

Editorial: *Building* Research Capacity - one year on

Welcome to the fifth issue of *Building* Research Capacity. The journal is now entering its second year and over that time its circulation has increased from approximately 150 Teaching and Learning Research Programme (TLRP) researchers to over 400 named individuals with backgrounds in research, practice and/or policy-making, as well as on-line readers. Interest in this journal comes from across the entire educational research field and from many different types of institutions and organisations and in all regions of the UK. The journal has become an important channel of communication between the Cardiff-based TLRP Research Capacity Building Network and the wider research community. In its first year it has also covered a wide range of methodological, theoretical and philosophical issues whilst trying to provide practical and concise suggestions for any educational researcher to develop their research expertise. It has also attracted authors from across the UK, the US, New Zealand and Australia.

The potential of this journal and the wider activities of the TLRP Research Capacity Building Network (RCBN) is difficult to estimate. Interviews conducted by the RCBN with key stakeholders in UK educational research suggest three possible, and starkly differentiated, futures. In response to criticisms about the relatively poor quality and irrelevance of many studies, funding might cease, reduce, concentrate or

move away from academic departments of education. Many believe that this future is not a desirable one. A second possible future, and in response to the same criticisms, would be a UK equivalent of the relevant parts of 'No Child Left Behind' legislation in the USA (discussed by Bill Firestone in this issue, page 5). While many of the intentions of this legislation may be seen as desirable ones, few educational researchers are likely to favour a research community whose questions and methods are wholly dictated by policy-makers. The third future is one where we, as a community, accept some of the force of the criticisms we face and seek to become even better at doing 'theoretically-informed, large-scale, publicly-relevant rigorous research' (as one kind of research). This is the future that the Cardiff-based RCBN advocate, and which provides the motivation for us to support the capacity-building activities of the whole community of researchers. All educational researchers could use the unique opportunity provided by the ESRC Teaching and Learning Research Programme funding to learn a great deal more about the methods used by others in the profession in which they are engaged. That involves sharing our experience and expertise.

The RCBN aims to facilitate this by organising and brokering a wide range of activities meant to extend and develop research expertise

across the educational research community. Although the RCBN will continue to be responsive to requests for help to develop research capacity in any area of teaching and learning research the majority of the RCBN's activities are organised around eleven themes: building a research career, building on research expertise, combining methods, research design issues, the path from studies to evidence, the role of numbers, developing the use of in-depth datasets, use of large-scale secondary datasets, complex statistical analysis, researching educational interventions, and IT-assisted research (see the back page for forthcoming events).

However, with a growing interest in building educational research capacity it is timely that this issue of *Building* Research Capacity includes three articles that examine generic issues relating to developing research expertise. The first article, by Hammersley (page 2), reminds us how complex and problematic this task can be. However, the following article by Firestone (page 5), discusses the danger of ignoring the task ahead and considers the role of a scientific approach to educational research. The third article by Steele (page 6) continues this debate about a scientific or positivist approach to research. The final article by Gorard (page 9) continues the role of numbers theme by discussing conditional probabilities.

Making educational research fit for purpose? A hermeneutic response

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The context for this paper is the current effort to 'build research capacity' within the field of educational research in Britain. In part, this involves an attempt to draw together educational researchers who do different kinds of work: to encourage them to read all relevant research literature irrespective of methodological approach; and, when doing their own research, to select from the full range of available techniques in terms of what is 'fit for purpose' - what is most appropriate for the problem they are investigating (see, for instance, Gorard, 2002 and Taylor, 2002). Broadly speaking, this is a project with which I am in sympathy; but it is easy to underestimate and even to obscure the difficulties; and also to overestimate what is likely to be possible in the short, and perhaps even in the long, term.

There is a tendency on the part of some advocates of fitness for purpose to assume that intellectual fragmentation in the educational research community, and conflict between advocates of different approaches, derives primarily from methodological prejudice: a lack of openness to other views, and an unwillingness to learn, that result from socialisation into specific methodological identities. While there is some truth in this, we should also note how the intensification of work in universities, and the resulting pressure on time, has made it increasingly difficult to keep up with all the literature, even that which is directly relevant to one's own research. Methodological differentiation is, in part, an adaptation to this situation. Even more fundamentally, though, the fragmentation and conflict in educational research reflect the complex and multiple demands made on this field, and the diverse history of thinking about inquiry and knowledge on which it draws.

Against this background, I want to suggest that the notion of 'fitness for purpose' is likely to be less effective than might at first appear as a basis for drawing the educational research community together. For one thing, it assumes that the 'selection' of a research problem can be independent of ideas about how to investigate it. In other words, the proposal is that, first, a research problem should be specified, and then an appropriate method or a set of methods selected and implemented to investigate it. Yet this is not only a rather inaccurate picture of how research actually gets done - it is certainly at odds with the experience of most qualitative researchers - it is also, I suggest, not a realisable ideal or even one whose approximation is desirable.

