Chapter 4
Quality Education and Economic Development

Eric Hanushek

The United Nations ratified its Sustainable Development Goals (SDGs) in 2015. The 17 goals set out the range of objectives for world development. They are obviously challenging goals, and it is doubtful that all can be accomplished by 2030. Nonetheless, they do focus attention on important measures of world welfare.

When looking across the SDGs, two stand out because they will determine the ability to approach the other 15. Specifically, the set of goals cannot be accomplished without substantially larger resources than currently available, and that means that economic growth is paramount. The only way to expand the world's resources is to have economic growth.

The only way to have economic growth, in the long run, is to improve the quality of schools. Countries that can improve their schools can look forward to substantial gains in economic welfare and can begin moving toward accomplishing all 17 SDGs.

Schooling and Growth

The SDGs are an expansion of the Millennium Development Goals that previously set the goal of universal primary schooling by 2015. While developing countries substantially expanded access to schooling, many did not secure the hoped-for improvements in economic well-being. The simple explanation for this is the insufficient emphasis or appreciation for the importance of learning outcomes, or cognitive skills.

The skills of individuals and nations have traditionally been measured by school attainment, i.e., years of schooling. In particular, assessing school attendance and

E. Hanushek (✉)

Paul and Jean Hanna Senior Fellow on Education Policy, Hoover Institution, Stanford University, Stanford, CA, US

e-mail: hanushek@stanford.edu.com

attainment has been done across much of the world, and this presents a ready standard for judging the human capital of nations. But school attainment and access to schools are very incomplete and ineffective measures of relevant skills, and thus they serve as an imperfect basis for setting development goals.

The existence of international tests is now well known. The TIMSS and PISA assessments of math and science performance now cover a wide range of countries.[1] What is less known is that they provide a good indication of the skills of a country's labor force, skills that are important for development.

History shows that it is cognitive skills, which in the aggregate I call the knowledge capital of nations, that drive economic growth.[2] Moreover, these cognitive skills can be proxied by the international tests.

Figure 4.1 shows the relationship between knowledge capital and long-run growth rates in gross domestic product (GDP) per capita over the period 1960–2000. This figure is based on a statistical analysis that includes a single other factor (not shown)—the initial level of GDP per capita. Including the initial income level simply acknowledges the fact that it is easier to grow when starting behind because it is necessary only to copy what others are doing; if starting ahead, it is necessary to innovate and to invent new things, which is more difficult.

Nations fall quite close to this line. Differences in the skills in each country explain most of the variation in growth across countries. Moreover, this is a very steep line, a fact that will be demonstrated below.

Importantly, school attainment has no additional explanatory power once one takes into account what has been learned as measured by the tests. Of course, this does not say that schooling is worthless. There is a strong correlation between school attainment and test scores. Nonetheless, since schooling builds on what was learned previously, the test scores given at the end of lower secondary schooling (when TIMSS and PISA are tested) are good predictors of how much people will know when they complete more schooling.

Before considering the strength of this relationship, however, it is important to consider the issue of causality. For policy purposes, we want to know whether long-run growth will increase if we find a way of improving school quality. While it is difficult with macro data to obtain conclusive support for a causal interpretation, a variety of complementary investigations supports such an interpretation.[3] Most importantly, there is direct evidence, that countries improving their test scores over time have seen an increase in their annual growth rates.

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[1]TIMSS is the Trends in International Mathematics and Science Study (https://timssandpirls.bc.edu/), and PISA is the Programme for International Student Assessment (http://www.oecd.org/pisa/test/).

[2]Hanushek and Woessmann (2015a).

