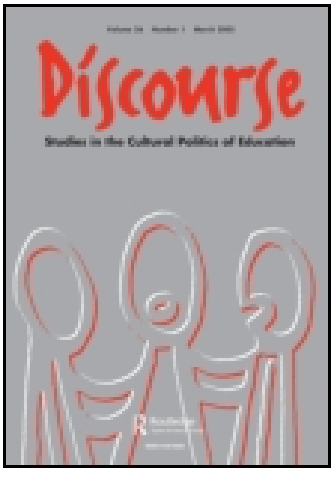

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The medicalization of current educational research and its effects on education policy and school reforms

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The medicalization of current educational research and its effects on education policy and school reforms

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This paper starts from the assumption of the emergence of an educationalized culture over the last 200 years according to which perceived social problems are translated into educational challenges. As a result, both educational institutions and educational research grew, and educational policy resulted from negotiations between professionals, researchers, and policy makers. The paper argues that specific experiences in the Second World War triggered a fundamental shift in the social and cultural role of academia, leading up to a technocratic culture characterized by confidence in experts rather than in practicing professionals (i.e., teachers and administrators). In this technocratic shift, first a technological system of reasoning emerged, and it was then replaced by a medical "paradigm." The new paradigm led to a medicalization of social research, in which a particular organistic understanding of the social reality is taken for granted and research is conducted under the mostly undiscussed premises of this particular understanding. The result is that despite the increased importance of research in general, this expertocratic and medical shift of social research led to a massive reduction in reform opportunities by depriving the reform stakeholders of a broad range of education research, professional experience, common sense, and political deliberation.

Keywords: medicalization; evidence-based; education research; education policy; expertise; intervention studies; democracy

Introduction

This paper[1] starts from an observation and a thesis concerning current education research and policy. The observation is that we are trapped in the paradoxical situation of never having had so much educational research, but at the same time never having had so little room to actually do educational policy. This paradox is owed – and this is the general thesis of this paper – to a medicalized research "paradigm"[2] or system of reasoning that is being favored by politics and that dominates today's educational research. This medicalized research system of reasoning is a child of the Cold War having its roots in the Second World War, and it limits the array of educational policies.

This new system of reasoning is embedded in an overall educationalized culture that emerged around 1800. Perceived social problems were assigned to education, or vice versa; an educational field was defined to solve perceived social problems. The star of this educationalization process around 1800 was the Swiss reformer Johann Heinrich Pestalozzi, who in the course of the nineteenth century became the hero of the foremost professionals in the field, the teachers (Tröhler, 2013). According to this educationalized

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culture, education was seen as an agent for fabricating the citizens and for developing societies, and its material result was the erection and expansion of the education systems in the nineteenth and twentieth centuries. The more that education was gaining social acceptance and the more that social aspirations called for more education, the more that questions of education became an object of academic research.

The expansion and materialization of the educationalized culture over the last 200 years is the result of specific sets of mutual relations between professional experience, policy makers, and researchers as central pillars of school development. Against this background, this paper argues that specific experiences in the Second World War triggered a fundamental shift in the social and cultural role of academia (research) and led to a technocratic culture that places confidence in experts rather than in professionals. In this technocratic shift, first a technological system of reasoning emerged, which was then replaced around 1970 by a medical "paradigm." The medical paradigm eventually led to a medicalization of social research, in which a particular organistic understanding of the social reality is taken for granted and research is conducted under the mostly undiscussed premises of this particular understanding of social reality. The result is – and this is the actual thesis to be discussed in this paper – that despite the increased importance of research in general, this expertocratic and medical shift in social research led to a massive reduction in reform opportunities by depriving the reform stakeholders of professional experience, common sense, and political deliberation and by assigning policy to a new caste of so-called experts that work within the logic of biomedical research.

This thesis will be made plausible in five steps. First, I will reconstruct the first step in the shift in the research "paradigm" during and after the Second World War, which I call the mechanization and linearization of the research. In the next step (2), I identify and demonstrate indications of some ruptures in this mechanized and linearized attempt around 1960; and show then how this led to a second step of this shift, biologization or medicalization of the research "paradigms" in the course of the 1960s and the early 1970s. In the following step, I analyze the research of the relevant tools of this "paradigm" to make evident (5) how the research "paradigm" has affected current policy in education.

