

Numeracy Skills and the Numerate Environment: Opportunities, Supports, Demands

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The Problem

In PIAAC Survey of Adult Skills 2012 of 23 industrialised countries, the UK (England & NI) scored below average on adult numeracy.

- Several recommendations focus on the need for (some) individuals in the population to undergo training. Yet, even in “high-performing countries” like the Netherlands, many adults (1.5M) score at or below PIAAC Level 1 (“functionally innumerate”).

[13.2% of adult popn in NL]

But, really ...?

How do all these people manage in important domains of their lives? Perhaps they are more at ease than some policy makers allow (Grotlüschen et al., 2016)?

- This echoes earlier findings:

Ekinsmyth & Bynner (1994) + other ALBSU earlier

Inge Henningsen, “Some adults don’t know how stupid they are” (ALM-13 conference): Respondents consistently self-rated their level on literacy & numeracy higher than they “should have”, given their scores on tests (IALS, ALL and Skills for Life)

... Perhaps researchers and the typical adult live in different worlds?

characterise the worlds lived in by different adults

Trying to understand the notion of **context** has been a long-standing concern in maths education. Issue: E. Maier (1980); A. Bishop & C. Keitel [naming only two] in PME in the 1980s; Jean Lave (1988); Evans (2000); Evans Wedege & Yasukawa (“EWY”, 2013); many others.

Like many others, I have considered the world of adults to be “constituted” (framed materially, conceptually, socially) by the practices they are engaged in.

How can we know these?

Two approaches

- top-down (“generalising”, EWY, 2013) or bottom-up (“grounded”).

top-down (“generalising”): We can analyse (hypothetical) sets of practices that *adults in general* may engage in ...

- e.g. Bishop (1988) – 6 universal (very general) mathematical activities;
- national and international assessments, e.g. PIAAC
→ 4 contexts: work-related, personal, social and community; education and training

Two approaches

- OR bottom-up (“grounded”): We can describe sets of practices that particular **adults** may engage in
e.g. Barton & Hamilton (2012) study of literacy practices in Lancaster
e.g. Street, Baker & Tomlin (2005), Navigating Numeracies.

[*REFLECTION: Is there a middle ground?*]

Settings for exercise of adult numeracy

- The Director of a UK Polytechnic in the mid-1970s came into the Faculty Board and “reeled off” a series of statistics... that were meant to show, I think, how well the institution was doing under his leadership.

I thought, “I am a statistician and I can’t follow you!” – so I began to wonder if he really wanted *any of us* to understand!

- Citizens are often “talked at” in this way, during election campaigns. Parties often refuse – or are unable! – to give the basic numerate (or other) information that any reasonable citizen would need, to make informed decisions. e.g. the Conservatives’ refusal in the 2015 UK election campaign to specify where their £12 billion pounds of welfare cuts would be coming from over the next 3 to 5 years. ... If over 3 years, that is “only” £200 pounds per citizen of the UK *on average* ... But, if concentrated on the poorest 10% of the population, it is £2000 over 3 years. Cf. Blastland & Dilnot suggestions for making big numbers meaningful (2008, p129). ⁷

Settings for exercise of adult numeracy

- People often suspect many free-market firms of trying to obscure and confuse customers, by the complication or proliferation (where possible) of pricing. For example, acceptance of the reasonableness of this claim led to the UK Energy ombudsman requiring energy firms to reduce the rich proliferation of tariffs in 2014 [Ref.].
- More recently, the UK Consumers' Association has made a “super-complaint” to the Competition and Markets Authority (CMA), about supermarket retailers' use of multi-buys and different pack sizes. “We've found retailers are confusing customers with tactics that exaggerate discounts and manipulate shoppers, so we're using our legal powers to take the issue to the ... CMA” (*Which?*, 2015).

Don't blame the victims!

These examples suggest that responsibility for the lack of numeracy (or of literacy) of adults, might be shared across society, not only by the adults themselves.

We need to acknowledge the role of the powerful – individuals, political parties / governments, media and corporations – in determining the availability and the shape of the *choices* available, and of the *information* that is available, whether in textual or numerical (or digital) form.

