 to 1.4 trillion won in 2010, and remained unchanged until 2015 (Figure 1). The trend can be understood in the context of the growing attention on welfare. As a result, the lion's share of the budget was directed to projects that had immediate visible results such as school meals. In other words, with the same financial constraints lingering, the expansion of beneficiaries for free school meals means that the funds remain limited to invest in school facilities.

Policies for the investment in school facilities should aim to provide safe and positive educational environments for students.

In sum, government efforts to enhance the educational environment have been lacking amid the increasing public interest in welfare, which has overshadowed the necessity to improve the conditions in schools. Thus, by addressing the current conditions and pending issues of Korea's school facilities, this study presents policy measures that enable students to receive their education in a safe and positive environment

<Table 1> Number of Buildings By Establishment Year

Category	(No. of buildings)					Total
	Before 1970	1970–1980	1980–1990	1990–2000	After 2000	
Elementary	649 (10%)	1,648 (25.5%)	1,283 (19.8%)	1,270 (19.6%)	1,624 (25.1%)	6,474
Middle	229 (7.5%)	723 (23.7%)	707 (23.2%)	581 (19.1%)	809 (26.5%)	3,049

Source: EDSS (EduData Service System), "Education Statistics," (last access: May 11, 2015).

II . School Facilities in Elementary and Secondary Schools: Current Status and Assessment

1. General Educational Environment

Educational environments are generally evaluated on teaching conditions and school facilities as this enables a more objective assessment.

Indicators commonly used to gauge the educational environment include the number of students per classroom and teacher and the teacher's education level—all factors that could affect students' learning. The number of students per classroom is of particular importance and used frequently in the evaluation of educational environment. Student numbers in elementary and secondary schools peaked in 2003 and 2006, respectively, and declined by 42,000 to 2,670,000 and by 128,000 to 1,460,000 in 2016. As a result, the student quota per school and number of students per classroom also decreased. From 2011 to 2016, the number of students per classroom receded from 25.5 to 22.4 in elementary schools and from 33.0 to 27.4 in middle schools. The number of students per teacher also dropped by 2.8 to 14.6 for the former and by 4.0 to 13.3 for the latter.

Additionally, the number of teachers with advanced degrees has risen. Since 2005, teachers with master's degrees have increased 65%, reaching approximately 91,600 in 2015, and those with doctorates have doubled to roughly 2,400—this means that 30% are doctorate/master's degree holders. Conclusively, indicators show that the educational environment has indeed improved. However, a better evaluation requires an assessment of school facilities that are directly associated with students' health and safety.

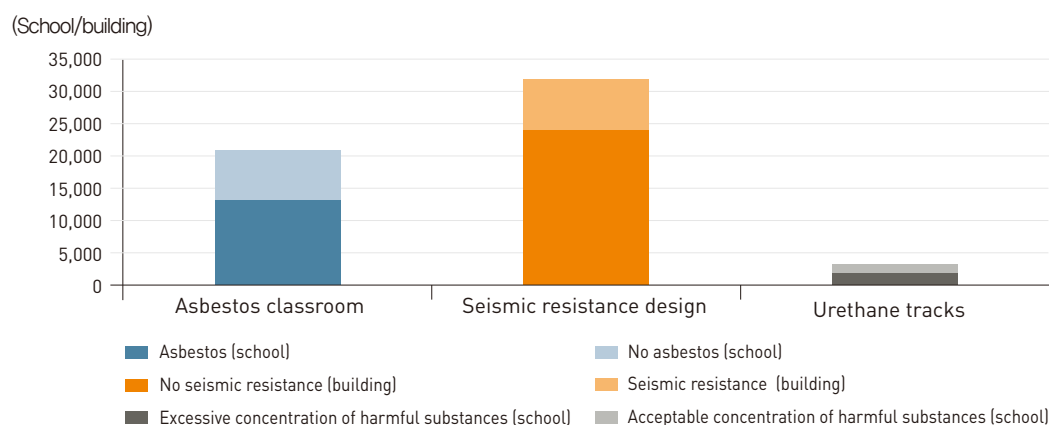
2. School Facilities

Discussions regarding school facilities directly linked to health and safety are conducted based on information on the objective safety and level of deterioration of facilities and concentration of harmful substances. According to data compiled from statistics on elementary and secondary schools, one out of ten facilities in elementary schools was constructed before 1970 (over 45yrs) and one out of four was built between 1970 and 1980. Of those in middle schools, one out of three was established before 1980 (over 35yrs), indicating a high proportion of aged facilities (Table 1).