Mechanization and linearization

Many scholars in the history of science have indicated the ways in which the experiences of the Second World War affected the interrelation between politics, the military, and sciences (mostly physics and chemistry) (Elichirigoity, 1999; Fortun & Schweber, 1993; Hughes & Hughes, 2000; Pickering, 1995; Rudolph, 2002). The success that interdisciplinary teams had in developing radar, sonar, proximity fuses, and the atomic bomb that helped to win the war provided the pattern for conducting research in the future (see, instance.g., Overy, 1995). To the stakeholders at the time it was evident that measures that were successful in winning the war should be transferred to peace time, and the central document in this transfer was written at the request of President Roosevelt by Vannevar Bush, who was a trained engineer and initiator of the Manhattan Project. Bush's (1945) report, *Science, The Endless Frontier*, was delivered on 25 July 1945, to President Harry S. Truman. It closely related the future fight against diseases, defense against aggressors, and the establishment of a welfare state to "new knowledge" that "can be obtained only through basic scientific research" (Bush, 1945, Summary of the Report), and doing

research meant teamwork by experts, just as had been practiced during the Second World War:

> Science can be effective in the national welfare only as a member of a team, whether the conditions be peace or war. But without scientific progress no amount of achievement in other directions can insure our health, prosperity, and security as a nation in the modern world. (Bush, 1945, Summary of the Report)

Evidently, science education as a program to support the "renewal of our scientific talent" was of highest importance for the future (Bush, 1945, Part 4).

In *Scientists in the Classroom*, Rudolph (2002) describes how this program was slowly introduced into educational reform and how with Sputnik the efforts were multiplied; one result was the convocation of the Woods Hole Conference in 1959, with Jerome Bruner as acting president and sponsored by the RAND Cooperation and the US Air Force, among others. The topic was how to adapt the schools to the alleged needs of a nation that felt it was lagging behind its enemy – the Soviet Union – in mathematics, sciences, and technology. On the occasion of this conference, Bruner noted that in reforming education the focus was on "the entire array of possible alternatives that might be created by using existing or newly developed technologies … from scratch" and that "the goals of education … expressed in terms of the human functions and tasks to be performed … can be as exactly and objectively specified as can the human functions and tasks in the Atlas Weapon System" (as cited in Rudolph, 2002, pp. 94, 99).

Thirty-four invited scholars participated at the Woods Hole conference, and three out of four were in mathematics, the sciences, or psychology. The only three scholars trained in education were one school administrator and the two others were engaged in educational testing: no philosophy of education, history of education, or curriculum theory had a voice at this conference (Tröhler, 2011). The result of this make-up of the scholars was a technocratic and science-oriented agenda and the claiming of a particular learning ideology. To learn a discipline at school was basically to learn its "structure" (Bruner, 1960, p. 6). This learning of the "structure" was praised as the "heart of the educational process" (p. 17), and it meant that every discipline – whether at university or at school – had a "general idea" (p. 17) or "basic or underlying principles" (p. 18) that needed to be learned by the student. Decisions concerning curricular contents should be taken by the experts: "The decision as to what should be taught … is a decision that can best be reached with the aid of those with a high degree of vision and competences" (p. 19) in the academic disciplines – and not a decision to be made by elected school boards or other agents in the educational field. Accordingly, the model discipline for education as an academic discipline was, as Bruner's Harvard colleague Israel Sheffler emphasized at a conference in 1961, physics (Sheffler, 1963, p. 50).

This expertocratic and technocratic ideology of engineering was also the basis of the very first Organization for Economic Cooperation and Development (OECD) conference on education held in Washington, DC, in winter of 1961. The predecessor of the OECD – the Organization for European Economic Cooperation (OEEC) – had hastened in 1958 to install an Office for Scientific and Technical Personnel (OSTP) after Sputnik and organized an international conference on *Forecasting Manpower Needs for the Age of Science* (OEEC, 1960). This planning ideology was at the basis of the first international conference, *Policy Conference on Economic Growth and Investment in Education* (OECD, 1961). And as one of the key speakers at the conference said, "May I say that,

in this context, the fight for education is too important to be left solely to the educators" (OECD, 1961, p. 35). In line with that, the conference had brought together "those with policy responsibilities for education and national budgets as well as professional economists and experts" (p. 9). Of the four keynote speakers one was a lawyer, the second had a university degree in political and social sciences, and the third and the fourth were economists by training.