There are several reasons for this. The first point is that when selecting a research problem we should take account of the feasibility of investigating it, and this means considering the various methods that could be employed. To take on a research problem without assessing whether it can be investigated effectively is a recipe for disaster. Secondly, neither the original formulation of a research problem nor the initial research design adopted to investigate it should be treated as fixed. Both may require clarification and even transformation over the course of the research. Moreover, this will be influenced by judgments about what is and is not likely to be possible, or most effective, in the circumstances. Indeed, methods are not usually entirely standardised; they generally have to be tailored to topic and to the conditions of inquiry, rather than simply being taken 'off the shelf' and used; and this will be an interactive process. Finally, contrary to what Stephen Gorard has suggested (op. cit.), the notion of 'the

complete researcher' who is highly competent in all methods is surely utopian (at least under present working conditions). Given this, it would be advisable for researchers to take their own current expertise into account in their selection of research problems, if they are to do high quality work. This is not to say, of course, that they should never be prepared to learn new approaches; but there is no reason why everyone should be expected to be equally competent in all methods. For these reasons, even in practical terms, setting research problems and selecting methods are not independent of one another, and the notion of 'fitness for purpose' must take account of this.

Aside from these practical considerations, though, there is a more deep-seated flaw in the idea that research methods ought to be selected according to whether they are 'fit for purpose'. It seems to imply that there is a consensus about what are and are not worthwhile problems for investigation; or at least that any disagreement about this is independent of the ideas that researchers and others have about the value of different approaches to educational research. Yet there are strong parallels between ideas about education and those about methods in social research, both partly deriving from assumptions about the nature of human social life. The perspective implied by the notion of 'fitness for purpose' is what is sometimes referred to as a technical-rational one, in which problems simply arise and strategies for dealing with them are selected in terms of 'what works' as a solution. However, this is a perspective that has been subjected to cogent critique in connection with policymaking and practice, and one that seems to be singularly inappropriate in relation to research. In re-

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search, problems do not simply emerge, they are constructed, and (as already noted) will often have to be reformulated in the course of inquiry. Furthermore, initial and later formulations of a research problem, and selection of methods, will draw on the researcher's wider framework of assumptions about the social world and how it can be understood.

The significance of this becomes clear when it is recognised that there is genuine disagreement within the educational research community about what the purpose of inquiry can and ought to be. In other words, there are differences in perspective both about what sorts of knowledge it is possible to produce, and about the kinds of product at which educational research ought to aim. While the view is currently influential that the main focus should be on whether policies and practices 'work' (see, for example, Hargreaves, 1996 and Oakley, 2000), there is a great deal of opposition to this, on at least two fronts.

First, there is denial by some educational researchers that knowledge of this kind can ever be supplied; after all, the attempt to produce it is not new and has not been notably successful in the past. A whole host of reasons have been put forward for the failure. One is that in studying the social world it is not possible sufficiently to control the multiple factors involved so as to determine what causes what; and/or that even attempting to do so distorts our understanding of what happens in natural rather than experimental settings. A related argument is that it is impossible simultaneously to maximise both internal and external validity, so that there is an unavoidable tension built into any investigation of 'what works'. A third point is that the kind of causation assumed by the Hargreaves/Oakley position simply does not operate in the social world. A fourth is that this position assumes the possibility of objective research findings of a kind that are not available because of the pivotal

role that the researcher plays in shaping the research process and producing the findings, and/or because the phenomena investigated are themselves always discursive constructions. In my view, even if one does not find these arguments entirely convincing, it is foolish to deny that they raise some serious questions to which there are no easy answers.

The second front of opposition opens up because the focus on 'what works' is seen as claiming a form of expert knowledge that tends to be anti-professional and even anti-democratic. Scientific research is treated as the overriding determinant of what ought to be done. And critics argue that this neglects the way in which situations vary, requiring subtle and sometimes dramatic differences in response according to professional judgment. It is also suggested that the idea that research should determine what ought to be done ignores the diverse valuations of means and ends to be found among stakeholders. In other words, research becomes a political strategy or force that silences some voices and amplifies others. Here, once again, there are issues that need attention; they should not be dismissed as part of a 'wasteful paradigm war'.

I am not suggesting that we are faced with incommensurable paradigms. For one thing, most researchers have mixed positions: they draw on several sources of ideas in thinking about their work. For another, the various points of dispute involve common ground among at least some of the positions, despite fundamental differences in other respects. Nevertheless, in practical terms, there are often intractable difficulties involved in people understanding, or at least appreciating, one another's arguments; and the chance of one side persuading the other is small, at least in the short term. This is because educational researchers draw on a diverse range of ideas about the aim of their work, its rationale, and how it should be pursued, many of which are at odds with what I referred to above as the

'technical-rational' perspective, and with one another.

Among these alternative views is what can be referred to as the hermeneutic tradition, and it is a source of much of the methodological thinking behind qualitative research. Equally important, it provides some insight into why the disagreements among educational researchers are so difficult to resolve. While it is internally diverse, the hermeneutic tradition carries implications both for what sorts of knowledge can be produced by educational researchers and for what they ought to aim at. It raises questions about any attempt to understand human behaviour in causal terms, at least as modelled on causality in the physical realm, and thereby about experimental methods. It emphasises the importance of openness in seeking to understand other people's beliefs and actions, and therefore distrusts those approaches which employ highly structured data collection devices, whether questionnaires or systematic observation schedules. Furthermore, while in one of its versions – that inspired by the work of Gadamer – it has a practical orientation, this is very different in character from the idea of educational research providing technical knowledge about 'what works'; instead, it implies a dialogical engagement with practitioners wherein not just means but also ends are reflected on.