Evaluation of the educational environment should include not only indicators for teaching conditions but also that for school facilities.

One out of three elementary and middle school buildings were found to be over 35 years old.

[Figure 2] School Facilities (Asbestos Use / Seismic Resistance / Urethane Track)



Source: Ministry of Education (Jul. 14 and 27, 2016); Yoo (May 20, 2015).

Aged school facilities pose problems that directly affect students' health and safety such as asbestos, lack of seismic resistance and hazardous urethane blend tracks.

Old buildings pose a serious threat to students' health and safety; prime examples being asbestos and the lack of seismic resistance. Asbestos, in particular, is on the list of WHO's IARC Group 1 carcinogens,²⁾ and the outcome of long-term exposure includes lung cancer and malignant mesothelioma. Its use is banned in the UK, Australia and Japan.³⁾ Also, seismic resistance is vital in the event of a natural disaster.

However, according to data from the Ministry of Education (2016), the above problems are still prevalent in a high number newer school facilities. As of 2016, the use of asbestos was confirmed in two out of three schools, and only one out of four schools was found to have seismic resistance. With regards to heavy metal exposure, urethane track facilities in two out of three schools were confirmed to have higher heavy metal concentrations than the accepted level, triggering a growing wave of frustration against the use of harmful substances in schools (Figure 2).

To tackle this problem, the Ministry of Education arranged the necessary funds, which were, however, far from the required amount. In 2014, each local education office was allocated a mere 2.94% or 160 billion won of the budget for the removal of asbestos. A year later, in 2015, only 20.5% or 21.2 billion won was appropriated of the 103 billion won originally proposed to reinforce seismic resistance. And, despite earmarking 200 billion won to replace urethane track facilities, only 17.0 billion won was raised from the special grant for national policy projects and injected ahead of time. Indeed, notwithstanding the urgency to repair or replace substandard school facilities, there is still a lack of substantial action. Without efforts to rectify the current situation, it is the students who will have to bear the damaging consequences, and hence policy discussions to seek solutions are imperative.

2) Asbestos, smoking and crystalline silica are on the list of WHO's IARC Group 1 carcinogens.

3) Korea has banned the use of cement and automotive parts containing asbestos since 2006 and that of all asbestos since 2009.

III. Investment in School Facilities: Significance and Direction

1. Impact and Significance of Investment

Investment in school facilities can be made in diverse ways. Overcrowded classes can be downsized by increasing the number of classrooms and outdated facilities can be renovated or repaired. Such investments could be effective not only in achieving the primary goal—improving student health and safety—but also in enhancing students’ academic performance by directly and indirectly affecting the environment for both teaching and learning.⁴⁾ For instance, neglected and malfunctioning facilities emit hazardous air pollutants, having a negative impact on students’ health and academic performance, and increasing absence rates and reducing attention spans (Rivera-Batiz and Marti, 1995, Mendell and Heath, 2005). In particular, in economically distressed regions with a large low-income population, most school facilities are in subpar condition.

Han (2015) found that, in schools with low investments averaging 15,000 won per student, doubling the investment increased the share of students with above-average grades in Korean, English and Math by 1.5-2.0%p, confirming the positive correlation between investment and performance. The result implies that even a small amount can have a positive impact on the academic performance of disadvantaged students as well as contributing to the educational environment.

