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What is educational research? Changing perspectives through the 20th century

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This paper reviews the history of educational research, primarily in Britain, showing how the concept of research in education—what it is, how it was done, and what its function should be—has changed over the past hundred years. A central theme is the growing acceptance of research in education, which paradoxically, it is suggested, may have had the effect of restricting its scope. Experimental research in education originated in the late 19th century in Germany, and initially was seen primarily as psychological inquiry into learning, an academic activity whose contribution to school practice and policy issues was essentially theoretical and long term. The application of research came to be recognised in the first half of the 20th century, but it was seen as the work of experts and specialists, to be used where appropriate by teachers and administrators. The 1950s and 60s saw educational research accepted as a discipline in its own right, and brought it into closer partnership with policy and practice, with increased funding giving those who commission research greater say in design, management and dissemination. The teacher–researcher movement, initially aimed to support teachers in carrying out research themselves, developed into a more fundamental view of research as a key element in a professional approach. In summary, the role of researcher has moved from academic theorist in phase 1, through expert consultant in phase 2, to reflective practitioner in phase 3. The paper concludes with a review of recent trends, postmodernist and poststructuralist, which challenge the positivist assumptions underlying the scientific–experimental paradigm which has been dominant throughout the 20th century.

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Introduction

> A repetition of this experiment with 16,000 or 18,000 more cases is needed before final conclusions should be stated. (Wodehouse, 1925, p. 41, spuriously attributed to Thorndike)

> Case study is an umbrella term for a family of research methods having in common the decision to focus inquiry round a single instance. (Adelman *et al.*, 1977, p. 139)

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> 'Oh, I can't stand those people,' he said, 'postmodernists or poststructuralists, or whatever they call themselves … They think there is no such thing as scientific proof and that science is only one interpretation of the world among others equally valid.' 'Well, isn't it?' I said. (Lodge, 2001, p. 228)

These three quotations illustrate different ways in which the concept of educational research has been interpreted over the past century. This paper reviews the history of educational research, primarily in Britain, showing how different styles of research have developed, linked with the function which research is expected to perform. It is concerned primarily with experimental research, and not with philosophical or historical research, or to the extensive individual non-funded scholarship in universities, although some of the points apply equally to these fields. A central theme is the growing acceptance of research in education, which paradoxically, it is suggested, may have had the effect of restricting its scope.

The idea that practice and policy in education should be guided by research was first suggested in the 19th century. The second half of that century had seen striking advances in science and technology and the scientific model came to be applied with growing success to medicine, engineering and psychology. Could education too be given a scientific base through research?

In the past, educational practice was based on tradition and authority, especially the authority of the Bible or of Aristotle or other classical writers: the validity of an idea was judged by the authority of its source. It was this way of thinking which was questioned in the 18th century period known as the Enlightenment, when authority was challenged by the supremacy of rationality: the validity of an idea was to be judged on the basis of evidence. The concept of basing educational practice on empirical research on the model of the physical sciences was developed by an Aberdeen professor, Alexander Bain, in a treatise published in 1879 with the title, *Education as a science*. The dominant figure in England was Francis Galton who introduced the science of anthropometry, using physical measurements to classify not only racial difference but also, he claimed, intelligence and even criminality. In 1877, he announced (over-ambitiously) to an assembly of the British Association for the Advancement of Science:

> It is now possible to inquire by exact measurement into certain fundamental aspects of mind.

His guiding principle in research was: 'Whenever you can, count'—a fundamental principle in the new 'science' (though some later mistakenly interpreted it as 'If you can't count it, ignore it').

Galton's work in England was not followed up: the main thrust of the scientific approach came in Germany, where experimental studies of mental activity laid the foundations of psychology. Philosophers like Kant had dismissed the idea that the mind could be measured, but from the 1860s on scholars such as Wundt, Fechner and Helmholtz studied aspects of mental activity which *could* be measured—reaction time, sensory discrimination, aspects of sensation and perception, and fatigue—studying the senses as an entry to the workings of the mind. Ebbinghaus, from 1885,

applied these methods to experiments on learning and memory: it was he who invented nonsense syllables (for experiments on memory) and the completion test (later used by Binet and others). Psychological laboratories were established at Leipzig, Jena and Berlin, in Geneva under Claparede (famous later under Piaget), and also in Paris in 1889 (Binet joined the staff there two years later and became Director in 1894). These research centres attracted American students, for at that time there were no adequate facilities for postgraduate study in America. Many European scholars were now active in this new field of research, such as Decroly in Belgium; in Russia, for example, the Musée Pedagogique was established in St Petersburg in 1900.

The first educational research textbooks

By the first decade of the 20th century, enough experimental work had been done on these lines to enable publication of the first educational research textbooks in Germany and Switzerland. The appearance of textbooks is a sign that the sphere of research is recognised as a discipline in its own right, and their influence is to define the boundaries and content of that discipline. The concept of educational research which was established was experimental, primarily psychological, involving measurement, seeking solutions to the educational problems of the day, and this interpretation monopolised educational research for the first half of the century. The paradigm of understanding by analysis, breaking down the components and analysing these components out of context on the analogy of the physical sciences, was both its great strength and, in education, its fundamental weakness. Because the experimental work described in these early texts had their origin in German laboratories, their basis was largely in psychology and physiology: in 1903, *Experimental didactics: its foundations, with some considerations of muscle sense, will and action* by Wilhelm Lay in Wiesbaden; and in 1905, *Child psychology and experimental pedagogy* by Edouard Claparede in Geneva.