Of course, the hermeneutic tradition is only one source of the disagreements that exist among social and educational researchers. But it also provides some insight into why those disagreements are so intractable. It is tempting to think that there is always sufficient common ground in any disagreement for there to be logical argument back to a consensual conclusion, so that disagreements can always be resolved if people have good will. Writers in the hermeneutic tradition, especially those associated with philosophical hermeneutics, throw doubt on this assumption. Instead, they emphasise the considerable

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work that is involved in understanding another person's position, and the partiality and uncertainty of any understanding that is reached.

At the same time, there is an important contrast between the hermeneutic tradition and many of the ideas that come under the heading of post-structuralism and postmodernism. For the former, seeking to understand, and persisting in that attempt despite the obstacles, is an obligation. And while any understanding is always less than total and transparent, it is judged feasible and worthwhile. By contrast, some post-structuralists and postmodernists deny the very possibility of understanding. Indeed, for them the obligation is to challenge any claim that understanding has been or could be reached, and to celebrate the endless deferral of meaning or the incommensurability of forms of life. Now, while engaging in argument with anyone who sticks rigidly to this postmodernist position would be fruitless, here too it is important to resist the temptation of outright dismissal. Something can be learned from this point of view by educational researchers, even though its general validity cannot be accepted with consistency. At the very least, it raises doubts about the likelihood of the rational value consensus assumed by much current discussion of the role of research in relation to policymaking and practice; and it insists that we face, and respect, the differences between us rather than ignoring or glossing over them.

In this discussion I have tried to show that, though appealing in certain respects, the notion of 'fitness for purpose' does not provide a common basis on which the various extant approaches to educational research can be easily brought together. Even in practical terms, methods should not be selected simply according to whether they are appropriate to some pre-given and fixed research problem. Rather, if research is to be done properly, both problem and methods must be reshaped iteratively, and in terms of

their mutual relationship to one another. Furthermore, at a more fundamental level, there is disagreement among educational researchers about what the very purpose and product of inquiry can and ought to be, as well as about how it should be pursued. The hermeneutic tradition is one source of ideas which are at odds with some of those currently driving the attempted 'reform' of educational research through 'building capacity'. But this tradition also provides us with a model for the approach that is needed if we are to draw the educational research community more together, in order to explore whether greater unity in perspective about purpose and practice can be achieved. Needless to say, it does not offer any prospect of an immediate solution to the problems of fragmentation and dissensus. Moreover, there will be some who do not even wish to engage in dialogue of this kind, either because they regard those on the other side of the divide as ethically and politically beyond the pale or because they do not believe that mutual understanding, even less unification of the educational research community, is possible or desirable. Nevertheless, there are probably many who would want to engage in the discussion, so long as their starting point is not ruled out by the very way in which the dialogue is set up.

Note on the hermeneutic tradition

For anyone not familiar with the hermeneutic tradition, and who has the inclination and time to explore it, there is a considerable literature. A brief outline of the development of nineteenth century ideas about 'understanding' and their relationship to the social sciences can be found in Hammersley 1989:ch.1; while Makreel 1975 provides a more detailed discussion focusing on the work of Dilthey. Palmer 1969 and Howard 1982 also cover this ground but extend the discussion to twentieth century developments in philosophical hermeneutics, especially the work of Heidegger and Gadamer. Crusius 1991 provides an introduction to this latter work and explores some of the implica-

tions for pedagogy, while Weinsheimer 1985 and Warnke 1987 contribute more detailed discussions; see also Hahn 1997 and Dostal 2002, which include bibliographies for Gadamer. Truzzi 1974 includes some key articles about the 'method' of understanding in the human sciences; Thompson 1981 is another collection in the same area but with a rather different slant. O'Hear 1996 contains a set of essays that cover diverse aspects of the issue of understanding in the humanities and social sciences. Michelfelder and Palmer 1989 document the failure of Gadamer's attempt to engage in dialogue with Derrida. Caputo 1987 provides a reading of hermeneutics that brings it closer to deconstruction.

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The culture wars affect research methods: A report from the USA

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In recent years, a greater and greater array of educational issues has been politicized. The most obvious cases have been the introduction of a multi-cultural curriculum and (in the US at least) the issue of prayer in schools (its unconstitutionality here). Even more central issues have also become politicized, including the teaching of mathematics (constructivism v. basic facts approaches) and reading (phonics v. whole language) (Loveless, 2001). Until recently, however, research methods have seemed, if nothing else, too arcane and irrelevant to be the subject of legislation.

That view changed dramatically, first with the passage of "No Child Left Behind," the Bush administration's reauthorization of the Elementary and Secondary Education Act—the main federal education legislation since the 1960s—and then authorization for a new Institute for Education Sciences, the name change for what had previously been the Office of Educational Research and Improvement and then (going back to the 1970s) the National Institute of Education. (If name changes are an indicator, research may have been more politicized for longer than most of us thought.)

What was striking about both pieces of legislation was that they

provided legal definitions for "scientific research" in education. While in general this term "means research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs" (Education Week, 2002), a key element in the more specific definition is that it includes experimental and quasi-experimental research. Moreover, this legislation provides incentives to educators for using scientific research as defined by this legislation, including \$900 million last year to help states and districts establish scientific, research-based programs for children ages five through nine.

