

## HOW IT ALL BEGAN: EDUCATIONAL RESEARCH 1880-1930

JOHN NISBET

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### SYNOPSIS

The perception of Scotland as a pioneer in educational research has spread because it was the one of the first countries to set up a national research council (SCRE). But Scotland came late to research in education. The concept of educational research was shaped by the German scholars who developed 'experimental pedagogy' in the 1880s. Experiments, surveys and standardised tests began in other countries between 1890 and 1915. In Scotland, from 1915 on, Rusk introduced the Germanic psychological-statistical style of research, while Boyd developed a school-based style with teacher involvement. The appointment of Rusk as first Director of SCRE in 1928 signified the dominance of the scientific model based on experimental design, statistical analysis and psychological theory, continuing until the 1950s when there was a challenge to this approach by phenomenological and qualitative studies and a revival of interest in teacher involvement in research.

There may be a tendency to assume that educational research in Scotland began with the founding of the Scottish Council for Educational Research (SCRE) in 1928–29, especially as Scotland was one of the first countries to have a national research council, long before the NFER in England and Wales, founded in 1946. But the idea of 'experimental education' dates back to the start of the century and even earlier, and by the time that SCRE was established the style of what counted as 'educational research' was already shaped (more or less) by the work of the early pioneers.

'Educational research' here means *experimental* research, not philosophical or historical research for which a different history needs to be written. The concept of educational research as experimental, adopting scientific research as a model, is a product of the 19th century. *Education as a Science* is the title of a book published in 1862 by the Aberdeen philosopher, Alexander Bain, one of several scholars of the time who sought to base the principles of education on observation and experiment, in the hope that in this way education could break free from outmoded traditional practices. The second half of the 19th century saw striking advances in science and technology and the scientific model came to be applied with growing success to medicine, engineering and psychology: if education too could be given a scientific base through research, it would win for teachers the status of a profession based on specialist science.

The 1880s were 'years of intellectual ferment' (Wolf, 1973) in philosophy and its various offspring studies. It is sometimes difficult to distinguish between experimental psychology and pedagogy: psychological texts around this time analysed concepts (such as Herbart's 'association') which influenced the experimentalists, but were not themselves 'experimental' in that they were philosophical analyses of ideas about the nature of consciousness, reasoning and memory, but were not disciplined inquiry involving controlled experimentation or survey to yield evidence to test theory. This is the meaning given here to 'experimental', and it was the systematic application of this principle that marks the beginning of educational research.

In the years to 1930, the emerging discipline of psychology (together with new procedures in statistical analysis) monopolised experimental studies in education. By the 1950s, sociology (and later, politics and management) came to challenge this positivist, quantitative style of research, extending the concept of 'experimental'

to include phenomenological and qualitative approaches. In the period covered by this paper, psychology was the dominant discipline: 'experimental psychology', an expression introduced by Wundt in Leipzig around 1880, became 'experimental pedagogy', the term coined in 1900 by Meumann, Wundt's student (De Landsheere, 1988). By 1915 this had become 'experimental education', the term used in Aberdeen's EdB degree until the 1960s, to be replaced eventually by 'educational research'.

#### EUROPE

The history of educational research starts in Germany. Philosophers like Kant had dismissed the idea that mind could be measured; so from the 1860s on, Wundt and Fechner and Helmholtz—German scholars working in the fields of physiology and psychology—selected aspects of mental activity which *could* be measured—reaction time, sensory discrimination, aspects of sensation and perception. This was psycho-physical parallelism, the study of the senses as an entry to the working of the mind—more experimental psychology than education. But Ebbinghaus, from 1885, applied these methods to the study of learning and memory and the curve of forgetting: it was he who invented nonsense syllables (for experiments on memory) and the completion test (later used by Binet and other test constructors). Psychological laboratories were established at Leipzig, Jena and Berlin. By 1907 sufficient work had been done to enable publication of one of the earliest textbooks on educational research, Meumann's *Vorlesungen zur Einführung in die experimentelle Pädagogik* (Lectures on the Introduction to Experimental Pedagogy). Meumann's first edition was in two volumes and ran to 1,040 pages; the 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 says, 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 the methods used (eg, 'The experimental investigation of the mental and physical development of the child and its pedagogical significance', Lecture 3; 'The experimental investigation of mental abilities...', Lectures 4 & 5; 'Methods of examining thinking and imagination', Lecture 7; 'Experimental methods for the study of feelings', Lecture 8; and so on.').

