Research Paradigms in Education

Thomas Kuhn, himself a historian of science, contributed to a fruitful development in the philosophy of science with his book *The Structure of Scientific Revolutions* published in 1962. It mapped out how established thinking, research strategies, and methods in a scientific field, in Kuhn’s terminology “normal science,” were established. It brought into focus two streams of thinking about what could be regarded as “scientific.” the Aristotelian tradition with its teleological approach and the Galilean with its causal and mechanistic approach. It introduced the concept of “paradigm” into the philosophical debate.

“Paradigm” derives from the Greek verb for “exhibiting side by side.” In lexicis it is given with the translations “example” or “table of declensions and conjugations.” Although Kuhn himself used paradigm rather ambiguously, the concept has turned out to be useful in inspiring critical thinking about “normal science” and the way shifts in basic scientific thinking occur. A paradigm determines the criteria according to which one selects and defines problems for inquiry and how one approaches them theoretically and methodologically. Young scientists tend to be socialized into the precepts of the prevailing paradigm which to them constitutes “normal science.” In that respect a paradigm could be regarded as a cultural artifact, reflecting the dominant notions about scientific behavior in a particular scientific community, be it national or international, and at a particular point in time. Paradigms determine scientific approaches and procedures which stand out as exemplary to the new generation of scientists—as long as they do not oppose them.

A “revolution” in the world of scientific paradigms occurs when one or several researchers at a given time encounter anomalies. For instance, make observations, which in a striking way do not fit the prevailing paradigm. Such anomalies can give rise to a crisis after which the universe under study is perceived in an entirely new light. Previous theories and facts become subject to thorough rethinking and reevaluation.

In well-defined disciplines which have developed over centuries, such as the natural sciences, it is relatively easy to point out dramatic changes in paradigms, such as in astronomy from Ptolemy through Copernicus to Galileo or in physics from Aristotle via Galileo and Newton to Einstein. When the social sciences emerged in the nineteenth century, people like Comte tended to regard the natural sciences as scientific models, but without awareness that the social scientist is part of a process of social self-understanding. Educational research faces a particular problem, since education, as William James pointed out, is not a well-defined, unitary discipline but a practical art. Research into educational prob-
lems is conducted by scholars with many disciplinary affiliations. Most of them have a background in psychology or other behavioral sciences, but quite a few of them have a humanistic background in philosophy and history. Thus there cannot be any prevailing paradigm or “normal science” in the very multifaceted field of educational research. However, when empirical research conducted by behavioral scientists, particularly in the Anglo-Saxon countries, in the 1960s and early 1970s began to be accused of dominating research with a positivist quantitatively oriented paradigm that prevented other paradigms of a humanistic or dialectical nature being employed, the accusations were directed at those with a behavioral science background.

1. The Two Classical Paradigms

The twentieth century has seen the conflict between two main paradigms employed in researching educational problems. The one is modeled on the natural sciences with an emphasis on empirical quantifiable observations which lend themselves to analyses by means of mathematical tools. The task of research is to establish causal relationships, to explain (Erklären). The other paradigm is derived from the humanities with an emphasis on holistic and qualitative information and interpretive approaches (Versuchen).

Briefly, the two paradigms in educational research developed historically as follows. By the mid-nineteenth century, when Auguste Comte (1798–1857) developed positivism in sociology and John Stuart Mill (1806–1873) empirical in psychology, there was a major breakthrough in the natural sciences at the universities with the development of a particular logic and methodology of experiments and hypothesis testing. They therefore came to serve as models and their prevailing paradigm was taken over by social scientists, particularly in the Anglo-Saxon countries (see, e.g., Pearson 1892). However, on the European Continent there was another tradition from German idealism and Hegelianism. The “Galilean,” mechanistic conception became the dominant one, particularly with mathematical physics as the methodological ideal. Positivism was characterized by methodological monism. Philosophers at the University of Vienna (such as Neurath) referred to as the “Vienna Circle,” developed what is called “neopositivism” or “logical empiricism.” Around 1930 they founded a series of publications devoted to the study of what they called “unified science.”

Positivism saw the main task for the social sciences as being the making of causal explanations and the prediction of future behavior on the basis of the study of present behavior. Neopositivism emanated from the strong influence of analytical philosophy.