Based on human capital theory, the conference focused on economic growth. Economic growth demanded educational expansion in two aspects: more and longer schooling and transformation of the curriculum to include more (and "new") mathematics and sciences. To implement this thorough reform, it was decided that of "first importance for sound educational planning and for the development of education programs" was the collection of "excellent statistical data in respect of pupils, teachers, buildings and finance" in an "international comparable way" (OECD, 1961, p. 13). The general concept was therefore clearly quantitative and not qualitative (p. 10). The body responsible for implementing this planning ideology was the OECD Committee for Scientific and Technical Personnel (CSTP), the successor to the OSTP of the OEEC directed by Alexander King, about whom there will be more in the following. At the Fourth Conference of the European Ministers of Education in 1964, the CSTP was assigned to be in charge of planning and investment in education (OECD, 1964, STP/M(64)2, p. 13), and it immediately published a separate note entitled, "The Need for Improved Statistics" (OECD, 1964, STP(64)24). To fulfill its assignment, the CSTP stated that problems needed be solved to assure that the "statistics of the Member countries will be comparable" (OECD, 1964, STP (64)24, p. 1); this task was called the "most urgent task since no real progress can be made without adequate statistical basis" (p. 2). Under the catchword of development, an expert-driven scientific orientation in education based on statistics was meant to implement the global war and post-war ideologies of social development toward the vision of One World, the harmonious educational globe (Tröhler, 2010).

Evident limits

It is no coincidence that this ideology was labeled ideology-free, for instance by sociologist and journalist Daniel Bell in his 1960 bestseller, *The End of Ideology* (Bell, 1960): Ideologists were "the others," the communists, whereas the Western world would help itself to solve the social problems with the aid of modern science and technology. The optimism was remarkable, but several serious events started to shatter the instrumental mechanical view of progress and planning. Population growth – ever since antiquity understood as the result of good government – was becoming a severe problem, as Stanford biologist Paul R. Ehrlich stated in his bestselling and shocking book, *The Population Bomb* (Ehrlich, 1968), which started with the pessimistic statement: "The battle to feed all of humanity is over. In the 1970s, the world will undergo famines – hundreds of millions of people are going to starve to death in spite of any crash programs embarked upon now" (p. 15).

In this context, it is not important that later scholars debunked Ehrlich as an ideologist (e.g., McCalla & Revoredo, 2001). It is more important that Ehrlich was a biologist. A year after Ehrlich published *The Population Bomb*, the journal *Environmental Education* went into publication, resulting from a movement called environmentalism that was triggered in 1962 by the publication of *Silent Spring* (Carson, 1962) by marine

biologist Rachel Lois Carson. This is an impressive example of an educationalized culture assigning social (here the threat to humanity of a poisoned environment) problems to education. *Silent Spring* dealt with unforeseen and undesired consequences of applying instruments developed during war time in civil society: the widespread use of the synthetic pesticides, especially dichlorodiphenyltrichloroethane (DDT).

DDT had been used during the Second World War. Prior to the war, Japan had been the world's leading exporter of insecticides. After Japan entered the war with the attack on Pearl Harbor in 1941 and the offensive against the British and Dutch colonies in south Asia, insecticides became scarce in the West. The British authorities organized trials to find new insecticides, and the person in charge of this organization was a young chemist named Alexander King, who later would become the influential director of educational committees in the OEEC (1958–1961) and the OECD (1961–1972) (see above). During his efforts to find insecticides, King stumbled upon a compound for mothproofing furs (developed by Paul Müller at the Swiss company Geigy) that promised to be equally efficient for protecting British soldiers from insect-borne human diseases in the swamps of Malaysia. King, annoyed by the long name of the chemical, abbreviated its name to DDT. He traveled to the USA, where they tested DDT on poor unemployed black people in Florida before it was used for the British soldiers in Asia (King, 2006, p. 125f.).

