From the Editor

Welcome to the first issue of the NIE Researcher for 2003. It includes the usual mix of pedagogical research and content research articles. It reinforces the fact that NIE staff are involved in a wide variety of research activities. The issue also includes an article from Allan Luke, the new Dean of the Centre for Research in Pedagogy and Practice.

The Future Of Educational Research: Pragmatism, Alignment, Multidisciplinarity

Allan Luke

Educational research is at a key historical juncture. In what used to be quaintly referred to as the 'postwar period', educational researchers have been looked to for solutions to the range of complex social, cultural and economic problems faced by what have been variously termed industrial, 'postindustrial' and 'advanced capitalist' societies. These include not only questions about the production of skills and knowledge for new and emergent labor markets, imperatives for the advancement of knowledge and science, engagements with new information and learning media and technologies - but as well persistent and key questions about the power of schools in the formation of beliefs and ideologies, discourses and expressive forms, dispositions and identities.

In the last four years, there has been a controversial push in the US by government to narrow what counts as educational research to classical 'controlled experimental design' work only. As part of a reorientation towards 'evidence based policy', the Bush administration has enforced this focus on what they term a 'medical model' of research by tying all Title I funding for lower-socioeconomic schools to the use of 'scientifically tested' reading programs. What this means is that federal and state governments will only fund those programs that can claim to have verification of efficacy by experimental research.

Elsewhere, I have argued that evidence-based policy is a logical, viable and productive route for the governance of educational systems and, more generally, for social and economic policy (Luke, 2003; in press). But many of us in the international educational research community have also argued that such an approach must be based on broad, rich and disciplinarily diverse data, on containing and varied analyses and interpretations of the meaning of and connections between this data.

This has not been the case in the US and UK, where government has narrowed rather than expanded the kinds of data, research and analysis that count as evidence for decisions about policy and practice. This means that case-based work, large scale survey and interview work, interactionist analyses, ethnography,
discourse analyses, action research, even quasi-experimental design, as well as sociometric, economic and demographic analyses have been factored out of many important decisions on program adoption and implementation. Quite ironically, even classroom observational work – key to understanding how teaching and learning occurs, what it looks like and its consequences for students – does not figure in these new US policies.

Two historical forces have contributed to this: first, the contraction of public funding for education and for educational research in the West; and second, the ostensible 'failure' of educational systems and of research to 'solve' some of the very profound and deep seated social, cultural and economic problems facing these countries. The baseline problems in the West include: the effects of poverty, cultural and linguistic diversity on educational attainment; changing patterns of social mobility, economic engagement, and access to social institutions; alienation and criminality amongst youth; and, a powerful emergent problem, the issues of retraining and skilling workers who lose their jobs in rapid economic shift. A simple point: these are complex social, economic and cultural problems – not educational problems per se.

I think the justifiable response to this is that education and, more specifically, schooling has and is asked to do far too much on its own in such societies. Despite its promise, as Basil Bernstein stated almost 30 years, 'education cannot compensate for society'. In and of itself, it cannot right all wrongs. In and of itself, it cannot reorganize material and social relations, it cannot generate new modes of cognition, abstraction or intellectual tools. In and of itself education cannot reshape normative identities and beliefs, nor can it shift labor market productivity, trade deficits and GDP. Furthermore, to ask schools and teachers, much less educational researchers, to address myriad complex social and economic problems in dense and change-resistant Western national contexts is, simply, to ask for outcomes and interventions that, at worst, are beyond their purview and possibilities or, at best, require the coordination of their work with that of a range of others, from families and parents, community elders, secular and non-secular organizations, public, non-government and private sector institutions. My point here is that part of the dilemma facing educational research in the West has been an overestimation or, more precisely, misestimation of the autonomous power of schooling and educational research. This has left schools, teachers – and the enterprise of educational research more generally in an extremely vulnerable position in these countries.

This isn't to say that education systems and educational research cannot 'make a difference'. But it is to say that they can only make a difference if there are at least two forms of what we could term 'alignment': (1) the alignment of community, government and institutional interventions of which education and schooling is but one; and (2) the alignment of a rich, broad repertoire of approaches, models and paradigms of educational research around the pragmatics of the solution of specific educational problems in ways that consider and address their relevant and related social, economic and cultural conditions and contexts.

Education and educational research can make a substantial difference if and where there is coordinated cross-governmental, institutional, non-governmental and private sector focusing of effort, resources and practices to the achievement of specific outcomes for learners, their communities and their pathways through institutions. To cite some examples, a new science or IT approach can have an effect if government and the private sector put in place the conditions for investment, for expansion of these sectors of the economy, for a transfer and utilization of educationally acquired skills, tools and capital to non-educational contexts. Another example: new approaches to language teaching might get much better 'grip' or 'traction' in sustained improvement of students' language use, where community and civic conditions exist for the languages to be used in everyday contexts, where specific registers and practices taught and learned in schools actually have transfer and value in everyday lives. It is axiomatic in the language planning literature that no matter how good the pedagogy or curriculum, that the articulation of language acquisition into sustained language competence requires ubiquitous and organic everyday contexts of use.