There are at least three strands for the other main paradigm in educational research. The Continental
idealism of the early nineteenth century has been mentioned. Around the turn of the century it had a dominant influence at German universities with philosophers, such as Wilhelm Dilthey (1833–1911), who in the 1890s published a classical treatise in which he made the distinction between Verstehen and Erklären. He maintained that the humanities had their own logic of research and pointed out that the difference between natural sciences and humanities was that the former tried to explain, whereas the latter tried to understand. He also maintained that there were two kinds of psychology, the one which by means of experimental methods attempted to generalize and predict, and the one that tried to understand the unique individual in his or her entire, concrete setting. Other philosophers with similar conceptions were Heinrich Rickert and Wilhelm Windelband. A counterpart in France was Henri Bergson (1859–1941) who maintained that the intellect was unable to grasp the living reality which could only be approached by means of intuition. In Sweden, John Landquist advanced an epistemology of humanities.

A second strand was represented by the phenomenological philosophy developed by Edmund Husserl (1859–1938) in Germany. It emphasized the importance of taking a widened perspective and of trying to "get to the roots" of human activity. The phenomenological, and later the hermeneutic, approach is holistic; it tries by means of empathy (Einfühlung) to understand the motives behind human reactions. By widening the perspective and trying to understand human beings as individuals in their entirety and in their proper context it also tries to avoid the fragmentation caused by the positivistic and experimental approach that takes out a small slice which it subjects to closer scrutiny.

The third strand in the humanistic paradigm consists of the critical philosophy, not least the one of the Frankfurt school (Adorno, Horckheimer, and Habermas) which developed with a certain amount of neo-Marxism. Marx himself would probably have felt rather ambivalent in an encounter between the two main scientific philosophies. On the one hand, he felt attracted to positivism. On the other hand, Marx belonged to the German philosophical tradition and the neo-Marxists have not had great difficulties in accepting hermeneutics and merging it with a dialectical approach.

The paradigm determines how a problem is formulated and methodologically tackled. According to the traditional positivist conception, problems that relate, for example, to classroom behavior should be investigated primarily in terms of the individual actor, either the pupils, who might be neurotic, or the teacher, who might be ill-prepared for his or her job. The other conception is to formulate the problem in terms of the larger setting, that of the school, or rather that of the society at large. Furthermore, one does not in the first place, by means of such mechanisms as testing, observation, and the like, try to find out why the pupil or the teacher deviates from the "normal." Rather an attempt is made to study the particular individual as a goal-directed human being with particular and unique motives.

The belief that science, particularly social science, would "save us" was expressed as late as in the 1940s by George Lundberg (1947), a sociologist who represented a consistent positivist approach. In the long run, the study of human beings would map out the social reality and provide a knowledge base for vastly improved methods of dealing with human beings, be they pupils in the classroom or workers in the factory. A similar hope still guided the establishment of research and development centers with massive resources at some North American universities in the 1960s. What experience and enlightened empathy could tell was somehow regarded as inferior to the knowledge provided by systematic observations and measurements.

2. A Historical Note

In his Talks to Teachers on Psychology, given in the 1890s, James (1899 p. 9) pointed out: "To know psychology . . . is absolutely no guarantee that we shall be good teachers." An additional ability is required, something that he calls the "happy tact and ingenuity," the "ingenuity in meeting and pursuing the pupil, the tact for the concrete situation." He mentions the demands of making systematic observations that some "enthusiasts for child study" have burdened the teachers with, including "compiling statistics and computing the percent." In order to avoid such endeavors resulting in trivialities they must be related to the "anecdotes and observations" which acquaint the teachers more intimately with the students.

What James refers to is something that in the terminology of the late twentieth century would be seen as a conflict between two main research paradigms. By the end of the nineteenth century, the scientific paradigm emerged that has since then been the prevailing one, at least in the Anglo-Saxon world. It was part of a larger movement toward "scientific management" in industry.

The new scientific approach emerging at the end of the nineteenth century was spelled out by the leading educational psychologist, Edward Lee Thorndike of Columbia University, in the preface to his seminal book Educational Psychology in 1903. He set out to apply "the methods of exact science" to educational problems, reject "speculative opinions," and emphasize "accurate quantitative treatment" of information collected (Clifford 1984). He acknowledged the influence on his thinking of people who
have advocated the quantitative and experimental approach, like James McKeen Cattell and R.S. Woodworth in the United States and Francis Galton and Karl Pearson in England. In a brief concluding chapter he dealt with the problem of education as a science and presented the main characteristics of what he regarded as scientific in education:

It is the vice or the misfortune of thinkers about education to have chosen the methods of philosophy or of popular thought instead of those of science. . . . The chief duty of serious students of the theory of education today is to form the habit of inductive study and learn the logic of statistics. (Thurstone 1903: p. 164)

Part of the new scientific paradigm was to make a clear-cut distinction between the descriptive and the normative. Research conducted according to “logic of science” was supposed to be neutral with regard to values and policy-making.