King makes no secret that among other devices, DDT as a result of the "impressive use of science and technological development in helping to win World War II" was believed to be "equally successful in the period of reconstruction, and thereafter by building prosperity and social progress in a peaceful world" (King, 2006, p. 163). And indeed, in 1945 DDT was made available to US farmers as an agricultural insecticide; in 1959, a total of 35,771 metric tons were sold (World Health Organization, 1979) and contaminated *silently* large parts of American agriculture. *Silent Spring* (Carson, 1962) was a reaction to this contamination and inspired an environmental movement that challenged the idea of a mechanical and technological world order and of linear notions of progress.

Another incident had similar effects. The chemical thalidomide, or brand name Contergan, was mostly sold starting in 1957 by the German pharmaceutical company Grünenthal. It had been developed by Wilhelm Kunz and Heinrich Mückter. Mückter was a physician and chemist, and as a member of the NSDAP (Nazi Party) he had been involved in medical experiments with inmates at Nazi concentration camps in Poland. Mückter escaped arrest by the Polish authorities after the war by fleeing into the Western occupation zone. At Grünenthal, Kunz and Mückter developed an anti-nausea drug named Contergan, to be used to alleviate morning sickness in pregnant women. It could be bought without a prescription. Not long after the drug was put on the market, several thousand infants in Germany were born with malformation of the limbs; not even half of them survived (Bren, 2001). These devastating results resulted in the 1962 US Kefauver Harris Amendment, or "Drug Efficacy Amendment" to the Federal Food, Drug, and Cosmetic Act, requiring drug manufacturers to provide proof of the effectiveness and safety of their drugs before they could be approved. This "proof-of-efficacy" requirement had not existed before (Peltzman, 1973), and it introduced an imperative of medical research that was called *evidence based*. Evidence-based medicine – the term seems to have been coined in 1968 – is seen as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). As an empirical method, it came to be

appreciated as providing "more reliable knowledge than other methods" (Howick, 2011, p. 3). The idea was promoted by the books *Clinical Judgment* (Feinstein, 1967) by a physician and *Effectiveness and Efficiency* (Cochrane, 1972) by a physicist. Within 20 years, the evidence-based method began to serve as a model for other sciences, too (Wessling, 2011), although it has often been contested or at least criticized by scholars (see, e.g., Hjørland, 2011; for the case of education, see Thomas & Pring, 2004).

Indeed, the 1960s were an unplanned test phase for the engineers' perspective and the research ideology developed in the Second World War. The public scandals in connection with DDT, thalidomide, and the problem of the growing world population led to a cultural shift within the dominant "paradigms." The new "paradigm" remained within the realm of the (natural) sciences and excluded none of its disciplines, but the leading science was now more at the intersection of biology and medicine, biomedicine, and not as much physics and technology. Especially after the discovery of DNA and its public recognition by awarding two pioneers with the Nobel Prize in 1962, James D. Watson and Francis H. C. Crick, for an article that they had already published in 1953 (Watson & Crick, 1953), biology emancipated itself from a mechanistic language and turned to the organistic language of social interaction and communication, as Canguilhem (1966, p. 219), a physician by training, noted in 1966. It was – to put it simplistically and one-dimensionally – a shift from a more mechanistic to an organistic world view, from the engineer and technician to the chemist and biologist. This we can see in a most informative debate (see below) on the concept of "system," which now was no longer restricted to technical devices, but included biological and social systems.

Biologization or medicalization

One of the major figures in the struggle of defining the "proper" understanding of system was Ludwig von Bertalanffy, a biologist in Vienna. In 1949, Bertalanffy had already challenged the dominant mechanistic ideology in *Problems of Life: An Evaluation of Modern Biological and Scientific Thought* (Bertalanffy, 1949/1952). In that book, he acknowledged the great success of mechanical physics in its attempt to "resolve and reduce complex phenomena into elementary parts and processes" (Bertalanffy, 1972, p. 409). However, although the method of reduction is able to describe the relation between different variables, it is not able to deal with the crucial aspect of the "self-maintenance" of any "living organism" (p. 409). What was needed was a "biology of organisms" ("organismic biology") as a specific case of a "general systems theory" (p. 410), whereby "organic entities" could be "social groups, personality, or technological devices" (p. 410).[3]