Pre-1900 developments in England are dominated by one name, Francis Galton. In an address to the British Association in 1877, he asserted:

'It is now possible to inquire by exact measurement into certain fundamental qualities of the mind.'

(Galton included the characteristics of the criminal mind which he thought could be detected by tests and measures of the head!) Initially, his aim was to link mental qualities to physical measurements—for example, measuring to see if intelligence could be linked with size of head. He was working with children in local schools in 1881 and set up his anthropological laboratory in 1883, measuring sensitivity to smell, touch, hearing and sight—like the Germans, looking for a way into the mind through measuring the senses. In 1888 he co-operated with the Teachers' Guild of Great Britain and Ireland in a study of mental fatigue. He also invented the supersonic dog whistle which a dog can hear but we can't, and he suggested a means of measuring the boredom of a conference paper by counting the number of fidgets and 'noting unequal horizontal interspace between head and head'. His guiding principle in research was:

‘Whenever you can, count.’

This became a fundamental rule for the new ‘science’ of experimental pedagogy (though some later mistakenly interpreted it as ‘If you can’t count, ignore it’).

Galton however was a pioneer whose ideas won no followers at the time. A later historian commented:

‘In England there was a complete failure to continue what Galton had begun – until experimentation was re-introduced from Germany by McDougall, Spearman and others in the 20th century.’ (Flugel, 1933, p 214)

However, the revival of experimentation cannot be credited only to the psychologists named by Flugel: from 1900, a group of London County Council inspectors, Kimmins, Winch and Ballard, began to carry out an impressive series of research studies on the issues of the day, transfer of training, memory and attention, surveys of children’s interests, and the construction of standardised tests. (Burt, who has got most of the publicity, did not join them until 1913.) Winch, one of the most productive (see later), was given leave of absence in 1905 to visit USA to review the development of educational research and testing there (see Sharp & Bray, 1986).

In France, as in Germany, there were active groups of researchers on the psychology of mental functions in the 1880s. In 1889 Liard and Ribot set up a psychological laboratory in the Sorbonne, based on the German model. Binet, whose first book, *La psychologie du raisonnement*, was published in 1886, joined this laboratory in 1891, becoming Director in 1894 and founding the psychological journal, *L’annee psychologique*, in 1895 (see Wolf, 1973). The laboratory attracted American students (for it was customary at that time for Americans to come to European centres for postgraduate study), and it may have been partly their influence that focused Binet’s interest on experimenting with and measuring individual differences. In 1905 he and Simon presented to an international conference in Rome their first scale for measuring intelligence, using tests borrowed from others like Ebbinghaus—the famous Binet scale.

There were many other scholars across Europe now active in this borderland between psychology and pedagogy (see De Landsheere, 1988): Decroly in Belgium, for example, and Claparede who founded the J J Rousseau Institute in Geneva, later made famous by his pupil, Piaget. In Russia, the Musee Pedagogique was established in St Petersburg in 1900. The Child Study movement, initiated by Stanley Hall in USA in 1881, was taken up world-wide: in 1911, in the 4th edition of his textbook on *Experimental pedagogy*, Claparede was able to describe the spread of this movement in 16 European countries as well as in Japan and Argentina.

#### USA

Educational research in America at the beginning of the century drew on these European beginnings, several of the leading American scholars (Cattell, Hall, Judd, Rice, for example) travelling to Germany for their doctoral studies. In 1910, Whipple produced the first American textbook in educational research, *Mental and Physical Tests*, drawing heavily from Galton and the Germans. This was adopted widely for college courses on ‘Experimental Education’ as it was now called. Whipple’s text covered mental tests, rules for testing, basic statistics, and a wide range of anthropometric measures (eg, skull diameter, vital capacity, grip, tapping, aiming, auditory discrimination) and forms of test (eg, fidelity of report, mirror drawing, memory, suggestibility, size-weight illusion, fables, Ebbinghaus’s completion test). Whipple also gives a list of 57 journals to consult, of which 18 are German. But characteristically the Americans developed their own styles of educational research: the introduction of experimental design into educational inquiry, and a dramatic

extension of the principle of measurement to the construction of standardised tests and scales of achievement.

