

RESEARCHERS AS POLICY ACTORS? EXAMINING INTERACTIONS BETWEEN MATHEMATICS EDUCATION RESEARCH AND PIAAC

Jeff Evans & Keiko Yasukawa

Middlesex University & University of Technology Sydney
J.Evans @ mdx.ac.uk & Keiko.Yasukawa @ uts.edu.au

Education policy making is a fluid and political process involving various actors bringing with them different perspectives and ideologies. We ask what is a policy actor, what types of roles can be played in the policy field, and what actions can be performed, by researchers in areas like mathematics education, and particularly adults' mathematics education. We then focus on a relatively new part of the OECD's portfolio, the Programme for International Assessment of Adult Competencies (PIAAC). The first wave of the Survey of Adult Skills (SAS), in 2011-12 involved an assessment of adult skills in Literacy, Numeracy and Problem Solving in Technology-Rich Environments in 24 industrialised countries. It is likely to have significant transnational influences on agenda setting with respect to national lifelong learning policies in participating OECD countries. In this paper, we examine a selection of analyses published by mathematics education researchers to investigate whether, and in what ways, such researchers are interacting with the PIAAC agenda.

INTRODUCTION

Recently, there has been a substantial growth in critical policy studies in education. One of a number of factors promoting this change has been the growth in prominence of international surveys such as Programme for International Student Assessment (PISA) and Programme for International Assessment of Adult Competencies (PIAAC), which clearly have as their main purpose to influence national policy in education and training. One of the focuses of such policy research has been on the role of transnational organizations such as the OECD and the European Union in setting the agenda for national education policies (see for example Hamilton, Maddox & Addey, 2015; Meyer & Benavot, 2013). Besides uncovering the economic agendas being transferred across nations through participation in these assessment surveys (Yasukawa & Black, 2016), these studies also illustrate what kinds of research is taken notice of by policy makers.

In October 2013, the OECD published the first results of the Survey of Adult Skills (SAS), the first initiative of their PIAAC. Twenty-four countries participated in this first wave of assessment of adults' proficiencies in Literacy, Numeracy and Problem-Solving in Technology Rich Environments (PSTRE). In all of the participating countries, at least 4500 adults, aged between 16 and 65 were surveyed. As is now familiar when the PISA results are released, international league tables were published by the OECD and reproduced in national media following the release of the PIAAC SAS results.

The OECD, in collaboration with other transnational organisations such as the EU, has constructed and promoted the 'skills and competencies agenda' in all sectors of education and training. This means a focus on the ability to use skills in practical situations, as distinct from possessing formal qualifications in subjects that are assumed to produce skills. More

generally, the OECD and others are disseminating ideas and practices aimed at strongly influencing national policies worldwide, in several ways: (i) by creating comparable datasets, so that countries can measure the *relative* success of their education systems and shift policy orientations accordingly; (ii) thereby promoting ‘soft governance’ of national educational systems, via the production and dissemination of knowledge, the publication of comparative data (educational and social indicators), and country and thematic reviews – so as to ‘govern by data’. Some critics have been concerned that, far from being simply descriptive, comparisons perform prescriptive and political functions, driving and justifying changes of an instrumental nature in many countries around the world (Grek, 2010; Ozga, 2009; Tsatsaroni & Evans, 2013).

In this paper, using a tentative ‘taxonomy’ of positions educational researchers might take vis-à-vis a study such as PIAAC, we examine how and whether *adult mathematics education researchers* can be seen as ‘policy actors’ vis-a-vis the PIAAC agenda. This paper aims to build understanding of how different policy actors are involved (or not) in the processes of translating various policy agendas (including those of the OECD / PIAAC) into national / local education policies.

To do so, we examine a selection of academic publications focused on the Survey results (especially Numeracy) in the period from their release in October 2013 through to now.