Systems are all related to each other, are detectable by "mathematical techniques," and have a "predictive value" (Bertalanffy, 1972, p. 416). In its external description, a system is a "black box"; "its relations to the environment and other systems are presented graphically in block and flow diagrams" (p. 419), whereas the internal description is restricted to "describe the systems' behavior in terms of state variables and their interdependence." In contrast, "external description is 'functional'; the systems behavior is described in terms of its interaction with the environment" (p. 420). This methodological understanding is applicable to all systems, as well as to "educational institutions" (p. 421). Even if Bertalanffy may have not received the immediate recognition that he believed he deserved, the perception of an "organismic biology" became a dominant system of technocratic reasoning by around 1970.

Systems analysis was the catchword of the day, and the biomedical understanding of a system had become dominant by the end of the 1960s, also in the field of education. A fine example of this can be found in one of the landmark publications of 1968, which was written by Philip H. Coombs, an economist. Coombs was a keynote speaker at the 1961 OECD conference in Washington, DC, mentioned above, and from 1963 he was the director of the UNESCO International Institute for Educational Planning in Paris. In Coombs' (1968) *The World Educational Crisis – a Systems Analysis*, it becomes evident that the new, biomedical concept of system was not meant to serve our *understanding* of the system as a system, but only to *describe its functions*; as Bertalanffy would have noted: "A 'systems analysis' resembles, in some respects, what a doctor does when he examines the most complicated and awe-inspiring "system" of all – a human being" (in Coombs, 1968, p. 8). A systems analysis of the education system faces thus the same challenges as doctors do in their analysis of the human body:

> It is never possible, nor is it necessary, for the doctor to have complete knowledge of every detail of a human being's system and its functional processes. The strategy of the diagnosis is to concentrate upon selected critical indicators and relationships within the system and between the system and its environment. The doctor, for example, is concerned especially with correlations between such critical indicators … From these he appraises the way the total system is functioning, and prescribes what may be needed to make it function better. (Coombs, 1968, p. 8)

Coombs obviously knew the difference between human bodies and schools, but he insisted that as an "organic whole," they functioned in the same ways:

> Yet, in common with all other productive undertakings, it [an educational system] has a set of *inputs*, which are subject to a *process*, designed to attain certain *outputs*, which are intended to satisfy the system's *objectives*. These form a dynamic, organic whole. And if one is to assess the health of an educational system in order to improve its performance and to plan its future intelligently, the relationship between its critical components must be examined in a unified vision. (p. 9)

One of the motives underlying the cultural shift from a mechanistic to an organist worldview was the impression that the world was growing more complex. The idea that the future was predictable was still advocated, but the stakeholders realized that the goals were not to be implemented in an engineer's manner. In the same year that Bertalanffy died, in 1972, the International Institute for Applied System Analysis (IIASA) was founded with the financial support of the Ford Foundation. The driving force behind this idea was Aurelio Peccei, an Italian industrialist, and the aim was to overcome an analytical-mechanical approach by developing "a comprehensive, holistic vision of our convulsive, changing world" (Peccei, 1977, p. 54).

In the late 1960s, when Peccei had been engaged in creating the IIASA, he had become acquainted with Alexander King, who was then director of scientific affairs of the OECD, with King's collaborator Erich Jantsch, an Austrian astrophysicist, Hasan Özbekhan, a Turkish American systems scientist and cyberneticist, and Jay W. Forrester, an American computer engineer and systems scientist at MIT. They all attended an OECD symposium in Bellagio, Italy, in late October 1968, which was financed by the Rockefeller Foundation; the topic was long-range planning in a complex world. In contrast to the 1961 conference in Washington, DC, the participants now (in 1968)

asserted the need for an organistic and holistic model: "the need to plan systems as a whole, to understand the totality of factors involved and to intervene in the structural design to achieve more integrated operation" (Jantsch, 1969, p. 9).