This legislated definition of scientific research has prompted a number of responses. The view of the upper levels of the education research establishment is that, "Methods can only be judged in terms of their appropriateness and effectiveness in addressing a particular research question... Particular research designs and methods are suited for specific kinds of investigations and questions, but can rarely illuminate all the questions and issues in a line of inquiry" (Shavelson & Towne, 2002). Even Robert Slavin, who generally prefers experimental methods, sees room for using a variety of methods to increase our

knowledge of how to improve education. A wide range of views is presented in the November, 2002 *Educational Researcher*.

The near deification of experimental methods may be important for assessing the effectiveness of specific instructional programs (curricula, teaching strategies, or "whole school reform programs") once they are refined and ready for use. However, a wide range of methods is useful for learning about basic educational processes. Moreover, almost a half-century of experience shows that programs for improving education are rarely implemented as they had been designed. More context-sensitive research methods are needed to understand what factors influence implementation in general and how those factors affect specific improvement programs. Other processes are also highly context dependent. Educational leadership, for instance, is in large part about managing the relationship between the school and the outside world. There are too many contingencies to easily be reduced to experimental designs. Yet, leadership has important indirect impacts on student learning and even more important effects on improvement efforts (Hallinger & Heck, 1996).

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A number of theories have been offered about why legislators adopted such a narrow definition of scientific research. The conspiracy theorists would have it that the move is part of what seems to be a general push from this administration to gain support for more "back to basics" educational approaches. In this view, experimental methods are especially likely to generate support for phonics and more drill-oriented instructional approaches.

While that theory may have some merit, the push towards more rigorous methods preceded the Bush administration. It may also reflect a general frustration with the contribution of educational research to the improvement of practice. There appears to be a vicious cycle at work, however. Critics of educational research point to the lack of results and continually push to reduce the budget for such activities. Moreover, very few foundations support educational research. The limited funding for educational research has contributed to a plethora of small-scale studies that often avoid using more rigorous methods. A huge amount of "research" in educational leadership—to cite my own area—appears to be student dissertations. Thus, the shortage of useful results undermines confidence in research, which reduces funding,

which in turn reduces the utility of the enterprise.

It doesn't help that a significant number of those in schools of education question whether any form of educational research can contribute to practice. Extensive critique of the epistemological basis for any empirical research, as practiced by some post-modernists and others (Adams St. Pierre, 2002), may actually play into the hands of those who seek to tie the hands of those using a wide range of methods to explore educational issues, by making educational research appear excessively academic and irrelevant.

It is still too early to know what the consequences of legislating research methods will be. It seems likely that some people will follow the money and adopt experimental and quasi-experimental methods. Others, especially those who are not active researchers or whose methods require little support, will ignore the whole debate over methods. However, if the full range of research methods is to continue to be used to improve teaching and learning, some people will have to provide examples of how other approaches contribute useful knowledge to the field.

It will also be necessary to actively advocate for a broader range of

methods with concrete examples that non-researchers can understand. The post-modernists remind us that research is about discipline and the use of power. That is more true now than ever. Unless we make the case for our own relevance, our opportunity to contribute will be lost.

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Positivism's progressive past*

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Positivism has had a bad press in recent years but the very real criticisms that can be made of it as a philosophically flawed idea have obscured its progressive content. Positivist scientific thought gained its ascendancy in the eighteenth and nineteenth centuries, because it challenged a form of obscurantism, that of clericalism. From this period also dates the idea of education as systematic intervention into the life of ordinary people, and as a tool of social regeneration and reform. The attacks on evidence, ex-

perience, observation and method that form part of the post-structuralist breviary, frequently fail to note how essential such procedures actually are to creating useable knowledge and facilitating understanding. Science, positivism and empiricism may not have ushered in the utopia that their early proponents (Galileo, Bacon and Vico, for example) desired, but these fastidiously applied ideas and methods, have facilitated both human progress and the application of systematic education.

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A challenge to clericalism

One of the earliest challenges to priestly and biblical authority was made by Francis Bacon in works such as *The Advancement of Learning* (1605). Bacon's *New Atlantis* (1627) was a work of utopian speculation in which he described and advocated a community whose progress depended on its ability to conduct collective scientific research. Bacon was thus one of the first moderns to promote the view

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that human progress depended on systematic education. Hence, educational reform and the radical re-valuation of sources of knowledge went hand in hand. The challenge made both to accepted canons of knowledge and to the power of the knowledge holders - the church especially - accompanied popular demands for systematic education and 'really useful knowledge'.

Bacon's and then Locke's views on science and education were augmented by the first sustained application of scientific rationale to human affairs north of the border. The Scottish Enlightenment of the eighteenth century had a much greater significance and independent influence than English scholars usually allow. The French utopian socialists Saint-Simon and Fourier freely acknowledged the importance of the Glasgow philosophers Hutcheson, Ferguson and Adam Smith as did the originator of Positivist sociological thought, Auguste Comte. This was because they pioneered the practical application of ideas. As early as 1727 the University of Glasgow opened its undergraduate classes to *artisans* (like James Watt) who might benefit from scientific instruction.