The prevailing paradigm in North America spelled out by Thorndike was further developed by John Franklin Bobbitt, professor at the University of Chicago, who in 1912 advanced the notion that schools could be operated according to the methods of “scientific management” which had been developed in industry by Frederick Taylor. Bobbitt also played an important role in attempts to determine empirically the content of curriculum by analyzing what people needed as holders of occupations and as citizens in order to arrive at a common denominator of skills and specific pieces of knowledge with which the school had to equip them.

With an eye on the natural sciences, social science has for more than a century made the claim to be an “objective” and “explaining” science. It purported to be able to make a clear-cut distinction between aims and means of achieving these aims. It maintained that in handling social realities it was able to do it without any moral commitments. Its representatives claim that the natural sciences to reside outside the system they observe. Such a claim has been brought into question. Gunnar Myrdal (1969) did so in a book (first published in Swedish in the 1930s) on science and politics in economics. He showed that the social researcher could not be free from his or her own values and political convictions, but could arrive at more valid conclusions and gain in credibility by making his or her value premises explicit and by making clear what those biases were in describing reality. Thereby the researcher can also give the “consumers” of his or her research an instrument for correction.

Social research, not least that in education, consists of data collection and reflection about societal problems, with their dilemmas and paradoxes, tensions, and so on, as well as alternatives for political action which offer themselves. Not even in the ideal case can a consensus be expected around theoretical paradigms as separated from practical problems. Social science researchers are part of the social process which they set out to investigate. They share social and political values of the surrounding society. In a way, they participate in the process of social self-understanding. This means that there is no such thing as a “social technology” in the same sense as a technology based on natural science. This does not imply, however, that educational research endeavors are of very limited value or entirely futile. The “aloofness” of the researchers in terms of dependence on interest groups and politics with shared social values is a relative matter. The task of the academic of “seeking the truth” can become institutionalized. This is what happens when fundamental, discipline-oriented research is established in institutions where the researchers can pursue their tasks of critical review without jeopardizing their positions.

There were those who, in contrast to William James, thought that it would be possible to make education a science. One of them was Charles H Judd (a student of Wundt), who in Introduction to the Scientific Study of Education in 1918, tried to explain how research was related to teacher training and educational practice. In 1909 the Department of Education at the University of Chicago had abandoned course requirements for prospective teachers in the history of education and psychology. These courses had been replaced by one course called “Introduction to Education” and one in “Methods of Teaching.” Thereby the teacher candidates could be introduced to the school problems in “a more direct, concrete way.” Each chapter in Judd’s book presents practical school problems and gives sources of information for the solution of these problems. Much of this information is very incomplete, but as a whole Judd thinks that it is justified to speak about a “science of education.” To use the term “science” he thinks would be justified, even when the information available is very scanty, “for the essence of science is its methods of investigation, not its ability to lay down a body of final rules of action” (Judd 1918: p. 299).

A research paradigm similar to the one advanced by Galton, Pearson, and Thorndike developed in Germany and France under the influence of experimental psychology. Ernst Meumann, a student of Wilhelm Wundt and a leading experimental psychologist, published at the beginning of the twentieth century his monumental three-volume work Vorlesungen zur Einführung in die experimentelle Psychologie (Introduction to Experimental Pedagogy). He meant by “experimental education” largely the application of the systematic, empirical, and statistical methods to educational data. Alfred Binet in France had a similar influence in both child study and intelligence testing.

3. The Two Main Paradigms and Their Compatibility

One can distinguish between two main paradigms in
educational research planning and with different epistemological basis (Adams 1988). On the one hand, there is the functional-structural, objective-rational, goal-directed, manipulative, hierarchical, and technocratic approach. On the other hand, there is the interpretivist, humanistic, consensual, subjective, and collegial one.

The first approach is derived from classical positivism. The second one, which in recent years has gained momentum, is partly derived from the critical theory of the Frankfurt school, particularly from Habermas’s theory of communicative action. The first approach is “linear” and consists of a straightforward rational action toward preconceived problems. The second approach leaves room for reinterpretation and reshaping of the problem during the process of dialogue prior to action and even during action.

Phillips (1983) has contributed to a valuable conceptual clarification of “positivism.” He distinguishes between four varieties of it: (a) the classical Comtean positivism with its belief that the scientific method established in the natural sciences can be applied in the study of human behavior and human affairs in general; (b) logical positivism embodied by the Vienna Circle which had a strong impact among psychologists and sociologists in the middle of the twentieth century with its quest for verification and operational definitions; (c) behaviorism of the Watsonian or Skinnerian type; and (d) positivism as a general label for empiricism, which covers a broad spectrum of epistemological positions.