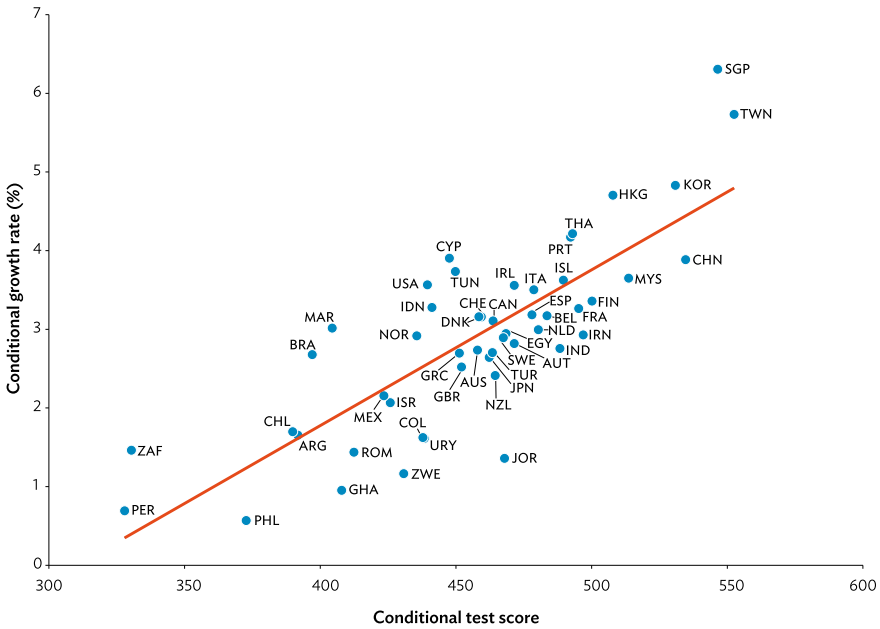[3]Hanushek and Woessmann (2012).

Figure 4.1 Knowledge Capital and Long-Run Growth Rates, 1960–2000. ARG = Argentina; AUS = Australia; AUT = Austria; BEL = Belgium; BRA = Brazil; CAN = Canada; CHE = Switzerland; CHL = Chile; PRC = People's Republic of China; COL = Colombia; CYP = Cyprus; DNK = Denmark; EGY = Egypt; ESP = Spain; FIN = Finland; FRA = France; GBR = United Kingdom; GHA = Ghana; GRC = Greece; HKG = Hong Kong, China; IDN = Indonesia; IND = India; IRL = Ireland; IRN = Iran; ISL = Iceland; ISR = Israel; ITA = Italy; JOR = Jordan; JPN = Japan; KOR = Korea; MAR = Morocco; MEX = Mexico; MYS = Malaysia; NLD = Netherlands; NOR = Norway; NZL = New Zealand; PER = Peru; PHL = Philippines; PRT = Portugal; ROM = Romania; SGP = Singapore; SWE = Sweden; THA = Thailand; TUN = Tunisia; TUR = Turkey; TAP = Taipei,China; URY = Uruguay; USA = United States; ZAF = South Africa; ZWE = Zimbabwe. *Note* Marginal relationship of test scores and growth rates of GDP per capita after allowing for the initial level of GDP per capita in 1960. *Source* Hanushek and Woessmann (2015a)

Educational Challenges

With that background, it is possible to consider the position of countries in terms of their current educational outcomes. We can do this for the 76 countries that have participated in one of the recent international tests of math and science skills.[4] This group includes six ADB countries: Georgia, Indonesia, Kazakhstan, Malaysia, Thailand, and Viet Nam. We record two measures of the educational challenge facing developing nations: the proportion of students completing lower secondary schooling and the proportion reaching basic skill levels.

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[4]The details of this analysis including data for all 76 countries can be found in Hanushek and Woessmann (2015b).

Countries around the world have made considerable progress in approaching universal access and attainment of lower secondary schooling, but not all countries, including some developed ones, have fully accomplished this goal. For example, fewer than half of Ghanaian children complete lower secondary schooling. It is also still the case that this represents an extraordinary challenge for many countries (and is almost certainly larger for countries outside the 76, for which we have data). Thailand, Viet Nam, and another 15 of the 76 countries have less than 80% of children not leaving school before lower secondary schooling completion. Clearly, this group of school leavers will have trouble competing against workers in a wide range of countries. Moreover, it does not bode well for growth, although there we must look more specifically at the quality of education.

Instead of the vague SDG goal to "ensure inclusive and equitable quality education," it is useful to consider setting an explicit quality goal. For concreteness, this analysis will consider the implications of the measurable goal that *all youth obtain basic skills*. This goal incorporates two components, which are the full enrollment of youth in secondary school (the quantity part of the SDG) and the expansion in achievement that provides a basis for economic and social participation.