Many of the participants at the OECD conference in 1968 had already met a half a year earlier in Rome at a first informal meeting to discuss the problems of the future (see Hahn, 2006, p. 39ff.). At this meeting, a dispute over the notion of "system" broke out. Although no details are available, we know that the French participants defended connotations of their concept of *système*, whereas the Anglophone participants advocated for connotations of their own concept of system. Disagreement between these two parties was so strong that the conference ended with no result, despite the excellent quality of the wine, as Peccei (1977, p. 65) reports with regret. The planners of the harmonious globe could not even agree to harmonize their core concepts.

Nevertheless, Peccei invited some of the participants to dinner at his home in Rome in April 1968, at which occasion the "Club of Rome" was founded. Two years later, a first prospectus, *The Predicament of Mankind* (Club of Rome, 1970), proposed the new paradigm. The subtitle of the prospectus is significant: *Quest for Structured Responses to Growing World-wide Complexities and Uncertainties*. Two years later, the Club of Rome became famous across the globe by commissioning a book presenting the results of computer simulations of interactions between population, industrial growth, food production, and limits in the ecosystems of the Earth, using the WORLD3 model. The results were again devastating. The authors of the book, *The Limits to Growth* (Meadows, Meadows, Randers, & Behrens, 1972), were all researchers working in Jay W. Forrester's professorship for systems dynamic at MIT. The tremendous success of the book indicates how well it represented the general feeling concerning the world, its "logic," and the future. The oil crisis a year later in 1973 reinforced this general feeling regarding the limits of growth and the need for reorientation.

Medicalization: biomedical systems and research models

Medicalization has become an important field of study for knowledge sociologists and also knowledge historians. It started – and this is no coincidence – right after the "medical turn" around 1970.[4] In 1975 in *Limits to Medicine* (Illich, 2010), Ivan Illich made the accusation that there was social overmedicalization that amounts to *expropriation of health*; this analysis was expanded into all different academic disciplines. Newer research has been less accusing than Illich was, but is nevertheless still critical; see, for instance, Peter Conrad's (2007) *The Medicalization of Society*. However, these studies describe practices that are more and more "affected" by medicine and do not so much analyze the fundamental organistic shift behind the new practices.

The understanding of the world as a complex organistic system included infinite numbers of sub-systems, and because these sub-systems could be a person, social groups, or organizations, moral qualities had to be included as well. King depicted the situation in 1968 this way: "Large numbers of people were appalled by the crass materialism of society, the domination of the machine and the clammy hand of the huge bureaucracies – impersonal, faceless and heartless" (King, 2006, p. 293). The new "paradigm" was no longer mechanistic and materialistic, but was a combination of idealistic (or moralistic) and organistic claims. This had effects on the way that research was supposed to be conducted: in medicine through "biological standardization" (Porter, 1995, p. 29f.) and from there, beyond the limits of medicine, to the social sciences.

Doing research in a system as part of a meta-system does not aim at understanding the functioning as a whole. Evidence-based policy depends on research results that are not designed to understand the whole system, but rather to statistically identify the functioning of isolated parts of the system (effects). A quantitative approach is indispensable because individual effects of tests can be accidental. Statistics becomes a key method of detecting evidence of effects. Statistics is closely linked to medicine and psychology, as Porter (1995) noted, and it moved from there to "their relatively applied subfields" (Porter, 1995, p. 200), such as education. The "culture of evidence" had reached education (p. 198). The model is "clinical trials":

> A controlled clinical trial (CCT) is a study testing a specific drug or other treatment involving two (or more) groups of patients with the same disease. One (the experimental group) receives the treatment that is being tested, and the other (the comparison or control group) receives an alternative treatment, a placebo (dummy treatment) or no treatment. The two groups are followed up to compare differences in outcomes to see how effective the experimental treatment was. A CCT where patients are randomly allocated to treatment and comparison groups is called a randomised controlled trial. (Clinical trial, n.d.)