PIAAC AS POLICY-ORIENTED RESEARCH

Towards the beginning of the Project, its wider objectives were presented by Andreas Schleicher (2008) of the Education Directorate at OECD – as helping the participating countries to:

- Identify and measure *differences between individuals and across countries* in key “competencies”
- Relate measures of skills based on these competencies to a range of economic and social outcomes relevant to participating countries, including *individual outcomes* such as labour market participation and earnings, or participation in further learning and education, and *aggregate outcomes* such as economic growth, or increasing social equity in the labour market
- Assess the performance of education and training systems, and clarify *which policy measures* might lead to enhancing competencies through the formal educational system – or in the work-place, through incentives addressed at the general population, etc. (pp. 2-3, italics added).

The main focus in PIAAC is on the measurement of adult skills or ‘competencies’, the abilities to *use skills in practical situations* – Literacy, Numeracy, and IT skills (“PSTRE”). These are measured in the educational testing part of an interview done in the interviewee’s home, along with a Background Questionnaire (BQ). The BQ measures some socially valued outcomes or ‘effects’ claimed to be related to adult skills, such as employment status, wages, self-rated health and “political efficacy” – and also plausible determinants of skills, such as demographic and social characteristics, and measures suggestive of potential policy tools, such as courses taken, the use of mathematics at work, and so on.

The population of interest for the survey is adults 16-65 in the countries studied, with the test items and the BQ questions, administered via a PC by default, though provision is made for adults not comfortable with computers to complete a pencil-and-paper test. Round 1 of PIAAC (in 2011-12) included 24 “industrialised” countries (17 EU, USA, Canada, Australia, Japan, Korea; OECD, 2013). Round 2 (2014-15) included nine more varied countries (among

them Greece, Indonesia, Israel, New Zealand, Singapore, Turkey; OECD, 2016). Round 3 is planned to include six countries, including three from Latin America and the United States (the latter for a second time).

RESEARCHERS AS POLICY ACTORS?

There is a long history of studies in political science and political sociology aiming to assess the influence of different groups on the national policy making process. For example, Gilens and Page (2014) aims to compare the influence of ordinary citizens, affluent citizens, business-oriented and mass-based “interest groups” in the USA in the twenty years to 2002. However, the groups they report on are large-scale and very heterogeneous.

Recently educational researchers have begun to consider more fully the roles that they themselves might play in the processes of formulating and implementing policy, as well as evaluating it. For example, Ball et al. (2011) offer “a typology of roles and positions through which teachers engage with policy and with which policies get ‘enacted’” (p. 625); these roles include those of ‘Narrators’, ‘Translators’, ‘Critics’ and ‘Receivers’. But these refer to the ‘policy work’ of people they call ‘teacher actors’ in schools, so do not refer to the group we are studying here. Yasukawa, Hamilton and Evans (2016) have examined *national media* and the journalists involved as policy actors in Japan, France and the UK, following the release of the first wave of the SAS results in October 2013; however, only a minority of the authors contributing to media outputs in this area are researchers or academics.

Lawn and Lingard (2002) pointed out earlier that, in Europe, “significant policy actors in education are working today [...] in joint governmental projects and networking translating, mediating and constructing educational policies” (p.290); these policy actors often have transnational identities or allegiances. Grek (2010) examines “the ways that international comparative testing in the field of education has not only offered policy-makers with much needed data to govern, but has in fact almost fused the realms of knowledge and policy”; she calls this near-fusion of expertise and promotion of “undisputed, universal policy solutions” an ‘expertocracy’ (p, 695).

Farrell (2014) observes that increasingly there are non-traditional players in research who are producing research that is gaining strong traction by policy makers. She cites ‘corporate researchers’ such as large commercial publishers (Pearson), commercial service providers (Price Waterhouse & Coopers, McKinsey), and national employers’ associations (e.g. the Australian Industry Group) who produce research that is “not only designed to influence policy, it was also designed to implement government policy around global competitiveness” (Farrell, 2014, p. 69).