In the Foreword to Lay's book the author asks: 'Is an experimental didactic possible and necessary?' Commenting on how this area of research had 'matured' over the previous fifteen years, he wrote: 'I started on it applying philosophical and physio-psychological knowledge to the practice of teaching … extended to all subjects, reading, writing, arithmetic, perception-teaching (anschauungsunterricht), religious teaching…'; and he declared that his earlier publications showed that 'it was possible to treat educational topics in an experimental fashion' (p. vii). A glance through the chapter headings of his book shows how much psychology there is in his interpretation of *Experimentelle didaktik*: it starts with 'muscle sense' and goes on to cover feeling, attention, association, apperception, memory, imagination, thinking, suggestion and willpower.

The original title of Claparede's text in 1905 was *Child psychology and experimental pedagogy*, and it covered the field in 76 pages. But, illustrating how the discipline had developed, his fourth edition in 1911 ran to 332 pages, and reversed the order in the title, *Experimental pedagogy and the psychology of the child*. The Introduction begins:

> That pedagogy ought to be based upon the knowledge of the child, as horticulture is based upon the knowledge of plants, would seem to be an elementary truth. It is, nevertheless, entirely unrecognised by most teachers and nearly all educational authorities. (p. 1)

Claparede attempts to identify the boundaries of this new discipline by asking, what problems is it expected to solve? First, theoretical problems: he identifies a range of new disciplines—Paidology and 'Paidotechnung', pure and applied, including Experimental Pedagogy (defined as 'the knowledge of, or the inquiry into, the circumstances favourable to the development of the child') and Experimental Didactics (primarily methodology); then also, Psychodiagnostics (measurement), Psychotechnics, and so on. His work is remarkably ahead of its time in some of the issues raised:

> 'Before learning anything, it is necessary to learn how to learn.' (p. 57)

> How far are the various mental functions able to be independent of each other, or, on the other hand, how far do they reciprocally influence each other? [correlation and factor analysis] (p. 61)

> When we educate a certain function, are we acting upon others at the same time? [transfer of training] (p. 64)

His chapter on methods includes discussion of the uses of questionnaires, the rival values of qualitative and quantitative procedures, and the pitfalls in experimentation; but it also includes the 'brass instruments' of the old German psychological laboratories, the kymograph, aesthesiometer, and so on.

In 1907, a classic text was published in Germany by Ernst Meumann, *Vorlesungen zur Einfuhrung in die experimentelle Pädagogik*. This first edition was in two volumes and ran to 1,040 pages; a second edition in 1912 had three volumes and 2,463 pages, a truly Germanic work of scholarship. The Preface to the first edition, after referring to Pestalozzi, Froebel and Herbart, says that a new phase has been reached in which education has to take account of the whole range of social sciences, avoiding 'doctrinairism' and instead basing our ideas on empirical studies of the child's nature. In this new phase, he writes, systematic observation and experiment have been developed to the stage where it is possible to speak of 'Experimental Pedagogy'. The chapters which follow report research studies mainly in psychology and describe the methods used: the mental and physical development of the child and its pedagogical significance, the experimental investigation of mental abilities, memory, visualisation, language, intelligence, the mental work of the school child and its relation to the teacher's method, mental hygiene, and experimental pedagogy in teaching reading, writing, spelling arithmetic and drawing, and also higher school subjects.

At first the boundaries of this new science were uncertain, and this can be illustrated from the changes in name of the main German research journal in which the results of experiments were published. The original title when the journal was founded in 1899 was *Zeitschrift für pädagogische Psychologie*. In 1900 the words '*und Pathologie*' were added, reflecting the inclusion of studies of the mentally handicapped. In 1901 the further addition of '*und Hygiene*' reflected the inclusion of health studies. The psychological emphasis remained, and in 1905, Meumann began a new journal with a stronger emphasis on education (at least in the title), *Zeitschrift für*

experimentelle Pädagogik. Depaepe (1992) has described the rivalry between these two journals, between experimental pedagogy and educational psychology (and, more personally, between Lay and Meumann). And it is significant that in 1911 the two journals merged under the title of *Experimental Pedagogy*, as there was now little to distinguish between them.

In this first decade of the century, one of the most influential research studies was that of Binet and Simon in France, who were exploring how to identify mentally handicapped children (as distinct from those educationally backward). From their work they developed an individual test of intelligence in 1905, which was frequently revised and improved. In the 1930s in the USA, Terman and Merrill revised the test material extensively to produce a standard version which was used for the next thirty years. With these tests came a recognition of the wide range of individual differences among children, and the aim of matching instruction to the level of intelligence of the children.

Some false starts

But the story of educational research is not one of steady progress: there were false starts and absurdities. Galton attempted to link intelligence with size or shape of head, or with sensory discrimination or reaction time. Binet (1908) reported an investigation into the effect of eating bread on a child's intelligence. From the housekeeping records of boarding schools, he measured the consumption of bread over a whole school year, and found that consumption diminished as the year progressed. From this he drew the conclusion that intense intellectual work injures the appetite. (This finding was confirmed in a later study by Schuytens in Belgium, but that doesn't make it any more convincing!) An experiment in 1910 (reported enthusiastically in Claparede's textbook) would be incredible today. The hygienist, Lorenz, in Berlin noticed that children's school work was poorer at the end of the day through fatigue, so he sprayed a class of children with a 1% solution of a nerve gas called 'antikeno-toxin' developed by Weichardt in Stuttgart. Claparede (1911) reports:

