The SAT

SAT scores range from 200 to 800 with a median of 500.
The standard deviation for a first-time test taker with an expected score of 500 is ~33.

How large a difference between two individual scores is necessary for statistical significance?

The expected value of two SAT scores must differ by more than 100 points to be significantly different.

The SAT Interpreted

The SAT score should use the AP’s scale: 1 to 5.
The SAT norms grades across high schools.
There are no correct answers to SAT questions.
Test prep increases scores by gaming the test.

K12
What works, what doesn’t.

Malcolm Getz
Vanderbilt Economics

Two Philosophies

1. Education fills empty vessels.
2. Education sparks curiosity.

The Goal

The education of other people’s children has significant value.
A. People are more productive in groups of educated people.
B. Markets and democracy work better with educated people.
Five Questions

1. Why focus on education now?
2. Will more spending improve outcomes?
3. Have tests produced gains?
4. How do we educate poor children?
5. Is privatizing effective?

#1 Why education now?

- The returns to schooling are high.
- Meritocracy emphasizes position.
- We spend less time at home.

The college-high school gap grew.

We seek relative position.

- A positional race can be enervating.
- We live in a meritocracy where educational performance defines us.
- Tournament play may discourage all but the top.

1. Demand is rising.

We have powerful motives for wanting more quality in education.
#2 Will more spending improve outcomes?

What can we buy? What Pays?

## Spending per student grew.

![Graph showing Real Expenditure per Pupil (2012 $s) over time](chart)

- Spending per student grew.
- Real Expenditure per Pupil $/pupil (2012 $s)
  - $0
  - $2,000
  - $4,000
  - $6,000
  - $8,000
  - $10,000
  - $12,000
  - $14,000
- Year
  - 1960
  - 1980
  - 2000
- Smooth

## Teacher salaries haven’t grown.

![Graph showing Average Teacher Salary US $2013](chart)

- Teacher salaries haven’t grown.
- Average Teacher Salary US $2013
  - Elementary
  - Secondary
  - Year
  - 1960
  - 1980
  - 2000

## Employment 1970–2000

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<th>Occupation</th>
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## Average class size has fallen.

![Graph showing Pupil Teacher Ratio, Public Schools](chart)

- Average class size has fallen.
- Pupil Teacher Ratio, Public Schools
  - 1955 to 2012

## Reading scores are steady.

![Graph showing National Assessment Educational Progress](chart)

- Reading scores are steady.
- National Assessment Educational Progress
  - Reading 4th
  - Reading 8th
  - Reading 12th
  - Years
  - 1990
  - 1995
  - 2000
  - 2005
  - 2010
  - 2015

Math scores rose.

Long-term Impact of Teachers

- Students of an average teacher yields $250,000 more in earnings for pupils as adults compared to a 5\textsuperscript{th} percentile teacher.
  - Chetty et.al AmEconRvw 2014

Spending improves outcomes.

- To improve quality, we could spend more: pay teachers more.
- With rising demand, why aren’t we spending more?

#3 Have tests produced gains?

- Good principals and teachers make good schools, not good tests.

Tests measure limited outcomes.

- Measure a limited number of skills.
- Teachers teach to the test.
- The same test questions year after year
- Focus on tests makes school boring.
- Multiple choice for art, music, PhysEd.

Incentive pay doesn’t work.

- Peabody study found no significant difference in gains in test scores with large incentives to teachers.
Finland has the best schools.

- Teaching is a valued profession.
- Teachers are well paid.
- Teachers colleges are highly selective.
- Teachers design the curriculum.
- Teachers drive most testing.
- There are few children from poor families.

The case for no-stakes tests.

- Good principals make good schools.
- Good teachers make good schools.
- When incentives are based on tests, we invite teaching to the test and cheating.
- To raise mean test scores, teach only to the middle.
- Test scores rise while learning drops.

#4 How do we educate the poor?

- Everyone learns by building on what they know.
- Experienced, capable, professional teachers design a school program that takes students where they are and moves them forward.

A higher percentage of children are poor.

Kirkpatrick Elementary

East Nashville:
Gross family income in Cayce Homes: $8,140 (2012) 720 units, 2,100 people
Rest of neighborhood: $28,000.

30% to 48% of pupils enter and exit during the year.

% 4-year olds in preschool
Educate all children.

Providing effective education for children from poor families is challenging.

#5 Privatize?
There are many ways to privatize.

Contractors
Charters
Vouchers
Online
Teach for America

Choose a World?

World A: Households average $50,000 of income; you get $45,000.

World B: Households average $30,000 of income; you get $35,000.

Three Problems with Private

1. Exaggerates a positional race.
2. Exaggerates the role of tests.
3. Undermines community.

Is contracting effective?

• A school board can write a contract with third party to operate a local school. The contractor’s profit motive gives strong incentives for good performance.

• From Fran Tarkenton in the 1970s to Chris Whittle in the 1990s, to the charter movement today, contracting has not delivered systematic gains.

Are charter schools effective?

• In recruiting and expelling students, charters create a positional race.
• Many charters depend on dense testing.
• Charters generally increase segregation.
• Do charters increase community responsibility for the schools?
Charters show no general gains.

- With random assignment of students to charters or regular schools, the charters show outcomes similar to regular schools.
- Charters often attract some, repel others.

Examples of careful studies

Angrist et al.: Massachusetts charters:
- low-income children in inner city in highly structured charters: Higher test scores
- Charters in suburban areas: Lower test scores.

Vouchers?

- A voucher is a payment that the State provides to schools chosen by parents.
- Parents may be required to pay additional tuition.
- In some settings, schools may choose among applicants.
- Voucher schools generally need not meet State standards for teachers, curriculum, buildings, transport, special education, and other services.

Online Instruction

Florida and Idaho require it.
Online schooling is a cash cow for investors that provides little education.

Teach For America

http://nepc.colorado.edu/publication/teach-for-america

TFA teachers perform slightly better than other uncertified teachers, but worse than certified teachers with the same experience. Inexperienced teachers are much less effective than experienced teachers.

It costs $70,000 to support a new TFA.
Fifty percent leave after two years, 80% after three.

TFA is an expensive way to build a corps of experienced teachers.

Privatizing: not a clear path.

- Contracting hasn’t worked.
- Incentive pay doesn’t work.
- Voucher and charter plans depend on the details of design. Gains are idiosyncratic.
- Online tools are not a substitute for teachers.
Do we understand the fundamentals?

- If declines in home-life and declining teacher quality are important, are charters and vouchers a plausible response?
- Any choice system will cause sorting with likely gains for some at the expense of others.

Progress

- More support for mothers and children.
- More quality pre-schooling (OK, GA)
- Expect rich, full curriculum.
- Employ great principals.
- Let school systems choose most tests.

Conclusions

1. Demand for school quality is rising.
2. Spending more on teachers will help.
3. Good management is essential.
5. Privatization is not a clear path.
6. Stratification discourages all but the top.

Oxter