Several American textbooks date the commencement of educational research from 1897, when an American researcher, Rice, published the results of his investigations into spelling. He compared class average scores in spelling tests with the time given to spelling in the syllabus, and found a zero relationship, thus proving 'the futility of the spelling grind', the title of his 1897 paper. Before this, in 1890, Cattell at Columbia University had invented the term, 'mental test' in his book, *Mental Tests and Measurements*. Dewey, of course, wrote extensively about the experimental approach, but did not conduct any experimental work himself. Cattell's student, Thorndike, was the major contributor to mental testing and the construction of measurement scales from 1904 on. With Stone, he produced the first standardised achievement tests in 1908, and a handwriting scale in 1909, followed by many others. Thus the 'measurement' aspect of educational research was firmly established in the first dozen years of the 20th century. Monroe's *Bibliography of Standardised Tests* in 1920 lists 104 standardised tests in its High School section alone.

It was in USA that the first extensive attempts were made to introduce research into educational practice and administration. At the beginning of the century American states began to set up 'Bureaux of Educational Research'. These were the first institutional provision for educational (as distinct from psychological) research; their real function was service-oriented, to help the state and district authorities to cope with their new responsibilities for elementary education. By 1926, there were 105 of the bureaux across the USA. The *American Review of Educational Research* (Harris & Lamke, 1956) commented on this period:

'In the pioneer period there was an almost evangelistic fervor on the part of a small number of forward-looking educators who believed that systematic research offered a new key to the solution of pressing problems and to the general improvement of education. Besides reporting the findings of their own studies, they gave attention to procedures, wrote discussions of research needed in various fields, urged teachers to undertake research, promoted the formation of bureaus and other organisations for research, and wrote eloquently of the advantages of research activity both to the field and to the individual investigator... In *Research for Teachers*, published in 1926, Buckingham says much about the stimulus to classroom effectiveness he believes will come when teachers undertake research... Monroe published a bibliography of 3,650 titles called *Ten Years of Educational Research, 1918-1927*.' (p 324)

To sum up, in an over-simplified way: the Germans introduced the concept of experimental pedagogy; the Americans developed educational measurement and began the use of research for the practical service of education; and this set the pattern for years to come. It was said of the American, William James, in the 1890s:

'He began that metamorphosis of German psychology which was to alter the Teutonic worm of sensory content into the American butterfly of functional reality.' (Boring, 1929, p 740)

'Functional reality' means the practical application of experimental studies to education; and it was at this stage, as the new century got under way, that educational research (by whatever name it is known) emerges as a distinct field of inquiry, though still dominated by psychology.

#### EXPERIMENTAL STUDIES

It would be quite wrong to see American developments as limited to testing and measurement. In the first decade of the century there was a succession of publications in USA on one of the main theoretical issues of the day, transfer of training—an early form of today's research on teaching children to think. For example, Latin held a prime position in the curriculum for centuries because, allegedly, it taught children to think logically. Do the skills learned in one context transfer to other contexts? In 1901 Thorndike & Woodworth published a classic study of this issue; they found limited transfer insofar as there were common elements. Then followed publications by Blair in 1902, Ebert & Meumann 1905, Cover & Angell 1907, Bennett 1907, Fracker 1908, Winch 1908, Foster 1911, Sleight 1911, Starch 1911, etc. (For references, see Selleck, 1968.) Why does no one quote any of these nowadays?

In England, in 1903, an Office of Special Inquiries and Reports had been set up and its Director, Michael Sadler, pressed the Board of Education to establish a national research council, unsuccessfully. However, in 1916, under pressure from the Teachers' Guild, an Education Reform Council was set up in England. The *Times Educational Supplement* reporting this commented:

'England at present lags behind other great nations in respect of giving official report to individual research and in organising large-scale research in education. Valuable research has been carried out by individuals, but the benefit which should result is largely lost through lack of organisation and insufficient publication.'