We assume that Level 1 skills on the PISA tests (fully attained) for 15-year-olds represent the minimal skills necessary for participating productively in modern economies. The borderline between Levels 1 and 2 is 420 points on the PISA mathematics scale. With a mean of 500 and a standard deviation of 100 for Organisation for Economic Co-operation and Development (OECD) countries, this score of 420 implies performance at the 23rd percentile of the overall distribution for OECD.

The different levels of performance correspond to the distinct skills of individuals (OECD 2013). The description of the performance at Level 1 (for math) is that students can answer questions that involve familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations.

Achieving Level 1 is meant to be a minimal skill level required as economic development proceeds around the globe. But, again, the challenges are clear—a large portion of the developing country population *that is still in school at age 15* cannot meet these minimal levels. Only one in ten Ghanaian 15-year-olds still in school can reliably answer Level 1 math questions, and for six countries (including Indonesia) in the restricted group that has participated in the international tests the proportion reaching basic levels is less than 20%.

Note that Viet Nam is a real exception, with just 11% of its students in school being unable to reach this basic level. The challenge to Viet Nam remains, however, that one-third of its 15-year-olds are out of school—and presumably likely to perform at a lower level on these tests.

The Economics of Universal Basic Skills

It is possible to put the education situation in each country together with the economic growth picture given previously in Figure 4.1. For this discussion, we concentrate on the subset of ADB countries that have participated in international testing: Georgia, Indonesia, Kazakhstan, Malaysia, Thailand, and Viet Nam. We can use the historical economic relationship to forecast the economic impact on individual economies of three separate scenarios that take different perspectives on development goals:

1. Provide full access to lower secondary schooling at current quality levels;
2. Bring all students currently in school up to the basic skill level; and
3. Provide full access to all students at the basic skill level.

Our analysis considers achieving universal basic skills in response to the changing performance of each country's schools over a 15-year period ending in 2030, consistent with the SDGs. The projections must of course take into account the dynamics of school improvement and of labor force improvement. Over time, the knowledge capital of the nation improves as better-educated youth enter the labor force. The more skilled workforce leads to increased economic growth and other social outcomes.[5] The economic value of the policy change is calculated as the difference between the GDP expected with the current workforce and the GDP expected with the improved workforce, calculated over the expected lifetime of a child born today. Because the benefits of growth are spread out over future decades, near-term gains are weighted more heavily than those farther in the future. Specifically, all future values are discounted back to 2015 at a 3% discount rate so that the future economic benefits can be compared in present-value terms.[6]

The economic impact of achieving each of the three scenarios for the six ADB countries participating in international tests is shown in Figure 4.2,[7] which shows the increase in the present value of gains in GDP expected from the educational improvements.

Considerable heterogeneity exists across the countries, reflecting both their current enrollment rates and current achievement levels. With the exception of Viet Nam, the first overall result is that improving quality only for those currently in school has a much larger impact than just bringing all children through lower secondary schooling at current quality levels. Second, the gains from universal basic skills are large. In both Georgia and Indonesia, the added GDP from universal basic skills approaches 20 times the current GDP. For these two countries, it would amount to lifting the average level of GDP over the next 80 years by more than 18%.

The other ADB countries get smaller gains—because they are currently closer to universal basic skills. Nonetheless, the gains are still large: 7.6% increase in the average level of GDP for Kazakhstan, 8.9% for Thailand, and 6.5% for Viet Nam.

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[5]Hanushek and Woessmann (2015b:10).

[6]Hanushek and Woessmann (2015a).

