Data-driven publishing

Timo Hannay, SchoolDash
SchoolDash example

From document to database
Poverty of opportunity?

2nd August 2016 by Timo Hannay [link]

Education is not just a vital cornerstone of our culture and economy, it is also potentially one of the great social levellers. However rich or poor our parents, however supportive or dysfunctional our families, a high-quality education ought to give each of us the opportunity to live a fulfilling life limited only by our own talents and efforts rather than by the circumstances of our birth. Or so the theory goes. In this post we look at the question of economic deprivation among children, and in particular how different types of schools either enable or hinder opportunities for those from poorer families.

Our main conclusions are:

- A substantial proportion of children in England live in relative poverty: it’s not uncommon in particular areas for half or more of pupils to be eligible for free school meals.
- In general, more affluent families live closer to schools, but this varies a lot by school type. A family living next to a school rated ‘Inadequate’ by Ofsted is over 60% more likely to be poor than one living next to an ‘Outstanding’ school.
- Just as importantly, this well-known ‘house price’ effect is far from the only factor keeping poorer children out of good schools. Even those poorer children who do live close to a high-performing school are less likely to end up going there. Indeed, the data presented here suggest that school selection is an even bigger driver of social sorting than the locations of family homes.
- School types in which poorer pupils are under-represented after taking into account the level of poverty in their local areas include:
  - Grammar schools and single-sex secondary schools
  - Certain faith schools, particularly non-Christian faith schools and Roman Catholic schools
  - Schools rated ‘Outstanding’ by Ofsted
  - Secondary converter academies and primary free schools

The rest of this post looks in more detail. You may also be interested to see other related work such as the Sutton Trust’s recent analysis of social selection in primary schools, Ofsted’s 2013 report on underachievement among poor pupils, and the LSE’s 2012 research into the effects of schools on house prices.

Patterns of poverty

The standard measure of deprivation in British education is eligibility for free school meals, which usually indicates a family in receipt of state benefits. As shown in Mao 1. this measure varies greatly from place to place around the
nearest neighbour is 0.7km and the mean is 1.2km. For secondary schools the median and mean distances are 1.4km and 2.3km, respectively. Given that catchment areas inevitably overlap (not all schools are suitable for all children and there’s usually a degree of choice), we guessimate that radius values of 2km for primary schools and 4km for secondary schools are about right. These don’t necessarily represent catchment areas, but rather the local area that is in principle close enough to the school to be served by it. The values we’ve chosen are necessarily somewhat arbitrary so in Figures 7 and 8 you can explore other values using the drop-down menus provided. In practice, however, changing them doesn’t affect the final results very much.

Figure 7: ‘Lazarus Index’ of schools grouped by Ofsted rating (2016)

Primary schools – Outstanding: 2,979. Good: 11,243. Requires improvement: 1,842. Inadequate: 137. All schools: 16,808
Notes: The column for Lazarus Index value 2.0 represents all values greater than 1.8, including those greater than 2.0.
Sources: Department for Education; Department for Communities and Local Government; Office for National Statistics; SchoolDash analysis.

With that, we will now use Figure 7 to look at the distributions of LI values for schools with different Ofsted ratings. Among secondary schools (using a local radius of 4km), those with a rating of ‘Outstanding’ are heavily skewed towards the left compared to the group of all schools, and those with a rating of Inadequate are way over to the right. Schools with ratings of Good or Requires improvement lie in-between. This is a very important insight. We’ve already seen (in Figure 2) that fewer poor pupils live in the vicinity of schools with higher Ofsted ratings. We now see that on top of this, fewer poor pupils get into such schools even taking into account the composition of their local
Percentage of pupils eligible for free school meals at any time during the past 6 years
(Total sample size: 20,142 schools)
The Henrietta Barnett School
Pupils: 745 girls aged 11-18
Type: Grammar (academy)
Faith: None
- Academic attainment: 100%
- Academic progress: 99%
- Inclusiveness: 3%
- Ofsted: Outstanding

This school is in the top 1% for progress between age 11 and GCSE
The Henrietta Barnett School

Profile

Contact Details

Address:
Central Square
Hampstead Garden Suburb
London NW11 7BN
Telephone: 020 8458 8999
Website: http://www.hbschool.org.uk/

School Type

Phase: Secondary and Sixth Form (ages 11-18)
Type: Converter Academy
Religious Denomination: None
Admissions Policy: Selective
Established: 2012
History: This school arose from The Henrietta Barnett School
Trust: The Henrietta Barnett School

Staff and Pupils

Head: Mrs Del Cooke
Numbers of Teachers / Assistants*: 47.1 / 1.0
Non-teaching Staff*: 13.4
Number of pupils: 745
Pupils Per Teacher: 15.8
Sex: Girls
Eligible for free school meals: 1.4% (low)
Local child deprivation rate: 15.9% (4km radius)

Nearby Schools

1. Kisharon School (0.7km) show on map
2. Garden Suburb Junior School (0.8km) show on map
3. Garden Suburb Infant School (0.8km) show on map
4. Golders Hill School (0.9km) show on map
5. Annemount School (1.0km) show on map
6. Brookland Junior School (1.0km) show on map
7. Brookland Infant and Nursery School (1.0km) show on map
ProbMods example

From textbook to programming tool
; make a world with two fixed circles and bins:
(define world (pair '(((circle) #t (60) (60 200))
(pair '(((circle) #t (30)) (300 300))
(bins -1000 1000 25))))

; make a random block at the top:
(define (random-block) (list (list "circle" #f '(10))
(list (uniform 0 worldWidth) 0))

; add a random block to world, then animate:
(animatePhysics 1000 (pair (random-block) world))

Assuming that the block comes to rest in the middle of the floor, where did it come from?

;; fold: Set up the world, as above:
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;; helper to get X position of the movable block:
(define (getX world)
  (if (second (first (first world)))
      (getX (rest world))
      (first (second (first world))))
;; given an observed final position, where did the block come from?
(define observed-x 160)
(define init-xs
  (nh-query 180 10
    (define init-state (pair (random-block) world))
    (define final-state (runPhysics 1000 init-state))
    (getX init-state)
    (= (gaussian (getX final-state) 10) observed-x)))
(density init-xs "init state" true)

What if the ball comes to rest at the left side, under the large circle (x about 60)? The right side?