This does less than justice to the activities of the LCC inspectors mentioned earlier, who had carried out numerous experiments and surveys and constructed new tests. The journals of the period carry their names frequently, especially Winch who was especially productive: between 1904 and 1914 he published two books and 38 papers, mostly in American journals. In 1916, Ballard developed one-minute reading tests standardised on over 22,000 children. A study of English children's interest in the cinema, covering 2,700 children from poor districts and 3,700 in rich districts, found that cowboy films were most popular and educational films least popular. Educational research was now well and truly on its way! In 1924, the Board of Education in London published a report on the use of *Psychological Tests of Educable Capacity*: these were in use in seven districts of England (Northumberland, Blackpool, West Riding, Stepney, Mile End, Cheltenham and Rugby) and in seventeen countries (Austria, Belgium, China, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Italy, Japan, Luxembourg, Norway, Spain, Sweden, Switzerland and USA—no mention of Scotland: Godfrey Thomson's Moray House tests originated at this time in Northumberland.)

#### SCOTLAND

In the meantime, what about Scotland? The Bell Chairs of Education had been established in the mid-19th century, but the Professors did no experimental studies. The first publication about experimental work in Scotland was in 1913, when R R Rusk published his *Introduction to Experimental Education*. In his Introduction, Rusk acknowledges his debt to Meumann's 1907 text (perhaps an understatement as his chapter headings are the same as Meumann's). The Educational Institute of Scotland saw in educational research the means to establish a scientific basis for education which would strengthen public recognition of teaching as having professional status. In 1917, the EIS followed the example of the English Teachers' Guild and appointed an Education Reform Committee. The following year, this was converted into a Committee on Research, with William Boyd from Glasgow University Education Department as its Chairman.



Boyd had played a leading part in the development of a school-based style of research, working in Glasgow schools conducting surveys and experiments in collaboration with teachers. His prime aim was to get teachers involved in carrying out their own research (and this was some 50 years ahead of the teacher–researcher movement). In the 1920s, his Saturday morning classes on educational research regularly attracted over 100 teachers. The EIS Research Committee, which he chaired, initiated an active programme in 1918: compiling a spelling list from a count of the errors children made, a plan for simplified spelling, tests of reading speed and comprehension, a survey of school subjects to identify so-called ‘useful elements’ in the current syllabus, and alternative methods in subtraction (‘8 from 5 you cannot, borrow 10’), adding up a column of figures versus adding down, and so on. This involvement of teachers was a new style of research, but it was met with scepticism by those who had been trained in the science-laboratory approach of the Germanic tradition. Rusk, Head of Education at Jordanhill Training College (as it was then called) and a life-long rival of Boyd, scathingly observed in his autobiographical notes:

‘A small committee of the EIS had been constituted under the chairmanship of Dr William Boyd, entitled the Research Committee, but as none of the members had any qualifications or experience of research, nothing came of it.’

The rivalry of Boyd and Rusk can be used to illustrate the clash between two styles of research. (There were, of course, other reasons: primarily the rivalry between the Training College and the University.) The two men were very different personalities: each disliked the other, and both were disliked by the Scottish Education Department (see Wake 1984 and Morris 1994). Boyd’s doctorate (from Glasgow) was on Rousseau, and he had a wide range of interests: in 1900 he was Warden of Glasgow University’s Settlement in the poorest areas of the city; he introduced the Workers’ Educational Association to Scotland; he was a founder member of the New Education Fellowship, and he was President of the EIS in 1920. His research was closely linked to the curriculum and schools, and much of it was done with the help of teachers. Rusk began his career in education as a pupil teacher, and through bursaries and night classes, he won his way to secondary school and university, to a post as a Professor’s assistant in Glasgow, and then to Germany where he gained his doctorate in psychology in 1906 from the University of Jena. Then he worked in the Cambridge Psychology Department, and in 1910 was appointed as a Training College lecturer, eventually as Head of Education in Jordanhill. His first published paper in 1910 was on ‘Mental association in school children’ in 1910.