> This antikenotoxin which had penetrated the bodies of the pupils by their channels, had the effect of augmenting the speed of reckoning by 50%, and also lowered the number of mistakes made [And Claparede commented] We would naturally desire that fresh experiments of this kind should be undertaken … It seems too good to be true. (pp. 304–305)

The Child Study movement first proposed by Stanley Hall in USA in the 1880s encouraged parents to make systematic observation and recording of their children's development. This attracted worldwide interest: Child Study Associations sprang up in many countries, and parents and teachers sent in their observations to Hall in Chicago for collation to provide records of many aspects of child behaviour—for example, see Hall's (1891) 35-page detailed lists of 'The contents of children's minds on entering school'. The 1899 volume of *Zeitschrift für Pädagogische Psychologie*, (3/4, pp. 171 and 230–1), lists 77 publications on Child Study, covering (in this order) children's geographical interests, their reasoning, children's rights, the social responsibility

of children, punishments, playthings, ambitions and fears. This gathering of 'objective' data was a new interpretation of 'scientific' inquiry, but it did not have any lasting influence on the development of educational research because it was unsystematic and lacked a theoretical base. Child Study was eventually discredited by the triviality of its findings. Hall, for example, solemnly reported in 1896 that out of 845 children, 191 preferred wax dolls, 163 preferred paper dolls, 153 porcelain dolls, 144 rag dolls and so on. (Even to this day, the media report surveys of this kind, and convey the impression that this is what educational research is all about.) The movement continued into the 1920s, but eventually lost interest: the story is told that in the 1950s cellars in the University of Chicago were full of unopened boxes of observations sent in by Child Study groups. When Piaget began his psychological studies in Geneva in the 1920s, he also drew his data from observation, but of only two children intensely studied over a long period, and he interpreted his observations in a psychological framework of theory which gained worldwide acceptance.

An interesting 'sideline' in the history of educational research was the invention of the name 'Paidology' for this new science of education. An American, Oscar Chrisman, claimed to have invented it—he is quite precise about the date, Wednesday morning, April 26, 1893 (Claparede, 1911, p. 14). Chrisman was a student of Stanley Hall, the originator of the Child Study movement; and Chrisman's aim was to link Child Study with the new Experimental Pedagogy, attempting to make Child Study more scientific, getting away from the botanist's method of observation and classification, towards the experimental style of physics, aiming to discover basic principles or laws in education. Paidology was taken up worldwide: a detailed history of the movement and its eventual demise is to be found in Depaepe (1992). In Europe, Belgium led the way: the *Zeitschrift für experimentelle Pädagogische* in 1907 reports that 'Brussels had the honour to be the first to include this new branch in the curriculum' (Jonckheere, 1907). Paidology laboratories were set up in Charleroi, Mons and Antwerp; and other centres of paidology research and teaching were in Hungary, Poland, Russia, Italy and Spain. The subject had its own journal, *The Paidologist*, from 1899. The highpoint of the paidology movement was an International Congress in 1906 in Brussels, where an International Faculty of Paidology was set up in 1914. But all this was destroyed by the outbreak of World War I, and the term 'paidology' disappeared in the post-war years. The reason probably is because of a more fundamental change. The idea of establishing basic laws for education was taken over by experimental psychology, whereas experimental pedagogy was concerned rather with how to achieve prescribed targets, with method rather than theory.

Although some of these early initiatives were misguided, it is more important to point to effective studies from this period, particularly on transfer of training, a crucial issue at the time—does the study in one field transfer to a non-related field, does studying Latin improve your mind? The study of gifted and retarded children also dates back to this time. Fatigue in learning was another topic extensively researched, and the findings are probably the basis for some present-day practice—for example, in secondary schools the 40–45 minute period, and in primary schools doing arithmetic

in the mornings. One feature of this period was its international exchange: scholars looked beyond national boundaries more readily than they do today.

Tests and measurements in USA

American histories of educational research tend to neglect European sources, dating the start of research proper in 1897, when an American researcher, Rice, published the results of his investigations into spelling. He compared class average scores in a spelling test with the amount of time given to spelling in the classroom and found a zero relationship, thus proving 'the futility of the spelling grind', the title of his 1897 paper. Initially, European influence was strong because many American scholars travelled to Germany for their doctorate studies, including Rice who studied in Jena and Leipzig, and Cattell who worked in Wundt's laboratory: his 1890 text, *Mental tests and measurement*, introduced the concept of 'mental test' in the terms by which it is understood today. A major American text in this field, Whipple's *Manual of mental and physical tests*, first published in 1910, reflects in its coverage the influence of Galton (measuring diameter and girth of skull, motor control, strength of grip) and the early German scholars (sensory discrimination, visual perception using tachistoscopes, mirror drawing, memory and suggestibility), but it also includes (at the end) examples from the burgeoning test movement at that time, with tests of reading, arithmetic and spelling.

The leading figure in measurement in these early days was Thorndike, whose doctoral thesis was on animal learning in chickens. Travers (1978) relates how at Harvard Thorndike had to keep his chickens in the basement of his professor's house (much to the delight of his children); but the story goes that when he was appointed to Columbia University to join Cattell in 1898, he took his two most educated chickens with him, but Columbia refused to give them accommodation, and so he studied children instead.

Whatever the truth of that, he carried over the laboratory scientist role, that of experimentally exploring basic 'laws of learning', such as the law of effect, later called reinforcement (the importance of reward in learning) and transfer of training (learning in one context is generalised to other contexts—such as learning Latin as a training in logical reasoning—only if common elements are stressed). Thorndike's main contribution, however, was in the construction of tests: together with colleagues, he produced the first standardised attainment tests in 1908, and a handwriting scale in 1909, followed by many others. In 1918, an American *Yearbook* listed 109 standardised tests which were in current use in schools: nearly 900,000 copies of one popular test were used in 1917, and several others had sales of over 100,000 each (Monroe, 1918).