Auguste Comte, a founder of positivist social science

Comte regarded the Scottish Enlightenment as the 'most advanced of all [the philosophical schools] of the last century'. He admired their commitment to historical investigation and the idea of continual progress 'from rudeness to civilisation' in Ferguson's phrase. He was also impressed by Smith's concept of the 'division of labour' but, like Marx and Comte's own student, Emile Durkheim, he was struck by the debilitating and alienating effects that work specialization entailed. Comte also regarded the Edinburgh atheistic philosopher David Hume as his 'principal philosophical predecessor' agreeing that it was pointless to build theological and metaphysical systems on what could not be verified by observa-

tion. Comte viewed education as a remedy to the unhealthy condition of society. He largely adopted his mentor, Saint-Simon's progressivism that promoted a meritocratic hierarchy, not unlike Plato's *Republic*, in which education would play a determining role. For him education was a mechanism for developing and gaining adherence to a common morality and agreement as to canons of approved social behaviour. It was also a sorting mechanism for intellectual capacity and positioning individuals in their most appropriate vocations. Thus through a systematic education Comte believed positivist social science should attain a structural role in creating a new social order.

Although these days this looks like an oppressive functionalism, it was clearly an advance on the elitism of birth of the *ancien regime*. Moreover Comte quite explicitly wanted his positive philosophy to appeal to ordinary people. He produced a number of popular pamphlets such as: *A Discourse on the Positive Spirit* (1844) which was written especially for working men; *A General View of Positivism* (1849) which dealt with the intellectual and social aspects of Positivism in relation to the working classes, women and art; and *The Catechism of Positive Religion* (1852) addressed specifically to women and which appealed to feminists such as Harriet Martineau who translated Comte's works and the novelist George Eliot (Mary Evans). Comte himself noted that 'the proletariat was the most disposed of all classes to accept Positivism on account of their common sense, their freedom from the taint of the metaphysical and literary speculation, their appreciation of science and their lack of self-interest' (quoted in Wright, 1986: 13).

French Radical Freemasonry

Surprisingly from a contemporary viewpoint, the social vehicle for the promotion of positivist ideas in the nineteenth century was French freemasonry. This was not the dull trouser leg rolling, backscratcher of business men and Chief Consta-

bles *de nos jours*, but a freethinking organization that had embraced those fiery spirits Voltaire and, in its Scottish homeland, Robbie Burns. By the 1860s, the deep anti-clericalism of French freemasonry had turned into a thoroughgoing atheism and it adopted positivism as a progressive ideology.

Comte's pupil Emile Littré led the movement to replace Masonic deism by atheism. He encouraged a materialistic and mechanistic interpretation of the universe based upon an evolutionary concept that emphasised reason and science. 'Positive' knowledge based on 'fact', should prevail over all forms of theological and metaphysical conceptions. This offended more conservative brethren and traditional deists warned that positivists were dedicated to turning masonry into little more than 'a vast school of propaganda for materialistic philosophy' (Headings, 1949: 43). Not surprisingly the old enemy the Catholic church was even more alarmed and Pope Leo XIII issued a Papal Bull in 1884, *Humanus Genis*, which warned of the overthrow of civilisation by freemasons, socialists and communists and, unofficially, he encouraged the formation of militantly anti-Masonic groups (1).

The Educational Campaign: the Ligue de l'Enseignement

Through its educational programme of positivist and rational thought masonry proposed to take the lead in the formation of the *citizens* of the future. The League was formed in 1866. The brainchild of Fourierist Jean Macé, it aimed to move freemasonry on from its previous ideology of revolutionary individualism towards a reformist socialism, in his words: 'to offer young women a more serious curriculum, improve the social position of teachers, and encourage adult education'. Macé's educational project changed the emphasis in French Freemasonry 'from a quietist, mystical theosophy towards a positivistic scientism and a practical preoccupation with popular education, friendly societies, co-operatives and legislative

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measures to reduce social conflict and social injustice within the nation, combined with efforts to rein-vigorate the ideals of international brotherhood' (Haywood, 1963: 4). So successful was the programme of positivist pedagogy that the Masonic paper *Chaîne d'Union* asserted that masons were now in the vanguard of laic and republican instruction.

The Rise of the *Universités Populaires*

The relationship of French freemasonry to the rise of the radical *universités populaires* is also intriguing. As a result of the educational movement, many Masonic lodges were *de facto* providers of classes and courses for adults. Many masons were impressed by the 'social education' provided by philanthropic groups in Britain. They agreed that Toynbee Hall and the Working Men's College were models to be emulated and some notice was also taken of university extension. In this spirit, the economist, Charles Gide, a freemason and Christian socialist (and uncle of the novelist Andre Gide), was very impressed by the cooperative movement of the Rochdale Pioneers. He established the Protestant Association for the Practical Study of Social Problems, in Nimes in 1887. In what might be seen as an Ur form of the 'Third Way', workers' co-operation was promoted in opposition to both the Marxist doctrine of class struggle and the laissez-faire rule of market forces.

Gide's lead was taken up by an anarchist printer in Paris, Georges Deherme who established the first *université populaire* for working men. Deherme believed that the positivism of Comte gave an impartial and objective account of human society distinctly different from the partialities of both Marxism and Catholicism. Between 1899 and 1914 over 230 *universités populaires* were formed with 50-60,000 adherents (although many of the new *universités populaires* were in fact simply existing discussion circles, social education groups and radical Ma-

sonic lodges).

The *universités populaires* cannot be separated from the Masonic drive for popular education, the doctrine of solidarism and the adoption of sociological positivism.