Against the backdrop of the emerging tran

snational discourses about adult numeracy (and literacy), we adapt an earlier typology (Evans, Wedege & Yasukawa, 2013, p. 234) to discuss more fully here the kinds of research role that adult mathematics education researchers might adopt to consider policy projects in general, and the aims, concepts, methods and results of international surveys such as PIAAC in particular. In these ways they might also contribute to the development of adult mathematics education and numeracy as a field of study.

The roles that we set down in the earlier piece (Evans et al., 2013) were:

1. Objective reporter of what is ‘really’ going on
2. Producer of accounts from those engaged in activities in context
3. Advocate for social or educational change, in terms of policy and/or practice
4. Activist working alongside those engaged in trying to bring about changes.

Our initial work with the literature above suggested that we needed to unpack role no.1 into:

- 1A. Narrator of the field and its prevalent claims, its extent and its boundaries; and
- 1B. Critic of the field and its claims, exponent of extending boundaries, etc.

Against this backdrop, we selected a range of publications to illustrate the ways in which mathematics education or numeracy researchers are acting, through their publications, in the policy space around the PIAAC agenda. The following types of publications were given priority at this stage:

- i) those appearing in publications primarily addressed to mathematics education or adult numeracy and literacy researchers;
- ii) those written by or with mathematics education researchers or those working in the adult numeracy and literacy field;
- iii) those focusing on PIAAC (solely or mainly).

The inclusion criteria for this initial study are admittedly restrictive; however, we are aiming to focus on the role (if any) of adult mathematics education/ adult numeracy researchers as policy actors, and to point the way towards a larger study. It is also worth noting that at the time of undertaking this study, there was not a large selection of publications that met these criteria; it could be anticipated that there would be a pool of suitable publications as more researchers engage with the PIAAC results. Thus we began by choosing Tout and Gal (2015), Jablonka (2015) and Straesser, (2015) which were published in a special issue on Numeracy of *ZDM Mathematics Education*. Carpentieri (2015) is a chapter from an edited collection on *Literacy as Numbers* (Hamilton, Maddox & Addey, 2015). St. Clair (2014) is based on a talk to a recent adult education research conference, and Reder (2015) is an opinion piece posted on Spotlight on Opportunity and Poverty, a US online policy discussion forum.

The selected publications were interrogated via the following questions:

- What aims (stated or implied) and perspectives do the authors bring to their examination of PIAAC?
- How do the authors position themselves in relation to the OECD or conceptions of Numeracy in the PIAAC?
- Are the authors seeking explicitly to influence policy; if so, at what level and using what resources?

Following the analysis of the publications, each publication was classified according to the typology of policy roles outlined above.

ANALYSES OF A SELECTION OF RESEARCH PUBLICATIONS

Tout and Gal give voice to ongoing concerns of the OECD in their article. Their comparative analysis of ML and N in the PISA and PIAAC, respectively, provides a justification for the OECD's design of these two studies as complementary assessments:

Certainly there is a need for further cross-fertilisation between the ideas underlying PISA and PIAAC, to inform development of a comprehensive conceptual framework that offers a unified view of the development and use of mathematical skills across the lifespan. (p. 705)

They are also supportive of OECD's aim to provide information that policy-makers can use to:

- examine the *impact* of reading, numeracy and problem-solving skills *on a range of economic and social outcomes*;

- *assess the performance of education and training systems*, workplace practices and social policies in developing the skills required by the labour market and by society, in general; and
- *identify policy levers to reduce deficiencies* in key competencies. (OECD 2013, p. 25)

The authors first provide a detailed comparative account of the conceptual and assessment frameworks for the PISA Mathematical Literacy (ML) and the PIAAC Numeracy (N). They then go on to argue that such an analysis can inform mathematics education pedagogy and curricular development, as well as policy decisions and directions.