The idea of improving the efficiency of teaching by setting standards based on tests seems to recur regularly through the century. The 1908 report of the US Commissioner of Education linked efficiency with testing, and his 1910 report proposed setting standards in terms of test performance. Across USA Boards of Education began to set up 'Bureaus of Educational Research' (sometimes called 'Bureau of

Research and Efficiency'). By 1926, there were 105 such bureaus across the country. But gradually they were abandoned, as they tended to be preoccupied with gathering statistics on test scores with which nothing was done (Nifenecker, 1918). Travers's verdict on this short-lived movement was that it 'did little for education, neither clarifying the concept of effectiveness nor making schools more efficient … it measured, but did not analyse.' (1983, p. 507).

Research begins to take root

In other countries too, individual scholars were conducting research inquiries and publishing their findings in newly established journals. The fourth edition of Claparède's textbook mentioned above, originally in French and now translated into English, German, Italian, Spanish and Russian, included a new chapter outlining the growth of experimental pedagogy in England, France, Germany, Holland and twelve other countries.

In England in 1894, an Office of Special Inquiries and Reports had been set up, and its Director, Michael Sadler, pressed the Board of Education (as the equivalent of the Ministry was then called) to establish a national research council, unsuccessfully. Taylor (1972, p. 4) records an exchange of minutes between Sadler and the Board's Secretary, Morant, which has a surprisingly contemporary ring. Sadler wrote:

> In order that the scientific work of educational inquiry may be searching and fruitful, it must be intellectually independent. Those engaged in it must be free to state whatever they believe to be true, apart from preconsiderations as to what may at the time be thought administratively convenient.

Morant replied in terms which were to be echoed in 1970 by Thatcher and in 1971 in the Rothschild Report:

> It cannot be too clearly impressed upon you that the work of the Office of Special Inquiries and Reports is done and must continue to be done, for the benefit of the Board, at the instance of the Board, and under the direction of the Board.

And Sadler resigned. However, London County Council had its own Inspectors of Schools, and from 1900 these inspectors, Winch, Kimmins, Ballard, Hughes and Burt, began to construct tests and carry out an impressive series of research studies on learning, memory, attention, fatigue and (especially) transfer of training. These classic experiments (paralleled by similar research in USA) deserve to be rescued from oblivion. The record of publications of these London school inspectors is impressive, considering that they were presumably doing their regular inspections at the same time. Winch, for example, published 3 books and 29 papers (mostly in American journals); he also got leave to visit Germany and USA to explore and report on developments there (Sharp & Bray, 1980). Ballard developed a one-minute reading test standardised on over 22,000 children. Burt, the most famous of this group, was not appointed until 1915, when he was given explicit responsibility for research.

In Scotland, from 1910 to 1916, the Scottish universities were discussing the introduction of a degree in Education, the first of its kind in Britain, and it was

thanks largely to Rusk in Glasgow (who had studied at Jena) that 'Experimental Education' was included as one of the main elements in the course of study for the Scottish degree. Rusk's book, *Introduction to experimental education*, was published in 1913. He acknowledges his debt to Meumann in the Preface, and the titles of Rusk's chapters follow Meumann's text closely: methods of experimental education, the physical and mental development of the child, attention, sense-perception, apperception, memory, association and imagination, aesthetic and ethical development, individual differences, inheritance, the mental work of the child, mental hygiene, and pedagogy in reading, handwriting, orthography (spelling) and arithmetic. In Glasgow at this time Boyd also began experiments and surveys. In 1918 the Educational Institute of Scotland (the teachers' union) set up a Committee on Research with Boyd as Chair; and Boyd introduced a school-based type of research, with the aim (50 years before the teacher–researcher movement) of getting teachers actively involved in their own research.

Educational research acquires identity—and a limited role

By the 1930s, educational research had established a certain degree of respectability and acceptance—'a certain degree' only, because very few teachers in schools or educational administrators regarded it seriously. Educational research journals grew in number and size, though their readership was almost exclusively members of the academic societies which produced them. Universities set up Departments of Education, but (except in Scotland) these were primarily concerned with teacher training; in England, London, Birmingham and Manchester Universities combined this with an active research programme. In 1928 in Scotland, the Educational Institute of Scotland and the Association of Directors of Education had set up the Scottish Council for Research in Education (SCRE), the first such organisation in Europe, but the Scottish Education Department declined to contribute and, as records show (Wake, 1984), was wholly sceptical of its value. For the next thirty years, with a staff of only a part-time Director and a secretary, the SCRE produced a series of significant research publications based largely on the work of academic staff in colleges and universities, but these remained virtually unknown among teachers.

Similar developments were occurring in other European countries as well as in USA, New Zealand and Australia. In Sweden, for example, Torsten Husen and Kjell Harnqvist were leading figures in an empirical, psychologically-oriented research which influenced Swedish educational policy in the 1950s and 60s. Institutes for Educational Research were established in many countries (Norway 1935, Denmark 1954, Finland 1957, and in the Netherlands, Stichting voor Onderzoek von her Ondervijs, SVO, in 1965).