These two scholars were the leading educational researchers in the 1920s and they represent two contrasting styles of research. When in 1928 the EIS and the Association of Directors of Education resolved to form a Scottish Council for Research in Education, there were only two possible candidates for the post of Director, Boyd and Rusk. It would be interesting to know what happened, but the records are bland and tell us nothing. In his autobiography, Boyd wrote:

‘I flatter myself that but for my research propaganda there would have been no Council. Some people wanted me to become first Director but I did not want to undertake what I knew would become an almost full-time post and I supported the appointment of Rusk.’ (p 241)

Rusk in his autobiographical notes merely records: ‘The decision was made that R R be offered the post.’ In the margin of his notes, according to Morris (1994), Rusk wrote: ‘EXIT BOYD’.

Thus by 1930 the scientific approach to educational research in Scotland was firmly established, over-ruling the school-based curriculum-centred style of Boyd and (before him) of the LCC inspectors from 1910 on. The scientific approach

saw research as a specialised activity, based largely on psychology and statistical analysis, requiring extended training, producing findings which were supposed to tell teachers and policy-makers what to do. This concept of educational research lasted throughout the first half of the century and beyond: it was the research culture into which I was inducted as a postgraduate student in 1948.

When this traditional pattern of research began to be questioned in the 1950s, the dominance of psychology gave way to sociology, and the positivist, scientific model was challenged by new styles — in particular, by phenomenological and qualitative approaches. A rapid expansion of research funding accompanied these changes (but was not caused by them): in the five years between 1964 and 1969 expenditure on educational research multiplied tenfold. Educational research grew to embrace a widening range of topics: management, technology, health education, poverty; and over the years much of the management of research has passed into the hands of those who provide funding. The Educational Institute of Scotland, in supporting research in 1917, had hoped that it would confer on teaching the status of a profession, like other professions based on specialist knowledge. Research has not met this aspiration: neither teachers nor researchers have the autonomy of a professional activity, and Boyd's idea of teacher involvement, revived by Stenhouse in the 1960s, has still to fight for general acceptance. The aspiration of the early researchers, acceptance of research as a means of establishing a rational basis for educational practice, is perhaps nearer realisation.

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p. 740; As cited in: John Nisbet, "How it all began: educational research 1880-1930." *Scottish Educational Review* 31 (1999): 3-9. The gift of professional maturity comes only to the psychologist who knows the history of his science. Cited in: David Ballin Klein (1977) *The Unconscious: Invention Or Discovery?* p. iii

During that decade no advocate of the ideal of pure research was more embroiled professionally in the bitter debates surrounding that issue than E. G. Boring. While preoccupied with the practicalist challenge, Boring was also at work on his prodigious *History of Experimental Psychology*. O'Donnell, John M. "The crisis of experimentalism in the 1920s: EG Boring and his uses of history." *Scottish Educational Review* , v31 n1 p3-9 May 1999. Traces the history of experimental educational research, based on application of the scientific method to pedagogy. Highlights the beginnings of educational research in German studies of psychology and child development; U.S. development of standardized tests and research-based administration; and European experimental studies. Discusses the rivalry in Scotland between school-based and more formal research styles. (SV). 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.

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.

The Child Study movement first proposed by Stanley Hall in USA in the 1880s encouraged parents to make systematic observation and recording of their childrens development.

Across USA Boards of Education began to set up Bureaus of Educational Research (sometimes called Bureau of. 32 J. Nisbet *Research and Efficiency*). By 1926, there were 105 such bureaus across the country.

Between 1880 and 1930, approximately 28 million immigrants entered the United States. In contrast to earlier waves of immigrants, most of whom had originated in western and northern Europe, this group arrived from eastern and southern Europe. As they entered through Ellis Island in New York Harbor and made their way into various new lives "in cities and rural areas coast to coast, from urban tenements to Midwestern farms to seaside towns" they encountered mixed reactions from existing Americans. They also entered into a political climate that was charged by the sweeping immigration restrictions