[7]The details of this analysis and the extension to all 76 countries can be found in Hanushek and Woessmann (2015b).
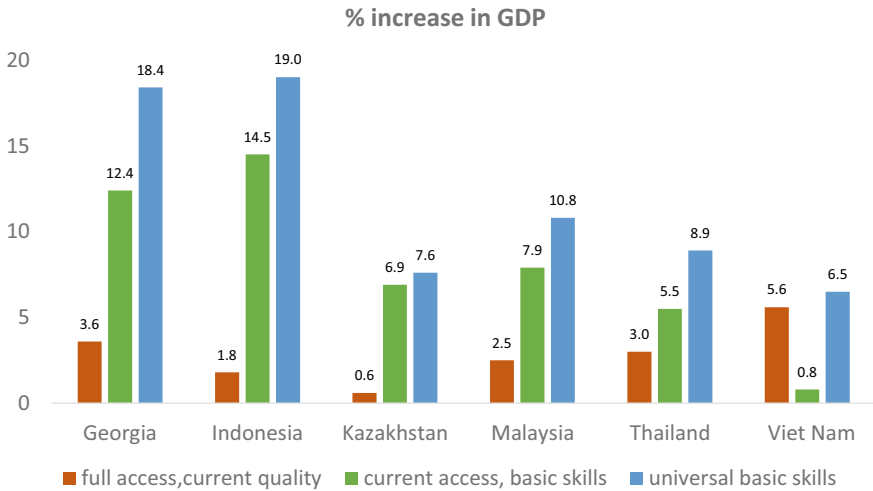
% increase in GDP

Figure 4.2 Increases in GDP from Achieving Universal Basic Skills, ADB Countries. *Source* Hanushek and Woessmann (2015b)

Viet Nam, as indicated previously, is a special case. The quality of schools is very high, but they do not reach substantial portions of the population. This country's challenge is expanding access while maintaining the current quality level.

It is extraordinarily unlikely that Georgia and Indonesia could move their schools quickly enough to meet the universal skills goal in 15 years. But, if they stretched reform out for 30 years, they could still expect an increase in the average level of GDP over the next 80 years by more than 13%.

The most important step for improvement is to establish a clear development goal and indicator in terms of measured skills—such as accomplishing Level 1 in mathematics and reading for 15-year-olds on PISA or its equivalent. There are three important facets to this: 1. It calls for regular assessments of student skills; 2. It calls for setting national policy and actions on the basis of measured student outcomes; and 3. It permits setting a realistic bar.

Importantly, relying on input measures of schools such as pupil–teacher ratios or spending has proven to be a bad approach to policy, because these measures are inconsistently related to student outcomes. Existing evidence suggests quite simply that to improve school outcomes there is no substitute for measuring and focusing on outcomes.[8] While measurement of outcomes by itself is not sufficient, it is a very necessary step.

The evidence of improvements in achievement over the past decade and a half shows that many countries could feasibly meet the goal of universal basic skills over the next decade and a half, assuming they duplicate the record of the best performers. For example, Poland was able to reduce the share of underperforming students by

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[8]Hanushek and Woessmann (2015c).

one-third from 22 to 14% within just a decade. Shanghai in the People's Republic of China reduced the share of underperforming students between 2009 and 2012 from 4.9 to 3.8%. There is no single policy that has led to these gains. Instead, there are local approaches informed by regular monitoring of student performance.[9]

Improvement is clearly difficult, and some countries have even seen their achievement levels fall. If countries wish to improve, there is no substitute for measuring achievement outcomes and evaluating policies on the basis of achievement. The inclusive growth made possible through the universal achievement of basic skills has tremendous potential as a way to address issues of poverty and limited healthcare, and to foster the new technologies needed to improve the sustainability of growth. No substitute for improved skills has been identified that offers similar possibilities of facilitating the inclusive growth needed to address the full range of development goals.[10]

This analysis also considers only the 76 countries that have participated in international assessments. For these countries the magnitude of the challenge is apparent, but for the many countries—generally at the low end of the income distribution—that have not participated, the challenges are likely to be even greater. Importantly, no country classified as lower income is included in the analysis, because they lack the necessary data. Without data on either achievement status or challenges, it is unlikely that these countries will be able to improve at a satisfactory rate.

It is not always true that "what gets measured gets done." But, it is more universally true that "what does not get measured does not get done."

Link to the presentation material: https://events.development.asia/materials/20160919/quality-education-and-economic-development

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[9]Hanushek and Woessmann (2015b:10).

[10]Hanushek and Woessmann (2015b:16).