Elwitt saw the *universités populaires* as 'a good example of how solidarist ideology helped to shape popular education and make it a kind of laboratory for experiments in class collaboration' (Elwitt, 1982: 57). This may put it little too negatively. They were not merely the products of middle-class paternalism but a genuine meeting of the aspirations of workers for 'really useful knowledge' and the desire of the liberal professions for class harmony and social justice. As such they can be understood as a moment in the formation of a reformist labourist and social democratic politics.

Positivism in the late nineteenth century therefore claimed to offer a model of unbiased social education, made from a critique of both capitalist economics and Marxist revolutionary politics from an apparently neutral scientific standpoint. Positivist social science became even more widespread among radical intellectuals and spread rapidly throughout Europe. It would be hard now to defend this unmediated objectivist viewpoint but a century ago there is no doubt that programmes of liberal social reform were formed through its perspectives. That these programmes were also a panoptical means of social control cannot be denied or that the revolutionary Marxist enemy to the left was subordinated to a modified acceptance of capitalism. However it cannot also be denied that it met the aspirations of many radical workers and academics for a way through to a more humane and egalitarian society purged of clericalism and superstitious belief. It also laid the basis for social inquiry based on evidence and observation and an unfashionable theoretical clarity.

The problem for those of us still interested in human progress and the value of education is that a kind of

new obscurantism has become the academic orthodoxy in much of the social sciences and humanities. Paradoxically, this climate grew from a very proper scepticism of scientific objectivism voiced by Marxists and other radicals of scientific objectivism. Although Karl Popper's *Open Society and its Enemies* for example had been a very effective scourge of a Stalinised Marxism, positivism in turn was challenged by radical social science students inspired by Marcuse. They argued that the cultural normativity of positivist social science permitted all kinds of abuses and social injustice toward minority and marginalised groups under the guise of liberal tolerance. The struggles of the sixties generation of students and academics to construct an intellectual critique that tested the validity of universalism and the liberal hegemony it underpinned was remarkably successful in one sense. A whole shadow cabinet of counter thinkers began to appear on university syllabi. Whole new fields of study, for example cultural studies and post-colonial studies, effectively revealed other voices and points of view missing from the cool 'scientific' accounts of an earlier period of academic specialism. Marx was never afraid of empiricism, scientific method or even positivism as his three volume work of political economy *Capital* made piercingly clear, but for him the *fact* of class struggle gave them a one-sidedness which denied their benefits to those who produced the wealth.

However, in the wake of the failure of its own utopian ambitions, the progressive scepticism of this generation of political activists appears to have given way to an easy cynicism about any attempt to establish truth and reliable knowledge. Habermas noted the air of resignation extant in so much post-sixties theorising, with some understatement: 'The fact that poststructuralism, with its wholesale rejection of modern forms of life, finds an audience is surely connected with the fact that the efforts of praxis philosophy to reformulate the project of

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modernity along Marxist lines has suffered a loss of credibility' (Habermas, 1987: 327). Even clarity of expression in some quarters is decried in favour of a pureed word-fog of Gallic origin, which signs itself as academic language. E.P. Thompson's early warning alarm about this kind of thing in his eloquent reply to Althusser, *The Poverty of Theory* (1979) went unheeded. Pierre Bourdieu, a few years ago, went as far as to suggest that a return to some sort of positivism or 'scientism' as he preferred to call it, in the social sciences, would be no bad thing. He suggested that we need a scientific knowledge of national fields of production in order to illuminate the 'national cultural unconscious' (Bourdieu, 1999: 226). Such a project might at least divert attention from the text back to the world again.

* This article is a summary of 'The Role of Scientific Positivism in

European Popular Educational Movements: the case of France' in *International Journal of Lifelong Education*, 2002.

Notes

1. The anti-Masonic crusade subsequently produced much exotic literature, such as the following published by the Christian Book Club of America: 'That the lodges of the Grand Orient are largely controlled by Jews, is, however, certain and that they are centres of political propaganda is equally undeniable... the ideas they propagate are simply those of International Socialism' (Webster, 1928: 280). The author called on patriotic Americans to adopt the example of 'our friend and defender' Mussolini's and Drive them out!

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Anyone can calculate conditional probabilities

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Keep it simple

I have written elsewhere of several of the errors commonly made by educational researchers when trying to do calculations with percentages (e.g. Gorard 2001). These errors and misunderstandings are crucial, because the risks and uncertain gains we work with in educational practice and research are probabilistic in nature, and are usually expressed as percentages. What I hope to do here is suggest one way of explaining, teaching and communicating the calculation of probabilities with minimal recourse to percentages. Insight into complex numeric situations can be encouraged simply by taking more care in the presentation of probabilities. Almost anyone can calculate conditional probabilities of the kind that would even confound some experienced mathematicians. To

make this possible, we mostly need to change the way we think about and represent probabilities, rather than simply improve our own computational ability.

As an analogy, consider this computational problem:

In a standard knockout competition, such as a singles tennis tournament, if there are four players then there will be three matches in total – two first-round matches and a final. If there are eight players there will be seven matches in total – four first round matches, two second round matches and a final. Sixteen players leads to fifteen matches, and so on. It seems that for any number (n) which is a power of two, there will be n-1 matches in total. If n is not a power of two,

then unmatched players will have a bye in the first round. How many matches would be needed in total for a tournament of 43 players? How could you prove your answer?

