Physical Conditions of Schools and Educational Outcomes

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Physical Conditions to Improve the Quality of Education

How important?

• Improving the access to quality education is a necessary condition for the productive transformation of countries

• School infrastructure have been an indispensible investment for school development

• Limited research-based measurements indicating to what degree the school physical conditions contribute to or influence educational outcome
Empirical Evidence

What is included in this exercise?

• Literature found in both developing countries and developed countries

• Analysis using different methods, sampling designs and statistical algorithms

• Correlation between some indicator of physical conditions of schools and colleges and some indicator of quality of education, educational processes and results

• Rate of return to investment in education infrastructure
Physical Conditions and Quality Parameters

• Comfort conditions for students, teachers & administrators: space for teachers and students, conditioned with temperature, adequate ventilation and lighting, water services, electricity, and Internet and proper hygienic conditions with modern design including sewage drainage

• Opportunities for the development of learning experiences, experiments and practices such as classrooms, libraries, laboratories for science, physics, chemistry and other technical fields like agriculture

• Spaces for the development of talent and entertainment, and for sport and culture
Color, light, space, furniture, technology, display, and acoustics combine to create an environment conducive for learning. p37. Photo: Joseph Romeo. Courtesy Perkins Eastman | EE&K.
Demand for architecture that
Facilitates the educational process,
Reduces inequalities and disparities between urban and rural areas,
Projects usage over the duration of the buildings’ useful life

Longer school days demand adequate space and time for leisure, interaction, recreation, and rest spaces, organized in an age-appropriate fashion
Schools in rural and urban areas
National and international schools
Empirical Findings from Developing Countries

Higher Enrollment & Results on Learning

• An improvement in the physical conditions of schools increased 10 percent from the standard deviation of learning while providing the technical equipment increased by 12 percent, the increase in libraries 10 percent, and teachers manuals by 7 percent

• The cumulative effect of having bathing facilities, water and electricity, is associated with a gain of between 3.2 and 5.6 percent on standardized tests in math and language

• In Latin America studies have confirmed initial findings and show that the physical infrastructure, including the presence of academic and educational areas such as libraries, laboratories, and access to public services and areas of sports and cultural entertainment, are highly associated with learning
Empirical Findings from Developed Countries

• In US, four sets of design patterns (movement and circulation, large group meeting places, day lighting and views, and instructional neighborhoods) explained between 2% and 7% of additional variance in academic achievement, controlling for school SES

• In Australia empirical evidence that individual factors such as light levels, air quality and temperature and noise, have an effect on the behavior and performance of students

• OECD’s study on tomorrow’s physical learning environment highlighted the relevance and users’ needs to the space and equipment. The creation of a learning space model should support the teaching and learning processes. Regarding access to and use of computers and learning outcomes, the study showed mere access to technology makes little impact
Impact of Infrastructure in Educational Quality

• Attendance & completion of academic cycles: Worldwide evidence that infrastructure correlates with increased enrollment, higher attendance and higher completion rates, in some parts of the world this is particularly relevant for girls
Impact of Infrastructure in Educational Quality

• The motivation of teachers:
  Also worldwide evidence that good infrastructure motivates teachers and improves attendance (decrease absenteeism). Both with direct impact on students’ academic achievement.
Impact of Infrastructure in Educational Quality

• Learning outcomes:
  worldwide there is a clear significant impact of the physical environment both on teacher retention and students’ achievement, including attendance, dropout rate and academic performance in standardized test scores.

• Production functions studies:
  positive relationship between school facilities/ quality of infrastructure/ schooling buildings and learning
Only Evidence on Attribution from Impact Evaluation

• Causality between infrastructure and educational achievement (additional number of years of formal education) and labor market results (higher income levels) (Indonesia-Dulfo)
Final Comments

• Infrastructure is justifiable from an economics of education perspective. However less and less studies to justify it.
• Better results if looked as an integral part with other education inputs/processes (interactive model)
• There is a need for more rigorous studies on attribution of education outcomes/results
Thank you

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