Tout and Gal also argue for the validity of the PIAAC Numeracy measure by citing correlations with other socially valued outcomes (such as trust, political empowerment, community participation and health literacy (p. 702). Pointing to the wide variations in N/ML proficiencies in many countries, the authors then make the assertion that “the results from PISA for mathematical literacy and PIAAC for numeracy should raise several red flags for mathematics educators” (p. 704). They can be seen to be seeking to influence policies at a number of different levels and directions: school and post-school policies about mathematics/numeracy education including curricular frameworks, and curricular frameworks for teacher education.

Jablonka’s article expresses her strong concern about the OECD surveys’ influences on local mathematics curricula. She is not critical of the PIAAC definition of Numeracy (N) or the PISA definition of Mathematical Literacy (ML) *per se*. Rather she identifies a conflict between the conceptualisations of N/ML and the traditional discipline-based knowledge of mathematics: traditional mathematics curricula are based on specialised knowledge and discourse, whereas introducing ML/N into the mathematics curricula would “bring about a shift in criteria for what counts as an accomplishment of a task” (p. 607) – and hence would weaken the traditional disciplinary discourses of mathematics education.

While she acknowledges other radical alternatives to the traditional mathematics curricula are justified in their goal of shifting mathematics education away from the social reproductive effects with which it has often been associated, ML and N as conceived by the OECD do not afford this alternative. Instead they are justified as skills necessary for economic goals. This, she argues would lead to a situation where:

Subjects are positioned as [either] deficient consumers or privileged critics, as manual workers or as knowledge workers. This language produces ‘truths’ about numerate or innumerate individuals or groups at different levels and about the cause for a lack of effective participation that excludes other explanations. (p. 607)

Jablonka seeks to critically question policy-making based on what she characterises as a “chimera” fostered by the dominance of OECD’s definitions of skills:

The analysis suggests that there is a need to disrupt an overhasty reliance on an apparent agreement on the meaning of numeracy or mathematical literacy [...]. (p. 607)

Straesser’s interest is in numeracy in the context of the workplace. Supported by his own and others’ empirical studies, many of them ethnographic in approach, his perspective on workplace numeracy is that: “Mathematics at the workplace is fundamentally influenced by extra-mathematical concerns and constraints and can only be superficially separated” (p. 673).

In his survey of the PIAAC documentation, he identifies two questions about workplace numeracy that may be informed by PIAAC:

1. The proficiency question: What kinds of qualifications do adults have in terms of workplace related mathematics?
2. The question on the use of skills: What do adults take for granted in terms of workplace related use of mathematics? (Straesser, 2015, p. 671).

On proficiency, Straesser finds that, although almost a quarter of the PIAAC N questions are reported to be work-related, information available from the OECD does not provide any results on those questions which might reveal anything specific about the surveyed adults' workplace numeracy proficiencies. He does find information about the use of skills, in the demographic and occupational data from the self-reported background questionnaire of the PIAAC. He believes that the PIAAC data could be exploited further, suggesting: "A more detailed analysis (e.g. by means of comparing workplace related items with other assessment items) could produce even deeper insight into the situation of numeracy at workplaces" (p. 672).

Straesser could be characterised as a selective and considered 'user' of the OECD's initiatives, seeking to find information that could build on the existing knowledge about workplace numeracy: "As long as one takes the operationalization of variables for granted and as long as one takes self-reports as a valid and reliable picture of the workplace situation, PIAAC offers most interesting information on numeracy at work" (p. 672).