Yet another example: particular approaches to teaching reading might improve children's actual breadth and depth of textual experience if and where there are available print resources, and print/textual work is valued in peer cultures, in workplaces, in community secular and non-secular life. My point then is that whether and where educational interventions might make a difference in achievement, in transfer of training, in the use and deployment of educationally acquired skills, is contingent on 'extra-educational' contexts and conditions. Not surprisingly, the possibilities for such alignments are much more possible in Singapore than elsewhere: because of scale of the system, because of concerted government and private sector and community commitment to education, because of synergies between ministries and sectors of the community.

My second concern is to align rather than oppose distinctive approaches to educational research in the interests of identifying and solving key problems. As John Dewey argued, education – for that matter, art, science and all other forms of human endeavor - itself is problem-seeking, or 'goal seeking'. This was a core principle of James, Dewey, Mead and Rorty's philosophic pragmatism. In this light, we can reframe educational research as a form of pragmatic, multidisciplinary 'problem solving' intellectual work. As such, it can draw upon a rich palette of social scientific approaches and models – quantitative and qualitative, logico-analytic and critical-interpretive. In a world of risk, indeterminacy, 'fuzziness' and contingency – the problems facing educational systems require a rich, rather narrow approach to educational research. Let me explain with a now familiar example drawn directly from the field of medicine.

In response to SARS, the efforts of the CDC, WHO, regional governmental and health institutions have been rapid, comprehensive and coordinated. They have also been multidisciplinary. To address the problem has required classical scientific experimental work, with pre/post studies of treatment effectiveness, drugs, and so forth.
But it also has entailed a range of other kinds of social scientific and scientific research brought together to build a comprehensive picture and, then, to normatively prescribe a series of governmental policy and practical interventions – both social and medical in kind. This has involved case study and tracking of individual patients and their histories, epidemiological detective work tracking index cases to their sources, ethnographic and sociological analyses of habits and social practices, observational studies of hygiene, food-handling, and so forth and social and demographic analysis of population movement. Even the actual laboratory work of isolating the virus and determining its DNA structure – the Watson/Crick/Franklin stories about the dynamics of lab work would remind us – has involved intuition, guesswork, and high theorization, as well as rigorous empiricism.

My point is simple and somewhat self evident. Educational problems have complex social and cultural, psychological and sociological dimensions. They cannot be solved exclusively or simply using randomized experimental trials. Modern epidemiology and medicine uses a broad range of methodologies to acquire and triangulate different kinds of epistemological ‘takes’ and data sets: these range from case-based work, observational ethnographies and interviews to complex social statistical analyses. So should educational research.

There is already evidence tabled by such senior researchers in the US as Robert Calfee (2003) of the University of California that the policy decisions made on the ‘experimental research only’ rules of current US policy have created and exacerbated a number of serious problems, including declining achievement and intellectual engagement in the middle years, and poor engagement with disciplinary knowledge at high school entry. We might call these ‘unanticipated effects’ or ‘collateral consequences’ – but the point is that similar phenomena occur when we extrapolate from, for example, simple drug trials to the social, institutional and cultural contexts where people put such medicines to work.

An educational research for the 21\textsuperscript{st} century must deal with complexity – and it must do so not by reverting to simple models. Unlike our predecessors a century ago who founded educational research – we have a broad array of tools, approaches, methods and discourses to use to unpack educational problems, to hold them up to the light of different analyses, to triangulate, compare and debate the relationships between the findings yielded – and then to make the hardest move of them all: apply research to the improvement of pedagogy. For us to tell the CDC or WHO that we would respond, make policy, shape practice and intervene in peoples’ lives only on the basis of randomized experimental data would have meant waiting for years, and then having limited or little sense of the host of other effects, implications or impacts of these interventions would have been medically and socially irresponsible.

As a community of educational researchers, our responsibility is to show that we can align all of our disciplinary, epistemological and methodological resources to bear not simply for purposes of critique – but to address and respond to the complex, multifaceted problems facing students and teachers in schools and other educational institutions. That’s our craft and our job.

References


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**Soft X-ray Radiography of Biological Materials**

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**Abstract**

We have demonstrated experimentally the adaptation of NX2 plasma focus x-ray source in Plasma Radiation Lab, Natural Sciences, NIE, as the soft x-ray of sufficient power for application in microscopic illumination of biological samples. The NX2 is a multiple radiation source. The project has been offered to a wide range of students (secondary school) and course participants (advanced diploma).

**Introduction**

X-ray, electromagnetic radiation of very short wavelength and very high-energy, is commonly used to take pictures of human bone structures for medical reasons. The images created by x-rays show different features of the body in various shades of grey according to their absorption. X-radiation has the ability to pass through all forms of matter to a certain degree. The amount of x-radiation absorbed is determined by the wavelength of x-ray and the material. The main aim of this project was to adapt the NX2 Plasma Focus as the soft x-ray source of sufficient power for student projects in radiology of biological samples.

**Theory**

NX2 Plasma Focus. Plasma consists of a collection of