The Importance of Educational Outcomes and Some Thoughts on Improvement

Eric A. Hanushek
Stanford University

Socioeconomic Impact of Education
Taub Center
September 2011
Outline of Talk

Three main ideas:

1. Quality education is very valuable
2. Teacher quality is most important aspect of schools
3. Institutions and incentives are key policy levers
• Measuring knowledge, not sitting in the classroom

• International agencies have conducted many international tests of students’ performance in cognitive skills since mid-1960s
  - 12 testing occasions, 36 separate test observations (age levels, subjects)
Cognitive Skills and Economic Growth

The diagram illustrates the relationship between Conditional test score and Conditional growth. The linear regression line has a slope coefficient of 1.980, with a standard error of 0.217 and a t-statistic of 9.12.
Years of Schooling and Economic Growth

Without quality control

With quality control

cof = .58144999, se = .09536607, t = 6.1

cof = .0264058, se = .07839797, t = .34
Growth Projections

• Scenario 1
  - Achievement improves by 25 points (1/4 s.d.)
Annual Gains from 25 PISA-Points Improvement

- Improvement (1/4 std. dev.):
  - 60%
  - 40%
  - 50%
  - 30%
  - 40%

- Percent addition to annual GDP:
  - 20%
  - 30%
  - 40%
  - 50%

Year:
- 2010
- 2020
- 2030
- 2040
- 2050
- 2060
- 2070
- 2080
- 2090
- 2100
- 2110
Annual Gains from 25 PISA-Points Improvement

![Graph showing annual gains from 25 PISA-Points Improvement. The graph plots percent addition to annual GDP against years from 2010 to 2110. The gains increase steadily over time, with a significant spike in the year 2090.]
Annual Gains from 25 PISA-Points Improvement
Annual Gains from 25 PISA-Points Improvement

Present value = 288 percent of GDP

Percent addition to annual GDP

Year

2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2110

0% 10% 20% 30% 40% 50% 60%
Growth Projections

- Scenario 1
  - Achievement improves by 25 points (1/4 s.d.)
    - PV = 288% of current GDP
    - $123T for OECD
    - $628 billion for Israel
• **Scenario 1**
  - Achievement improves by 25 points (1/4 s.d.)

• **Scenario 2**
  - Everybody Achieves at Level of Finland
    - $\text{PV} = 645\%$ of current GDP in OECD
    - $275T$ for OECD
    - $3.37$ trillion for Israel
  - $\text{PV}=1547\%$ of current GDP in Israel
Everybody Achieves at Level of Finland

$3.34T
Growth Projections

• Scenario 1
  - Achievement improves by 25 points (1/4 s.d.)

• Scenario 2
  - Everybody Achieves at Level of Finland

• Scenario 3
  - All students to OECD mean (500 points)
    - $1.64 trillion for Israel
    - 754% of current GDP
Rocket Scientists or Education for All?

- Should schooling policy concentrate attention at lowest or highest achievers?
  - Egalitarian vs. elitist school systems
    - BOTH seem important
      - Rocket scientists more important for developing countries
Policy options

- Spending
Math performance in PISA 2003

Cumulative educational expenditure per student

$R^2 = 0.01$

$R^2 = 0.15$
Policy options

- Spending
- Teacher quality
Teacher Quality

- Strongest evidence on systematic effects
- Not related to common measures
- Observable through both student performance and supervisor ratings
Value-Added Measurement

• Need to separate teacher effects from other things
• Look at growth in achievement, statistically adjust for other factors
• Shows impact of improving teacher quality
• Permits evaluations and performance rewards
U.S. Evidence on Value-Added of Teachers

• Large area of current research

• Consistent estimates of impacts
  - One year of learning more from good teacher
  - Overcome family background with 3-5 years of a good teacher

• Increasingly used in states and school districts
  - Race to the Top
  - Washington, DC; Denver; Florida
Alternative Estimates of Least Effective U.S. Teachers on Student Achievement

The diagram illustrates the relationship between the percent deselected and s.d. performance gain for Finland and Canada. The x-axis represents the percent deselected, ranging from 0% to 12%, and the y-axis represents the s.d. performance gain, ranging from 0.00 to 1.00.

- **Finland** is represented by a blue line, indicating a high estimate of teacher effectiveness.
- **Canada** is represented by a red dashed line, indicating a low estimate of teacher effectiveness.

The high estimate of teacher effectiveness for Finland shows a steady increase in s.d. performance gain as the percent deselected increases, while the low estimate for Canada shows a decrease in s.d. performance gain with an increase in percent deselected.
Policy options

• Spending

• Teacher quality

• Institutional changes
  1. Competition and choice (private schools)
  2. Accountability (central exit exams)
  3. Autonomy
  4. Tracking
  5. Teacher performance pay
  6. Pre-primary education system
School autonomy

1. Use of superior local knowledge
2. Opportunistic behavior

School autonomy may be good or bad
How Central Exams Change Behavior
— Thus Changing the Effects of Autonomy —

• Central exams provide *information*

• Central exams ease the monitoring

• By introducing accountability, central exams ease the “bad” effects of autonomy, ensuring a “good” net effect
Central Exams, School Autonomy, and Student Performance

Math test score

No
Yes
Central exams

School autonomy over teacher salaries

TIMSS + TIMSS-R
Trends in Test Scores

Countries: Japan, Australia, Canada, Korea, Finland, Netherlands, N. Zealand, Canada, Australia, Belgium, France, Norway, Sweden, USA, Italy

Years: 1975, 2000

Scores range from 460 to 560.
Trends in Growth Rates vs. Trends in Test Scores
Conclusions

Three main ideas:

1. Quality education is very valuable
2. Teacher quality is most important aspect of schools
3. Institutions and incentives are key policy levers