While stating that he is not particularly interested in the national comparisons and the international league tables produced about each of the PIAAC domains, he is not unaware of the larger political agendas of the OECD:

...large scale surveys that ask a specific set of questions, such as the PIAAC, are usually partly politically motivated. Presenting the results based on the participating nations' numeracy skills is a hint that PIAAC carries with it political purposes/ agendas. Politicians can use these rankings to either praise their work or to push for political moves. (p. 672)

Finally, it would be difficult to argue that Straesser is seeking to influence policy in his article. However, he expresses a concern about the use of the term 'numeracy':

The term often takes an inadequate meaning because—in *workplace contexts*—it has a weak association with numbers, and underplays the role of other mathematical topics like algebra ..., geometry and stochastics within the workplace and society at large. In addition, 'numeracy at work' suggests a uniformity of numeracy related to workplace contexts, which is not the case... (p. 672). (emphasis added)

Carpentieri (2015) aims to suggest a way out of what he sees as the current "policy impasse", whereby policy makers "have [quantitative] data on (literacy or numeracy) proficiency, but these data do not point the way to improving proficiency" (p. 96). Indeed, the comparison of the 2003 and 2011 Skills for Life (national proficiency) surveys in the UK shows the literacy scores as more or less unchanged (while the numeracy scores declined slightly), even after controlling for number of non-native English speakers. (Carpentieri's paper focuses almost exclusively on literacy, but similar arguments can be made for numeracy.)

He draws on a policy framework from the European High Level Group of Experts on Literacy (EU-HLG, 2012), notably its aim to foster more of a 'literate environment' in European societies, that is an environment where the broader culture encourages participants to engage in a variety of reading practices, rather than few or none (pp. 97-98). He also wishes to overcome a fragmentation in the adult skills sector, where qualitative researchers produce descriptions of everyday practices, and quantitative researchers study standardised test scores. Because of the wealth of data available from the PIAAC Background

Questionnaire on use of reading (and also numerate practices and IT skills) in everyday and work contexts, there can be cooperation among researchers, and policy makers can supplement the data on proficiencies, with other available data on literacy (and numeracy) practices. So Carpentieri's overall aim is to ensure that PIAAC data on everyday practices is not overlooked.

In terms of his position towards the OECD skills agenda, he argues for the use of data on proficiencies – but supplemented with data on everyday (and work) practices. He accepts that “in the ‘evaluative state’ [...], quantitative data are the favoured form of evidence” (p. 106). Thus he does not seek to argue against policy makers’ use of quantified data, but rather that they should use the everyday practices data as well.

Carpentieri seeks via these arguments to influence policy makers, as well as adult skills researchers. He reiterates the argument of EU-HLG (2012) that “In the absence of meaningful improvements in levels of everyday literacy practices, governments are unlikely to achieve their skills goals” (Carpentieri, 2015, p. 106).

St. Clair (2014) makes similar arguments to advocate the use of a range of ‘ignored’ and ‘invisible’ data from PIAAC, e.g. on the distribution of ‘educational goods’ and learning careers. He does question the PIAAC measure of literacy. But he goes on to suggest that, rather than being considered as a tool influencing access to valued ‘social goods’ such as level of trust in others or political efficacy, PIAAC literacy might be considered as an indicator of a social good in its own right, leading to social equity questions about its unequal distribution. He also recommends looking into available clues in the PIAAC data about patterns of adult participation in learning, or ‘learning careers’. He finishes by reminding the reader that the costs of the SAS (conservatively estimated as \$150 per respondent) have been borne by the populations of the 24 countries, who therefore deserve some return from the data produced (p. 204).

Reder (2015) aims to build a more equitable society through supporting the development of adult literacy (and numeracy) skills. This short piece, written from what we call an Activist perspective, starts from the fact that the PIAAC Background Questionnaire found that “General health and key markers of social cohesion are closely tied to adult literacy, as are more direct economic indicators, such as employment and earnings” (p. 1).

In terms of his position towards the OECD skills agenda, he appears to accept the proficiency measures as useful for demonstrating worrying correlations of the kind mentioned above. However, he does appear to criticise the narrowness of the existing measures, when he asserts that “We must measure basic skills with more than just standardized test scores: we want to measure people’s use of text, numbers and diagrams – in printed and digital form – to gather, process, and communicate information in their important everyday contexts” (p. 2).

Thus Reder aims to influence policy, particularly at the national level in the USA, by arguing for “policies and programs that support lifelong and life-wide adult literacy in both workforce development and other important life contexts” (p. 2).