Moreover, teachers working in unfavorable conditions may be tempted to transfer to schools with better environments. They may be feeling tired and discouraged which could affect students negatively (Uline and Tschannen-Moran, 2008). Indeed, it has been widely reported that school conditions affect students’ attitudes and behaviors. Likewise, the relationship between student and teacher is closely linked to the learning environment (Schneider, 2002).

The school environment can, of course, affect each student differently. However, if conditions fall below a certain standard, the health, safety and education of all students are put at risk. Furthermore, as academic performance and labor market outcomes are closely linked, focus must also be placed on the long-term affects of investment in the educational environment at elementary and secondary schools.

2. Direction of Investment

Investments in school facilities have thus far been centered on quantity rather than quality in order to keep up with the increase in the school-age population. However, as this proportion of society slowly tapers off, some have argued that investments in school facilities should too be cut.

The fact that the school-age population is shrinking is undoubtedly a vital component in making investment decisions. But the reality is fraught with mounting challenges such as the health and

Investment in school facilities could be effective not only in achieving its primary goal of improving health and safety but also in inducing secondary effects such as heightened academic performance.

A quality educational environment can have a positive influence on the attitudes and behaviors of both students and teachers.

4) Indoor air conditions, temperature, humidity, illumination, noise and the age and quality of the building can affect students’ grades (Schneider, 2002).

safety risks posed by crumbling buildings, asbestos-filled classrooms, urethane tracks and lack of seismic resistance.

Future investments in school facilities need to enhance quality and reflect the changes in the educational curriculum.

Future investment in school facilities should also proceed in line with the changes in the school curriculum as they not only contribute to health and safety but also to the seamless operation of the syllabus. In fact, classroom activities are becoming more centered on debates, discussions and practical activities that involve interaction between students and teachers. And schools are actively adopting computer-related curricula. In response to such changes, a swift transition should be made towards establishing school facilities that conform to the advanced educational system. The number of computers per student in Korea is relatively higher than the world average,⁵⁾ but the proportion of computers available to middle school students is relatively low at 44% (KICE, 2015). The computer penetration rate is of great significance since software education will become increasingly important in the future school curriculum. The UK designated 2014 as the “Year of Code,” injecting coding and programming courses into the compulsory curricula for elementary and secondary education. And, the US released its education policy package in 2013 focusing on ‘computational thinking’ in the K-12 curriculum. Indeed, smart IT education is a growing global trend, and thus it is time for Korea to concentrate on investing in school facilities that can keep up with the trend.

IV. Policy Suggestions

As in many parts of the globe, elementary and secondary education is compulsory in Korea and as such, it is the responsibility of the government to create the appropriate settings. But, despite the significance of a quality educational environment, policies that enable this have been few and far between. If the urgent need to invest in school facilities is recognized, two issues, in terms of investment, must be considered.

To raise the needed financial resources for investment, it is necessary to adjust the expenditure structure by item within the total education budget.

First is raising the necessary financial resources. And for this, the expenditure structure within the total education budget should be adjusted by item. The school-age population is on a rapid decline in the mid- to long-term, and resultant decreases are expected in the number of schools and faculty. Rather than cutting back hastily, methods that enable flexible expenditure by item should be considered. For instance, a certain proportion of the decreasing rigid labor cost could be used to invest in key areas such as improving facility safety and teaching conditions and providing software education, etc. To that end, a phased investment plan must first be mapped out based on an accurate estimation of the cut in budget and according to the priority of projects and targets for

5) Thanks to policies in the early and mid 1990s to promote computer penetration, the number of students per computer plummeted. However, the rate still remains above the world average with 7.4 students per computer in elementary school and 7.7 in middle school, as of 2015.

6) This can be achieved without revising the laws. According to paragraph 1-① of Article 5-2, when there is a special financial demand in the education-related nationwide policy project, special subsidies shall be granted, and as referred to in Article 58 of the Local Finance Act, schools particularly in areas of high deprivation can receive the special subsidy from local authorities. Therefore, if the government and local authorities put in enough effort, it is possible to promote investing in the improvement of the educational environment.

the investment in school facilities. However, in the short-term, it is also necessary to seek measures to use the special grant for schools in underdeveloped regions in need of immediate support for safety issues.⁶⁾ The special grant is a financial resource offered by the central government to local authorities that require a special fiscal demand. If the grant is transferred to educational institutions, this can be invested to enhance the educational environment.