However, the common attitude to research at this stage in the century was that it was an academic study out of touch with 'real' problems. In fact, important ground work was done on reading and other elements of the primary school curriculum, but in Europe the secondary school curriculum remained the province of subject

specialists. The unreliability of the examination system was also demonstrated in the research of this period, but that tradition was too well established to be affected by mere research evidence. The 'scientific' approach in the early history of educational research, together with its increasing reliance on the sophisticated statistical methods which were being introduced resulted in educational research being regarded as a specialist activity, 'done by those *outside* the classroom for the benefit of those *outside* the classroom' (Nixon, 1981, p. 5), requiring extended training (much of it statistical and psychological) and with the function of producing theoretical principles to guide teachers and policy-makers.

> Until about the 1960s, research was essentially a small-back-room activity. Researchers may have dreamed about reforming the world of education, but it was a long-term aspiration, to be achieved by patient scholarship. There was little expectation that policy-makers, administrators or teachers would be much influenced by, or even interested in, research. (Nisbet, 1984, p. 3)

This now began to change as the scale of educational research grew and the number of researchers in universities and in specialised units increased dramatically. The role of acting as the intelligence of the educational system was quite an attractive one for the researchers, even if the system still had only grudging acceptance of what they reported. By mid-century, researchers had begun to establish this technocratic alliance with the power blocks in education (thus further earning the suspicion of teachers). The 11-plus examination, for example, which was used to select a minority of the year-group for grammar school, relied on standardised tests and statistical analysis which had been validated by research; in this way (though few would have acknowledged it until the mid-1950s) research was used to justify selection as the instrument of a structured society.

Thus for the researchers, the price of acceptance was the demand that research (or at least, funded research) should be 'relevant'. Relegating research to this instrumental role carries risks: trivialising, in pursuing volatile educational fashions; restrictive, in limiting research within the constraints of existing policy frameworks; potentially divisive, creating an elite group of researchers in alliance with authority; and ultimately damaging, in that it can leave the researchers wholly dependent on their powerful partner. Researchers who decline to accept this requirement, choosing an unpopular or unfashionable line of inquiry, are liable to find that they receive no grants, that their papers are not accepted by journals, or, if published, are not widely read or quoted. This restrictive influence of the established orthodoxy is to be found in all science. But the decade of the 1960s in education was to some extent an exception.

The 1960s and 1970s: the new look

The decade of the 1960s was a period of upheaval: it began with major reviews of the educational system in Britain and major investment in research in USA to tackle the problem of social disadvantage, and ended with student revolt in France and across the world. Educational research also experienced challenge to its traditional practice.

Rather unexpectedly (at least for the researchers) national governments began to set aside substantial funds for research in education. Between 1964 and 1969, expenditure on educational research in Britain multiplied ten-fold; in the USA, expenditure doubled each year from 1964 through to 1967. An Educational Research Board was appointed within the Social Science Research Council with funds for projects throughout Britain, and in the Scottish Education Department a Research and Intelligence Unit initiated research programmes and funded research in universities and colleges. Major UK reviews of education were commissioned in these years, Plowden on primary education, Newsom on secondary education and Robbins on higher education, and each of these was accompanied by a substantial research and survey programme. For the most part, however, the research findings from these programmes were used to strengthen the case for recommendations which the Committee had already reached—a rather limited interpretation of the term, 'research-based policy'. The Plowden Report (1967) in its recommendations on early education was more frank:

> The research evidence so far available is both too sparse and too heavily weighted by studies of special groups of children to be decisively in favour of nursery education for all. We rely, therefore, on the overwhelming evidence of experienced educators. (paragraph 303)

It was in these years that educational research began to emerge out of the shadow of the contributory disciplines of psychology and sociology and to develop its own conceptual frameworks, if not actual evidence-based theories. At the same time, a radical change questioned the established experimental style of quantitative statistical research in education. By the 1970s researchers were arguing that qualitative case studies exploring issues in depth with relatively small numbers were more appropriate in education. Quantitative research could show that there were wide ranges of individual differences in every kind of measure but seldom was able to explain the meaning or implications of the findings for everyday contexts: its aim was generalisation for the purposes of prediction and management. Qualitative research in contrast aimed at understanding and insight into the complexities of learning and human behaviour (see Stenhouse, 1981).

Two related innovations about this time introduced new perceptions of educational research, action research and the teacher–researcher movement. Following the Plowden Report in 1967, which had proposed 'positive discrimination' for schools in areas of social deprivation, a large-scale programme of four projects in England and one in Scotland was launched in that year, called the Educational Priority Areas (or EPA) projects, which aimed to combine action to improve conditions with research to identify how best to achieve this. The report, *Educational Priority* (1972), defines this 'novel type of research … (as) small-scale intervention in the functioning of the real world … and the close examination of the effects of such interventions' (p. 165). Action and research have different aims and values:

> Research values concepts such as precision, control, replication and attempts to generalise from the observation of specific events. Administrative action… translates generalisation into specific instances.' (*Educational Priority*, 1972, p. 165)

But in action research those who initiate action also conduct research which directs actions in a developing programme of reform.

There is a danger in action research of perpetuating the 'black box' style of research, in which essential underlying processes remain hidden and are not considered necessary so long as the outcomes are satisfactory. However, Nixon, in *A teacher's guide to action research* (1981), combining this mode of inquiry with the concept of the 'teacher–researcher', developed just the converse argument:

> The case for action research may be stated briefly. By investigating and reflecting upon their own practice teachers may increase their understanding of the classroom. (p. 6)

The teacher–researcher concept was developed in another major project begun in 1967, the Schools Council Humanities Project directed by Stenhouse (1970). The Humanities Project produced materials for the discussion of controversial issues (such as racial prejudice), but an integral part was evaluation by the teachers themselves, both to define the research problem and initiate research to guide subsequent action.