A (tentative) classification of policy actor roles

As a result of the analyses above, we classified each of the six articles in terms of its main apparent role as in Table 1. This was for the purpose of illustrating our developing typology of policy-oriented roles. No attempt is made here to evaluate the claims made in the articles.

Policy actor role illustrated	Publication
1A. Narrator of the field, and its prevalent claims, its extent and its boundaries	Tout & Gal (2015)
1B. Critic of the field and its claims, exponent of extending boundaries, etc.	Jablonka (2015)
2. Producer of accounts from those engaged in activities in context	Straesser (2015)
3. Advocate for social or educational change, in terms of policy and/or practice	Carpentieri (2015), St. Clair (2014)
4. Activist working alongside those engaged in trying to bring about changes.	Reder (2015)

Table 1: Policy actor roles and research illustrating the roles

DISCUSSION AND CONCLUSION

In this sample of academic publications, we are able to show examples of the different research roles vis-a-vis policy issues, concerning adult literacy and numeracy. In their various statements, the authors appear to give voice to a range of policy interests, not only those of the PIAAC agenda.

However, there are two limitations to our analysis presented here, besides the small size of the sample. First, we began by assuming that each paper illustrated only one role. However, we have found that many of the papers combine two or more roles. For example as well as the role we initially attributed to them, Tout and Gal *advocate* a number of curricular and pedagogic changes, for adults’ and for school mathematics, and Straesser *advocates* a greater disaggregation of PIAAC Numeracy results, so as to make visible those relating to workplace contexts. Second, we have considered only one publication from each researcher / team, without considering the other outputs from their work. Thus, for example, our characterization here of Reder’s article as *activist* ignores his contributions elsewhere, made for example through executing a local longitudinal study of adult literacy (LSAL), of a kind judged as crucial for robustly inferring causal links between measured literacy and numeracy and valued social goods (see e.g. Reder & Bynner, 2009). Thus the typology we are aiming to develop here is of *roles* vis-à-vis policy issues – and not of particular articles, and not at all of the researchers themselves.

Indeed, the additional roles noted for particular articles / researchers’ positions in the previous paragraph suggests asking whether it is worth conceiving of further roles, or indeed rethinking those roles already suggested. For example, the role of ‘Entrepreneur’, outlined by Ball et al. (2011) as “draw(ing) on disparate ideas, examples of ‘good practice’ and other resources to produce something original” (p.628), might suggest an extension of role 1B to:
 1B. Critic and reformer of the field and its claims to deepen its analyses, and to draw out new potential policy directions

We might also consider the roles played by the ‘experts’ on which Grek (2010) and Lawn and Lingard, (2002) focus, and which the OECD and EU foreground; see e.g. OECD PIAAC Numeracy Expert Group (2009) and EU High Level Group of Experts on Literacy (2012). These would presumably include roles 1A, 1B and 3.

For the purposes of a more philosophical analysis, it might be more satisfactory to focus not on policy actor roles, but on the more fine-grained (and often multiple) *actions* taken by a particular researcher or team. For example, in our particular sample:

- Pointing out a gap in the information, and hence analyses, available (e.g. Straesser)
- Drawing attention to ‘invisible’ / under-used information available in the PIAAC BQ, and / or in potential qualitative studies (e.g. Carpentieri, St. Clair, Reder)
- Suggesting the simplification of concepts or explanations (e.g. St. Clair)
- Pointing to possible use of new concepts e.g. ‘literate environment’ (e.g. Carpentieri), ‘reading engagement’ (Reder)
- Re-emphasis on importance of classic concepts, such as the *transfer* of meanings between different contexts (Jablonka, Straesser), including flexibility in the use of different representations (Tout and Gal)
- Suggesting possible new concepts, e.g. ‘numerate environment’? (cf. Evans, Yasukawa, Mallows and Creese, 2016)

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