Before you start working this out with paper and pencil, consider the following. Each match has two players and only one of them goes through. So each match eliminates one player. To have a winner we need to eliminate all but one player. Therefore, however many players there are, the tournament needs n-1 matches (42 matches for 43 players). This is a very simple proof of the general solution, and most people recognise it, but in practice even professional mathematicians struggle to find it for themselves (Dawes 2001). This is because the initial

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problem is phrased in such a complex way that many readers start looking for a complex answer. Once the problem is phrased more simply, the solution is obvious. My point is that when dealing with difficult issues in our research we should try and represent them as simply as possible. This, in itself, is not easy. It takes hard mental work for someone. But once done the simpler representation is easier to work with, easier to communicate, and easier to teach. How does this apply to computing probabilities?

The problem of complexity

Imagine being faced with the following realistic problem to calculate:

Around 1% of children have a particular special educational need. If a child has the need, then they have a 90% probability of obtaining a positive result from a diagnostic test. Those without the need have only a 10% probability of obtaining a positive result from the diagnostic test. If all children are tested, and a child you know has just obtained a positive result from the test, then what is the probability that they have this special need?

Faced with problems such as these, many people are unable to calculate a valid estimate of the risk. This inability applies to relevant professionals such as physicians, teachers and counsellors, as well as researchers (Gigerenzer 2002). Yet such a calculation is fundamental to the assessment of risk/gain in a multiplicity of real-life situations.

Many people who offer a solution claim that the probability is around 90%, and the most common justification for this is that the test is '90% accurate'. These people have confused the conditional probability of someone having the special need given a positive test with the conditional probability of a positive test given that someone has the special need. As we shall see, the two values are completely different. The problem can be solved using

Bayes' Theorem, introduced to readers in the last issue of *Building Research Capacity* by Roberts (2002). Bayes' Theorem describes how to calculate conditional probabilities correctly. It states that

The probability of event A given event B is the same as: the probability of A times the probability of B given A divided by (the probability of A times the probability of B given A plus the probability of not A times the probability of B given not A). Or in more formal terms (where 'p' signifies probability, and '|' signifies given):

$$p(A|B) = p(A).p(B|A)/(p(A).p(B|A)+p(A').p(B|A'))$$

If we substitute having the special need for A and testing positive for B, then we can calculate the probability of having the special need given a positive result in the test.

The solution of simplicity

Many readers will now probably be thinking that this is of very limited help, given their lack of mathematical confidence! But please read on, and see what a difference a simplification can make. Consider exactly the same problem expressed in proportionate frequencies rather than as probabilities or percentages:

Of 1,000 children chosen at random, on average 10 have a particular special educational need. Of these 10 children with the need, around 9 will obtain a positive result in a diagnostic test. Of the 990 without the special need, around 99 will also obtain a positive test result. If all 1,000 children are tested, and a child you know is one of the 108 obtaining a positive result, what is the probability that they have the special need?

This is the same problem, with the same information as above. But by expressing it in frequencies for an imaginary 1,000 children we find that much of the computation has already been done for us. Many more people will now be able to see that the probability of having the

special need given a positive test result is nothing like 90%. Rather it is 9/108 or around 8% (see Table 1). This result still depends on Bayes' Theorem, and is of course the same answer as would be obtained by conducting the calculation with the probabilities above (try it if you like! – the relevant probabilities are A=1%, B|A=90%, A'=99%, B|A'=10%). But it is far easier to compute in simple frequencies rather than percentages. Re-expressing the problem has not, presumably, changed the computation ability of readers, but has, I hope, changed the capability of many readers to see the solution, and the need to take the base rate (or comparator) into account.

A similar generic problem involving misunderstood percentages concerns the use of symptoms in medical diagnosis (Dawes 2001). Imagine an illness that occurs in 20% of the population, and has two frequent symptoms. Symptom A occurs in 18% of the cases with this disease, and in 2% of cases without the disease. Symptom B occurs in 58% of the cases with the disease, and in 22% of cases otherwise. Which symptom is the better predictor?

This situation is more complex than the example of special educational need, because there are now two conditional probabilities to deal with. But the same approach of converting it into frequencies leads to greater understanding. Many practitioners would argue that symptom B is the more useful as it is more 'typical' of the disease. There is a 16% gap (18-2) between having and not having the disease with symptom A, whereas the gap is 36% (58-22) with symptom B. Symptom B, they will conclude, is the better predictor. But while it seems counter-intuitive to say so, this analysis is quite wrong because it ignores the base rate of the actual frequency of the disease in the population.

Looked at in terms of frequencies, in a group of 1,000 people, on average 200 people (20%) would have

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the disease and 800 would not. Of the 200 with the disease, 36 (18%) would have symptom A and 116 (58%) would have symptom B. Of the 800 without the disease, 16 (2%) would have symptom A, while 176 (22%) would have symptom B. Thus, if we take a person at random from the 1,000 then someone with symptom A is 2.25 times as likely to have the disease as not (36/16), whereas someone with symptom B is only 0.66 times as likely to have the disease as not (116/176). Put another way, someone with symptom A is more likely to have the disease than not (Table 2). Someone with symptom B, on the other hand, is most likely *not* to have the disease. What we need for diagnosis are discriminators, rather than typical, symptoms. The more general conclusion is that from consideration of the 'politician's error' (Gorard 2000). Simple differences between percentages give misleading, and potentially extremely harmful, results.