> (This) marks a radical departure from the traditionalist view of research as a specialist activity, the results of which teachers apply rather than create … The teacher as a researcher movement, with its focus on the practical educational problems arising from particular situations, and with the aim of illuminating such situations for those involved, offers an alternative. (Elliott, 1981, p. 1)

The teacher–researcher movement has been taken up and given support by both BERA and SERA, the British and the Scottish Educational Research Associations, but thirty years on, it is still a minority group with relatively little published output. But research was now being seen as a professional activity for teachers as well as (or instead of) for specialist researchers, a mode of working to be adopted by all in facing up to problems, whether in policy-making or in school-based projects.

The practice of measurement was also questioned. In-depth interviews provided a different kind of data, approaching a topic from the perspective of the interviewee rather than within a framework decided in advance by the researcher. This phenomenographic method (as it is called) has its roots in the philosophy of phenomenology, which opposes the positivism or naturalism inherent in contemporary science and technology—the standard scientific approach to knowledge by formulating hypotheses and designing experimental procedures to test these—on the grounds that this finds (or negates) only what the researcher is looking for, whereas the open-ended methods of phenomenography produce data for formulating new interpretive constructs. This approach focuses on awareness or 'encountering', and accepts the role of description in how we perceive situations and how we interpret or 'understand' them. Thus, from the interview transcripts, the researcher derives interpretive categories: for example, the way students speak about their reading and understanding leads to the categorisation of 'deep' and 'surface' learning (Entwistle, 1981). Recognising the subjectivity involved, the interpretation is supported extensively by excerpts from the interview transcripts.

Questioning the scientific–experimental paradigm

While these new styles of research were gaining acceptance in academic circles, the experimental paradigm developed in the first half of the century still retained its dominance in Britain, especially where funded research was concerned. (It may be argued that this still the case today.) Reviews of research published around 1970 dealt mostly with studies which were experimental in style, statistical in method, psychological in analysis and positivist in philosophy. Butcher and Pont's three volumes of research collections (1968, 1970, 1973) are all experimental; Evans' research guide (1968) published by the National Foundation for Educational Research also assumes the experimental approach; and the textbook on research methods by Nisbet and Entwistle (1970) gives 3 pages out of 176 to case study. By 1980, there are signs of a change: the first edition of *Research methods in education* (Cohen & Manion, 1980), a widely adopted text, has 27 pages on case study (out of 328), 16 pages on action research and 18 on qualitative methods.

The most radical challenge to this scientific–experimental paradigm of the first half of the century came from outside educational research, from sociological and philosophical theories. Their appearance in educational research is relatively recent, and they still have to win acceptance in the practical world of assessment and evaluation, research funding and educational policy, being seen by hardliners as the province of eccentric scholars in an academic area of controversy. For many others, they came as a welcome challenge to the uncritical acceptance of positivist assumptions.

For example, Garfinkel (1967) introduced the term 'ethnomethodology' to describe his approach to research which explores 'the patterns and structures discernible in societies'.

> (These) are not a matter of external social constraints, roles or functions imposed on hapless individuals, but are produced through cultural and interpretive practices that people collaboratively use to make sense of the world and render it mutually comprehensible. (Maclure, 2003, p. 188)

Foucault (1972) and the poststructuralists go further than this:

> (They) reject the idea of universal truth and objective knowledge, delivered through the proper use of reason, and assert that truths are always partial and knowledge is always 'situated'. (Maclure, 2003, pp. 174–175)

For those working within this approach, interpretations of the world and of social interactions are based on concepts which we (or past generations) have constructed, and the task of the researcher is to 'deconstruct' these through versions of 'discourse analysis', to give us insights and clearer understanding, Thus, 'answers' to problems depend on how we conceptualise the problem, and this in turn is often dependent on the metaphors we use to grapple with and analyse the issues. Metaphors carry 'conceptual baggage' and may shape our thinking without us realising—'baggage' is itself a metaphor which illustrates the point. The metaphor of education as 'growth', for example, which we can trace back to Froebel (and which Claparede used in the quotation at the beginning of this paper) carries the implication of innate capacities which need only warmth and nourishment to develop naturally.

The postmodernist movement develops this argument that knowledge is a social construction.

> Postmodernism abandons the enlightenment ambitions of unity, certainty and predictability, because many aspects of life are ephemeral, if not completely unpredictable … The metaphor of chaos questions progressive betterment, questions the idea that the quality of life has improved. It seeks to understand, but not to reconcile, divisions … Those who write from a postmodern perspective tend to question the value of rationality, to reject grand theory, to favour local knowledge over systemic understanding, to eschew large-scale studies, and to view the world as an indeterminate place beyond coherent description … (It is) a requiem for the passing of the modernist quest for certainty, predictability, and the hoped-for advancement of knowledge and society-at-large. (Constas, 1998, pp. 26–27)

Hargreaves (1999) argues for a more complex interaction, distinguishing two modes of knowledge production:

> Many researchers have questioned and progressively abandoned the linear model by which knowledge is created by researchers, then disseminated and finally applied by teachers to their practice … [Knowledge production] Mode 1 is university-based, pure, disciplinary, homogeneous, expert-led, supply-driven, hierarchical, peer-reviewed. Out of Mode 1 grows Mode 2 knowledge production, which is applied, problem-focused, transdisciplinary, heterogeneous, hybrid, demand-driven, entrepreneurial, accountability-tested, embedded in networks. Because Mode 1 is the dominant form, it is more easily understood and recognised. Mode 2 is strongly concerned with knowledge that is useful—to a government or some kind of user—and does not get produced at all until various groups negotiate its generation from different types of knowledge. Mode 2 knowledge is not created and then applied: it evolves within the context of its application, but then may not fit neatly into Mode 1 knowledge structures. (p. 136)