It is of utmost importance to realize that clinical trials are *not* aimed at understanding *why* a medicine works but at evidence *that* it works, and that is why statistics become so crucial: statistical evidence replaces the (abandoned) quest for understanding. This shift fits the fact that the main bearers of this "paradigm" were not and are not medical doctors as professionals. Although physicians might have been promoting and disseminating a medicalized agenda in their practices, it seems that in the last few decades, the strong agents in universalizing the logics of biomedicine to the whole social sphere were patients, managed care organizations, and the pharmaceutical industry (Conrad, 2007, p. 14ff.). The expertise of the professionals decreased, and the expertise of the masterminds of the test trials increased. As Porter (1995, p. 91) reported, "medicine meant powerful professionals whose expert judgment was rarely questioned" until the mid-twentieth century. By the mid-1960s, professional judgment was increasingly seen as subjective: "We must show that the exercise of professional judgment and the desire for objectivity are complementary propositions" (as quoted in Porter, 1995, p. 92). Doctors were (no longer) perceived as monarchs of their practices, but as "firm individualists" with little disposition to merge "into a large-scale research program" (p. 205). The same thing happened to school teachers as professionals.

By 1970, "objectivity" had found its role "as an alternative to personal trust" (Porter, 1995, p. 90), and large-scale "data" had become a core part of the technocratic and expertocratic culture that believed it was emancipated from both professional expertise and politics or democracy. As modern European historian Richard F. Kuisel wrote, "technocracy" supposes:

> that human problems … have a solution that experts, given sufficient data and authority, can discover and execute. Applied to politics this reasoning finds interference from vested interests, ideologies, and party politics intolerable. Its antithesis is decision making through the weighing of forces and compromise. Technocrats thus tend to suspect parliamentary democracy and prefer the "rule of the fittest" and a managed polity. (Quoted in Porter, 1995, p. 146)

Efficiency of a system implemented by management based on large-scale data from evidence-based research was the dominant paradigm that served as a cultural model for

the modern medicalized world. "Monitoring" – a term originally used in hospital intensive care units – was to guarantee ongoing probation by regular "objective" data collection. Even organizations had to follow the model implemented in medicine, as Coombs (1968) stated in *World Educational Crisis*. The schools, mourned Coombs, were administered by teachers, that is, by laymen in management. The hospitals had the same tradition, but:

> What the hospitals frequently got in return was poor administration. When enough hospitals sank into the mire of financial troubles, this system was changed, at least in some countries, beginning with a change in the traditional assumption that underlay the whole thing. A new breed of specially trained hospital administrators was put in charge of the institutions, and they began to show significant improvements after that. (Coombs, 1968, p. 123)

Medicalization had reached not only a large number of everyday practices but also the whole culture and, with that, the unwritten guidelines defining what "good" research is. It is Big Science, dedicated to large-scale assessments, aiming for statistical evidence and ignoring questions of meaning and making sense. It was and partly still is mostly organized outside the universities and carried out by people trained in the universities. The Program for International Student Assessment (PISA) is but a good example of this new "paradigm"; it promises not a better understanding of the school system but knowledge about the state of the art. Intervention studies, monitored in large-scale procedures, promise to make this system not better understood but more efficient.

The implementation in education and its effects on policy and reform

As Hahn (2006, p. 41) reported, a dispute over the concept of system was one of the obstacles to a smooth founding of the Club of Rome (see above). As a matter of fact, the concept of system is one of the keys to understanding the cultural shift of the late 1960s, and it is thus to be found in education as well. A great help in understanding this shift are changes in the terms used in the German language, for not only did the connotations of the same word change, but an entirely new term came to be used. Up to the late 1950s, the concept of *Bildungssystem* (education system) had hardly existed. What is meant by education system had been called *Bildungswesen*. *Wesen* is literally "being," but in connection with education it was used in the sense of "how it is" or "how it has become." It was only starting at the time of Sputnik (again!) that the new term *Bildungssystem* came into use, at first foremost in the technocratic German Democratic Republic (DDR) and then a bit later also in the Federal Republic of Germany.

Figure 1 illustrates the findings of a corpus analysis of the usage of the two terms *Bildungssystem* and *Bildungswesen*. The graph clearly demonstrates, first, the tremendous educational momentum in the late 1950s after Sputnik and, second, the implementation of the term *Bildungssystem* around 1958 and its ascent up to 2006/2007, when *Bildungssystem* begins to be more often used than *Bildungswesen*.