The enormity of such misunderstandings can be made clearer by a real-life example. A study of 280,000 women in Sweden assessed the impact of a screening programme for breast cancer. Over ten years, there were 4 deaths per 1,000 among the over 40s without screening, and 3 deaths per 1,000 with screening. There are several different ways the gain from screening could be expressed. The absolute risk reduction is 1 in 1,000 or 0.1%, while the relative risk reduction is 25%. It is the last that is routinely used by advocates and those standing to gain from screening programmes, perhaps because it sounds like a saving of 25 lives per 100. All versions are correct – but the relative risk is more likely to get funding and headlines because fun-

ders, policy-makers and media commentators are easily persuaded by research findings expressed in percentages. In this example, the practical outcome is that information leaflets about the screening procedure mostly do not discuss false positives or other costs. Some even give the illusion that screening can reduce the incidence of the cancer. But to achieve even the level of success above requires a large number of false positives, and the distress and unnecessary operations that these entail. To these we must add the danger of cancer from the screening itself, and the financial cost of the programme (and therefore the lost opportunity to spend this money on reducing the risk in some other way). So viewed dispassionately, and with alternative ways of looking at the same data, a 1/1000 risk reduction may not seem worth it for this group.

Conclusion

This paper has two key conclusions. Most importantly it shows that confidence with probabilities can be improved. We can get better at dealing with probabilities simply by express-

ing them more naturally. And we can look for situations, other than those described here, to do it in. Second: the paper illustrates how a variety of important situations are being misunderstood. The ignorance of false positives in diagnosis and many other symptoms of societal innumeracy have real and largely tragic consequences. They are part of the reason why no citizen, and certainly no researcher, should be complacent enough to say 'I don't do numbers'.

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Table 1 - Probability of SEN having tested positive

	Test positive	Test negative	Total
SEN	9	1	10
Not SEN	99	891	990
Total	108	892	1000

Table 2 - Typical versus discriminating symptom

	Illness	No illness	Total
Symptom A	36	16	52
Symptom B	116	176	292
Total with illness	200	800	1000

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RCBN News

Change of staff within the RCBN

We are sad to announce that Helen Taylor (the RCBN Administrator) and Karen Roberts (research associate and co-editor of this journal) have left the RCBN. We would like to take this opportunity to thank them for all their help and to wish them both the best for the future. While the RCBN is in the process of finding their replacements you may experience some delay in responding to your requests for support and assistance. We hope that you will be patient during this time of transition and assure you that we will do our best to respond as soon as possible. However, we are happy to welcome three new members of the RCBN Executive Group: Professor Huw Beynon (Director of the Cardiff University School of Social Sciences), Dr Amanda Coffey and Dr Neil Selwyn. Their addition to the Executive Group will help us deliver our extensive programme of capacity-building activities (see below).

With changes to the core staff of the RCBN we have established a new email address for you to contact the RCBN. This is:

rcbn@cardiff.ac.uk

Programme of RCBN activities

As many of you will be aware the RCBN have outlined many of the capacity-building activities we hope to provide in the coming 18 months. For an indicative list of events and activities please visit the RCBN website and follow the link to 'RCBN Activities'. There are three main objectives for producing a programme of activities. The first is to provide greater notice to potential participants of future events. It has also been produced to illustrate the range of activities that the RCBN wishes to focus on during its current period of funding. However, we will continue to consult with TLRP and other researchers to determine the precise aims and content of each event outlined. This leads to the third main objective, which is to publicise the themes and activities as we would like to invite anyone who wishes to share their experiences and/or expertise with other educational researchers to participate and extend the RCB Network.

New career researchers

Following on from the successful two-day conference for new career researchers in Cardiff last November the

RCBN have established a web-based discussion board for such researchers to share and discuss ideas that emerged from the conference. To access this discussion board please visit the RCBN website, follow the link to 'RCBN Activities' and go to the new career researchers' Theme or Learning Network pages. The RCBN will be shortly advertising two forthcoming events that may be of interest to new career researchers, on applying for grant funding (most likely in Northern Ireland and Scotland). Please visit the RCBN website regularly for more up-to-date information.

Forthcoming RCBN events

The role of numbers

The following seminars are currently scheduled (the RCBN website provides more details on these):

Institute for Education Policy Research (IEPR),
Staffordshire University
School of Education, Southampton University
Institute of Education, University of London
School of Education, Leicester University
Faculty of Education, UWE

Using archived data sources for teaching and learning research, 4th June, Essex University

A one-day workshop has been organised in collaboration with the Data Archive at Essex under the RCBN theme 'Using large-scale secondary datasets'. This will cover the depositing and secondary use of both 'qualitative' and 'quantitative' datasets. Please contact the RCBN for further information and to book a place.

Introduction to systematic reviewing, 31st March, Institute of Education, London

This is initially a one-day workshop organised in collaboration with the EPPI-Centre. It will introduce the history and rationale of systematic reviewing, explore different approaches to conducting systematic reviews, and outline the main stages in undertaking such reviews. A further two-day workshop may be organised for participants to provide them with the skills to conduct systematic reviews, which will also be accredited by the EPPI-Centre. For more information and to book a place please contact the RCBN.

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