Writing about the wider field of scientific knowledge generally, Latour (1979) describes how this knowledge is constructed in laboratories, not neatly and logically but largely influenced by what he calls 'historicity', his term for the way that all beliefs and theories have a history and that history affect the nature of the belief or theory. Applied to education, this would require us to look at how knowledge is constructed, reflecting different purposes, different focal points and different philosophical and moral positions. To the hardheaded person looking to research for help and guidance, these theories are exasperating. In his website on his Actor Network Theory, Latour (2004) portrays a conversation between student (S) and professor (P):

> S: I am finding it difficult, I have to say, to apply Actor Network Theory to my case study in organisations.
> P: No wonder—it isn't applicable to anything!
> S: But we were taught … I mean… Are you saying it's really useless?
> P: It might be useful, but only if it doesn't apply to anything.
> S: Sorry—are you playing some kind of Zen trick here? …
> P: Sorry—I wasn't trying anything cute …
> S: So what can it do for me?
> P: The best it can do for you is to say something like this: 'When your informants mix up organisation and hardware and psychology and politics in one sentence, don't break it down first into neat little pots; try to follow the link they make among those elements

that would have looked completely incommensurable if you had followed normal academic categories.' That's all. ANT can't tell you what the link is.

These philosophical ideas, which are only touched on here, take us back to where we started, to the 19th century arguments about whether scientific procedures can be fruitfully applied in the field of educational inquiry. But in giving a wholly different perception of what research is and what its function should be, they may have the beneficial effect of requiring us to examine more thoughtfully our positivist assumptions and our search for 'correct' and final answers to educational issues.

The nature and function of research in education

Understandably, those who administer funded research from government are impatient of these 'modern' notions, and hold to the older interpretation, that the function of research is *instrumental*, that is, it is of value insofar as it can be used to solve problems or guide policy. What has happened in the second half of the 20th century is that knowledge is now seen as a key factor in promoting economic growth (the 'knowledge economy' metaphor), and inevitably the relation between research and the state has to change, as research capacity is developed to serve the interests of national economy. Governments use research to develop and implement policy (and sometimes to justify it!) Educational research in the past was marginal; in the current context, research-driven policy has become an integral part of government, and paradoxically this has both given power to the researchers and also taken it away. There is greater awareness and there are many more research posts, but the opportunities are in positivist modes of research which are more useful to policy-makers than research which questions or challenges or offers alternative paradigms.

Empirical research has been fuelled by the need for predictability. Policy-makers, said Stenhouse (1981), 'seek the reassurance of certainty to ameliorate the agony of responsibility'. The perspective of the 'New Look' of the 1960s and 70s was quite different. At the conclusion of the 1972 EPA report, *Educational priority*, volume 1, Halsey wrote:

> The co-operation of research in policy formation has to develop 'organically' rather than 'mechanically'. Action research is unlikely ever to yield neat and definite prescriptions from field-tested plans. What it offers is an aid to intelligent decision-making, not a substitute for it. Research brings relevant information rather than uniquely exclusive conditions. (pp. 178–179)

There is a variety of acceptable forms of research which corresponds to the variety of functions which research is seen to perform: to provide answers to problems, to guide policy, to provide insights and understanding, to establish fundamental principles of learning. Can these different styles of research coexist? They must, for if they are treated as separate, the academic becomes marginal and the applied research is superficial.

But there is an inherent danger when we try to integrate these different styles of research. Applied research, linked to issues arising in current policy and provision, will tend to be given priority over theoretical and long-term studies which often prove

eventually more important in that they bring about fundamental changes of attitude and understanding. If as researchers we go along with the demands of immediate policy issues, we have access to funds and influence—but at a price. For this is a Faustian bargain, for it risks losing autonomy and missing out on basic issues.

Underlying this tension between the applied and the theoretical approaches to research, there is a more fundamental contrast, illustrated by a quotation from the Greek historian, Thucydides. He complained that, among his contemporaries, the ability to understand a question from all sides meant that one was totally unfit for action. There is a sense that worthwhile research must start from a position of uncertainty, and uncertainty is difficult to reconcile with action and decision. In our own time, Husen and Kogan (1984), relate this to the issue of government funding of research in these terms:

> A political decision will lead to closure on an issue. Research findings add to, rather than reduce, uncertainty for decision-makers. The interplay between decision-making which must be authoritative and firm and the questioning and generation of uncertainty implicit in the research is an important phenomenon. It leads to a central policy question: can national authorities sponsor the generation of uncertainty? (p. 52)

> … Policy makers may foreclose on issues too quickly; social science can help keep open the space between the dissemination of ideas which might lead to policy changes and their enforcement through social engineering. It can help define, and extend, and challenge the agenda for social action. (p. 54)

The previous section described the trend in the later decades of the 20th century to move away from the experimental paradigm, whether through qualitative case studies, action research, the teacher–researcher movement, or the new approaches of postmodernism. At the same time, however, a quite different trend can be seen in the increasing recognition of educational research as an integral element in policy and practice. Where research is being funded by government or public authorities, there is an expectation (or even a demand) that research should be oriented to the requirements of the 'users' or 'consumers' of research. The concept of 'users' is characteristic, in implying that research is done in one place by one group, and then transferred to another group in another place to be put to use. The terms, 'users' and 'consumers', implicitly accept an *instrumental* function for research in education. On this view, good research is research which can be used—that which identifies *What works*, the title of a best-selling American book on current research (US Department of Education, 1987). Evaluation and data gathering studies are more likely to attract funding than theoretical analyses which aim at insights into problems, the *enlightenment* function of research. The emergence of this very different trend is best illustrated by events in Britain from 1970 onwards.