In particular ... free-market businesses, intent on “persuading” the individual to “consume”.

We could call these examples of ***barriers*** to adults' numeracy, in society at large.

Literate environment

EU High Level Group on Literacy (2012) suggest that “adults’ skills respond to and are shaped by the ‘literate environment’ in which they act” (Mallows, 2015). The HLG recommends:

- “books and other reading materials to be easily available at home, in schools, libraries and beyond, on paper and online,
- includes, for instance, libraries in unconventional settings such as shopping centres or train stations”.
- Parents “need help to improve their skills and confidence to engage their children in language development and reading for pleasure”.
- Reading promotion policies to stimulate reading and access to books, by organising media campaigns, book fairs, public reading events, competitions, and book awards”.

Literate environment

These recommendations about ***availability*** and hence ***opportunities*** ... (to read)

But the numeracy examples show also the need to somehow avoid or remove ***barriers***, or to provide ***supports***.

Numerate environment

For numeracy, what is the analogue to the various texts envisaged by the EU HLG (the “stuff” of the literate environment)?

... information ??

Opportunities to exercise numeracy: Information increasingly ***available***:

- “Open Data Institute” ... especially state statistics:
 - National Statistical Office websites now more user-friendly
- cf. “Big Data” - often harvested by private concerns →
fierce struggles over ownership

Numerate environment

... information

Supports in exercising numeracy :

- fact-checkers (stats, logic) ...e.g. Full Fact
- *in extremis*, UK Statistics Authority
- Broadcasters: BBC Radio “More or Less” (Blastland & Dilnot, 2008)
- Professional volunteers:
 - UK: Radical Statistics (Evans & Simpson, 2016), RSS;
 - USA: Statisticians without Borders
- the wider culture: norms about presentation / discussion of numerical information (Blastland & Dilnot, 2008)

Numerate environment

Besides the ***opportunities*** for exercising literacy and numeracy skills at work, at home, and in the community ...
... what are the ***demands*** for exercising such skills?

If they are low, and if adults are not required to read (or use numbers or maths), as a consequence their skills may *decline* ...

or fail to develop, leaving a large sub-class excluded from the literate / numerate environment, and relying on others for interpretation and access to information.

E.g. interpretations of PIAAC age differences

The literate / numerate environment

So ... three key aspects:

- the *opportunities* the practices may offer to the adult engaged in them
- the *supports / resources* offered, or conversely the *barriers* put up within these practices, and cultures more generally, that impede the adult's numerate (or literate) development
- the *demands* that the practices may (or may not) make on the adult.

All together: ***affordances*** (e.g. Greeno)

Conclusions and Recommendations

1. The idea of a *literate environment* offers a way to think about the context of literate thinking, and we think it can be used to describe (actual) numerate environments as well.
2. We also need to bring to bear qualitative research on literacy and numeracy practices that adults are encouraged / required to engage in and the implication of low demand / mismatch between adults' actual practices and those that are required for engagement in society.

Conclusions and Recommendations

3. Also need to highlight the opportunities for collective numeracy – i.e. numeracy as practices and skills created and held by groups, e.g. through trade union organising (Bond, 200x; Yasukawa & Brown, 2013).

4. More ambitiously, Blastland & Dilnot suggest that some of the changes required have to do with “culture”: “A culture that respected data, that put proper effort into collecting and interpreting statistical information with care and honesty, that valued statistics as a route to understanding, and took pains to find out what was said by the numbers we have already got, that regarded them as something more than a political plaything ... would, in our view, be the most valuable improvement to the conduct of government and setting of policy Britain could achieve.” (2008).

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Appendix

The current 24 participating countries in PIAAC include: 17 EU members, plus USA, Can., Aus, Japan, Korea, possibly Russian Federation (incomplete results). Only “industrialised” countries participated in Round 1.

Round 2 includes: Chile, Greece, Indonesia, Israel, Lithuania, New Zealand, Slovenia, Singapore, Turkey. Results 28 June 2016.