The second issue to consider is how to efficiently invest the funds. Here, a systemic and comprehensive monitoring system should be formulated to assess the educational environment. The Ministry of Education conducts an annual full-scale diagnosis of the structural safety of all school facilities and based on the results, implements short- to long-term measures to enhance the safety of building constructions. However, in terms of the learning environment, which includes air quality, cooling/heating system and classroom equipment, inspections are made sporadically. Even examinations that are conducted for asbestos and urethane tracks lack the proper follow-up actions due to manpower shortages or budget constraints, among others. Therefore, based on a comprehensive evaluation of all educational facilities, such as the Ministry's full-scale inspection, short- and long-term measures must be developed and the necessary manpower and budget must be arranged. Also, a monitoring system is needed to check whether follow-up actions are carried out in a duly manner.

Lastly, in addition to policy measures for the current educational environment, it is necessary to establish investment plans for school facilities in response to the expected changes in the educational environment. This means that investments should be made in light of the government's educational policy which shifts with the educational environment; although this is not yet a reality. Efficient investment will be possible only when the direction of education policy is linked to that of investment.

For efficient investment, a systemic and comprehensive system that can assess the educational environment must be formulated.

Future investment in school facilities should be made in light of the government's educational policy that fits the changing educational environment.

References

- Duflo, Esther, “The Medium Run Effects of Educational Expansion: Evidence from a Large School Construction Program in Indonesia,” *Journal of Development Economics* 74 (1), 2004, pp.163~197.
- Han, Sungmin, *Enhancing Value of Investment on Education Infrastructure*, Policy Study 2015-04, Korea Development Institute, 2015 (in Korean).
- Korea Institute of Curriculum & Evaluation, “ICT Educational Environment Improvement Measures Based on ICILS 2013 Results,” KICE Position Paper 7 (5), 2015 (in Korean).
- Mendell, Mark J. and Garvin A. Heath, “Do Indoor Environments in Schools Influence Student Performance? A Critical Review of the Literature,” *Indoor Air*, 15, 2005, pp.27~52.
- Rivera-Batiz, F. L. and L. Marti, “A School System at Risk: A Study of the Consequences of Overcrowding in New York City Public Schools,” New York: Institute for Urban and Minority Education, Teachers College, Columbia University, 1995.
- Schneider, Mark, “Do School Facilities Affect Academic Outcomes? National Clearinghouse for Educational Facilities,” *Environmental Education* 1 (3), 2002, pp.167~173.
- The Democratic Party of Korea, *Policy Pledge Booklet for the 19th Presidential Election Campaign*, Apr. 2017, p.213 (in Korean).
- The Ministry of Education, “Plan to Replace Urethane Tracks at School Which Contain Excess Amount of Hazardous Substance,” press release, Jul. 27, 2017 (in Korean).
- The Ministry of Education, “Regarding the News Article on Ministry of Education’s Absurd Guidelines on Asbestos Control,” explanation material, Jul. 14, 2016 (in Korean).
- The Ministry of Education, *Comprehensive Report on Local Educational Finance*, each year (in Korean).
- Uline, C. and M. Tschannen-Moran, “The Walls Speak: The Interplay of Quality Facilities, School Climate, and Student Achievement,” *Journal of Educational Administration* 46 (1), 2008, pp.55~73.
- Yoo, Ki Hong, “250 Earthquakes in Korea over the Past Four Years, Seven out of Ten Schools Nationwide Lack Seismic Resistance Design,” press release from the National Assemblyman Ki Hong Yoo’s Office, May 20, 2017 (in Korean).
- Local Educational Finance Info (<http://www.eduinfo.go.kr>, last access: Aug. 2017) (in Korean).
- EDSS (EduData Service System), “Education Statistics,” (last access: May 11, 2015) (in Korean).