Phillips (1983) argues that some of the many ardent critics of allegedly positivist researchers are themselves “more positivistic than they recognize,” some of them by using an instrumentalistic criterion of truth. They tend to make the mistake of “identifying positivism with particular research methods,” such as experimental design or statistical analysis methods. Thus, there is basically not such an unbridgeable gap between the two paradigms as is often purported by representatives of the respective camps.

Keeves (1988) argues that the various research paradigms employed in education, the empirical-positivist, the hermeneutic or phenomenological, and the ethnographic-anthropological are complementary to each other. He talks about the “unity of educational research,” makes a distinction between paradigms and approaches, and contends that there is, in the final analysis, only one paradigm but many approaches. The teaching-learning process can be observed and/or video-recorded. The observations can be quantified and the data analyzed by means of advanced statistical methods. Content can be studied in the light of national traditions and the philosophy underlying curriculum constructions. Both the teaching-learning process and its outcomes can be studied in a comparative, cross-national perspective.

Depending upon the objectives of a particular research project, emphasis is laid more on the one or on the other paradigm. One could quote the following as an example of how quantitative and qualitative paradigms are complementary to each other. It is not possible to arrive at any valid information about a school or national system concerning the level of competence achieved in, for instance, science by visiting a number of classrooms and thereby trying to collect impressions. Even a highly experienced science teacher is not able to gain information that would allow accurate inferences about the quality of outcomes of science teaching in the entire system of education. Sample surveys like the ones conducted by the IEA (International Association for the Evaluation of Education Achievement) would be necessary instruments. But such surveys are too superficial when it comes to accounting for factors behind the differences between school systems. Here qualitative information of different kinds is required.

But the choice or “mix” of paradigm is also determined by what kind of knowledge one is searching for. The ultimate purpose of any knowledge arrived at in educational research is to provide a basis for action, be it policy action or methods of teaching in the classroom. The former type of knowledge must by definition be of a more general nature and apply to a lot of local and individual situations, such as reforming the structure of the system or the relationship between home background and school attainment. But the classroom teacher deals with a unique child in a unique teaching-learning situation and is not very much helped by relying on generalized knowledge.

Policy makers, planners, and administrators want generalizations and rules which apply to a wide variety of institutions with children of rather diverse backgrounds. The policymaker and planner is more interested in the collectivity than in the individual child. They operate from the perspective of the whole system. Educational research has provided significant contributions to reforms of entire national systems of education. Sweden and Germany are cases in point.

Classroom practitioners are not very much helped by generalizations which apply “on the whole” or “by small and large” because they are concerned with the timely, the particular child here and now. Research on the teaching-learning process can at best give them a perspective on the particular teaching-learning situation with which they are faced. The pedagogical steps taken have to be guided by the qualitative information that Eisner (1982) refers to as “connoisseurship” which is a body of experiences and critical analysis which may well also be guided by research insights.

4. The Need for Pluralism in Approaches

In the late 1960s and early 1970s critical, dialectical,
hermeneutical, and neo-Marxian paradigms were advanced as alternatives or even replacements for the prevailing neopositivist paradigm of quantification, hypothesis testing, and generalizations. The latter had dominated the scene of social science research in the Anglo-Saxon countries for many decades and had taken the lead at many Continental universities as well. The new approaches were espoused by many from these universities to the extent that a group of younger researchers in education even prepared an international handbook of educational research that deliberately challenged the prevailing Anglo-Saxon research paradigms. The behavioral sciences have equipped educational researchers with an arsenal of research tools, such as observational methods and tests, which help them to systematize observations which would otherwise not have been considered in the more holistic and intuitive attempts to make, for instance, informal observations or to conduct personal interviews.

Those who turn to social science research in order to find out about the "best" pedagogy or the most "efficient" methods of teaching are in a way victims of the traditional science which claimed to be able to arrive at generalizations applicable in practically every context. But, not least through critical philosophy, researchers have become increasingly aware that education does not take place in a social vacuum. Educational researchers have also begun to realize that educational practices are not independent of the cultural and social context in which they operate. Nor are they neutral to educational policies. Therefore, dogmatic evangelism for particular philosophies and ideologies expounded as "scientific" and not accessible to criticism is detrimental to the spirit of inquiry. The two main paradigms are not exclusive, but complementary to each other.

See also: Policy-oriented Research; Hermeneutics; Philosoophy of Education: Analytic Tradition; Educational Research: History of; Educational Research and Policy-Making; Educational History in Biographies and Autobiographies; Positivism, Anti-Positivism, and Empiricism

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