As government funding for research increased, the inevitable consequence was a demand by ministers for a greater say in how the funds were to be spent. Margaret Thatcher, then Secretary of State for Education and Science, declared in a speech to Parliament in 1970:

> There was clearly only one direction that the Department's research policy could sensibly take. It had to move from a basis of patronage—the rather passive support of ideas which

were essentially other people's, related to problems which were often of other people's choosing—to a basis of commission. This meant the active initiation of work by the Department on problems of its own choosing, within a timetable and procedure which were relevant to its needs.

This view was quickly taken up in a review of government research funding by Lord Rothschild, whose Report (1971) produced the crude 'customer–contractor principle':

> The customer (government department) says what he wants; the contractor (researcher) does it (if he can); and the customer pays. (p. 3, paragraph 6)

A response from the Social Science Research Council at the time questioned whether following the 'customer's' priorities was best for the advancement of knowledge:

> It is not so much a matter of an ordered hierarchy of priorities, as a process of grasping at opportunities presented by an almost accidental coagulation of interest among a group of able research workers around a chosen problem in order to shift a frontier of knowledge forward. (SSRC Newsletter, 1971)

The words, 'an almost accidental coagulation of interest', are a good description of what happens in research, but in the spirit of the times, they were hardly likely to persuade. In 1982, however, Rothschild published a subsequent report on the Social Science Research Council (SSRC) in which he conceded:

> When one examines the work of the SSRC, there is very little to which the customer-contractor principle can be applied (p. 11, paragraph 3.9)

> … The need for independence from government departments is particularly important because so much social science research is the stuff of political debate … It would be too much to expect Ministers to show enthusiasm for research designed to show that their policies were misconceived. But it seems obvious that in many cases the public interest will be served by such research being undertaken. (p. 12, paragraph 3.12).

And in time, there has been fuller recognition of the importance of theoretical studies which contribute to the underlying disciplines in education—in Britain, especially in the programmes such as the Teaching and Learning Research Programme supported by the Economic and Social Research Council (ESRC). Even the Minister for Education, David Blunkett, in a speech to the Council of ESRC in February 2000, expressed the point in words which could never have been accepted twenty years earlier:

> There must be a place for the fundamental 'blue skies' research which thinks the unthinkable. We need researchers who can challenge fundamental assumptions and orthodoxies, and this may well have big policy effects much further down the road. [formerly on DfEE website but now deleted]

Conclusion

This review of the historical development of educational research has not dealt with the actual research topics which were favoured at different times: in the early stages, psychological studies of transfer of training and of fatigue in learning; then, the use of tests in selection and the reliability of examinations; in the mid-century, sociological

aspects such as the influence of home environment; and later a much richer variety of topics, as different styles of research came to be accepted. Instead, this review has focused on the concept of research in education—what it is, how it was done, and what its function should be—showing how this concept has changed over the past hundred years. At the risk of over-simplification, this can be portrayed as a series of phases, each with different perceptions of research and different implications for the contribution which research may make to education:

(1) Initially, research was seen as primarily an academic activity: its contribution to school practice and policy issues was essentially theoretical and long-term;

(2) Later, research came to be viewed as the work of experts and specialists, to be used, where appropriate, by teachers and administrators: the profitable business of test construction (involving complex statistical procedures) was a feature of this period.

(3) In the 1950s and 60s, educational research came to be accepted as a discipline in its own right, with its own distinctive procedures and literature: a greatly expanded research activity has extended to cover a wide range of issues.

This third phase has brought research into closer partnership with policy and practice, though in differing ways. Increased funding has given those who commission research a claim to a greater say in the design and sometimes also in the management of a project and the dissemination of findings. At the same time, the teacher–researcher movement, which initially aimed to support teachers in carrying out research studies themselves, has developed into something more fundamental: a view of research as a key element in a professional approach, a mode of working to be adopted by all in facing up to problems, whether in policy-making or in school-based projects to pilot new curriculum initiatives. In summary, the role of researcher has moved from academic theorist in phase 1, through expert consultant in phase 2, to reflective practitioner in phase 3.

This broadened interpretation of research is the main achievement of the past twenty years: in a word, research has become accessible. Primary school children working on their projects speak of doing research, and we can only hope that they do not subsequently come to regard research as a remote and inaccessible style of working limited to a small elite of specialists. However, it would be wrong to impose a dimension of value on the three phases outlined above: they are essentially a dimension of involvement. All three approaches to researching have their place. There are still some who hold that the underlying contribution of the academic theorist is in the long term the most influential and the most important. Also, the need for specialist expertise and for research which is rigorous and highly skilled must be acknowledged, for there is a danger of devaluing research if it is too lightly treated as something that anyone can do.

Nisbet and Broadfoot (1980) report a Senior Chief Inspector in England complaining:

> People say they have done some research when they really mean they have stopped to think for three minutes. (p. 2)

But research has become part of every professional role today, and in education one task of professional development is to weave a research element into the expertise of teachers, leading them to adopt at a personal level the self-questioning approach which leads to reflection and understanding, and from there into action.

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