A prime example of the cultural shift in education research may be found in the European Science Foundation (ESF), an association of over 70-member organizations devoted to scientific research in European countries.[5] In 2009, the ESF Standing Committee for the Social Sciences (SCSS) published a "position paper" titled *Vital Questions: The Contribution of European Social Science* (ESF, 2009), in which leading social scientists/experts defined and framed research questions on inequality, aging,

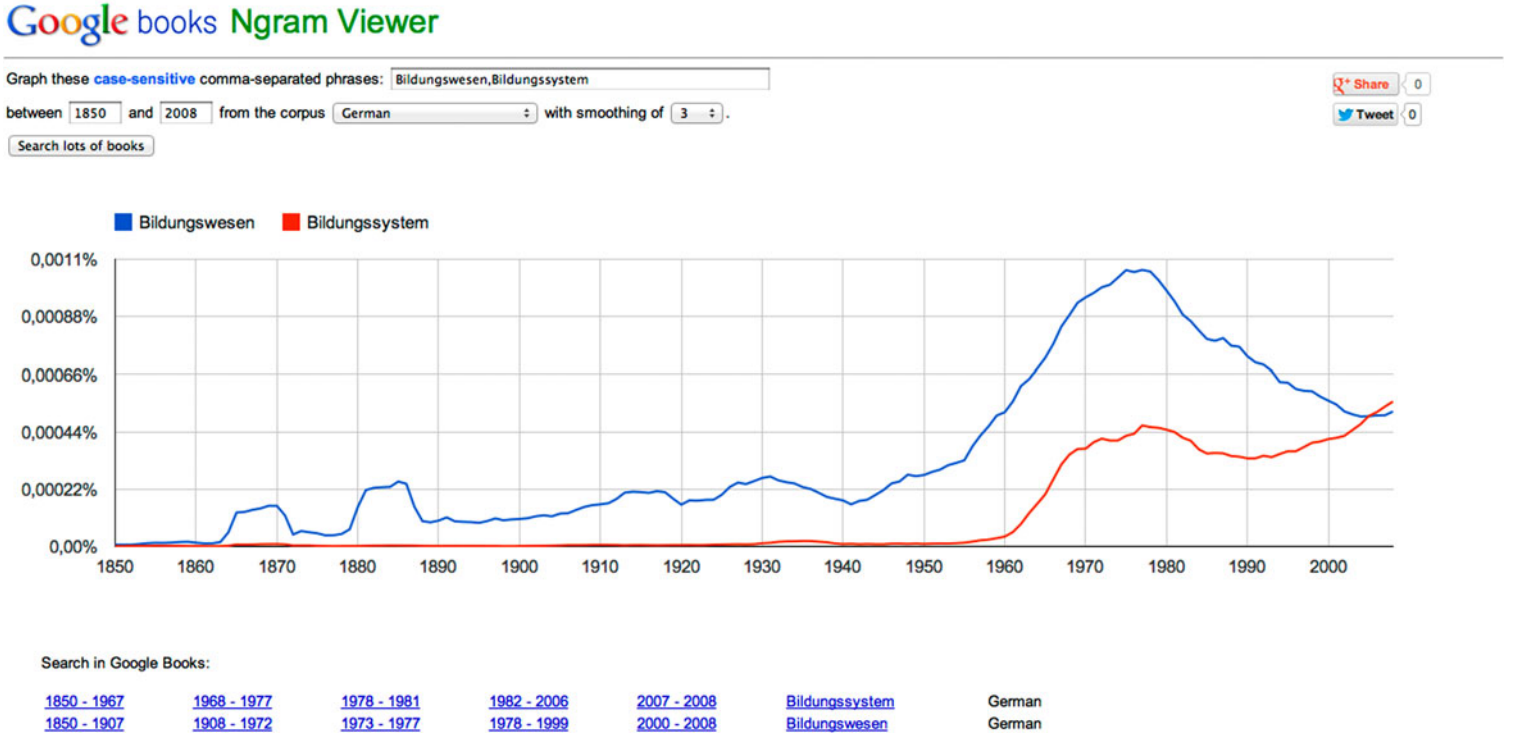

Figure 1. Quantitative use of the terms Bildungssystem and Bildungswesen.
Source: http://books.google.com/ngrams.

migration, education, and democracy. As stated in the introduction, written by Marja Markova, chief executive of the ESF, biologist and biochemist, and Roderick Floud, chair of the SCSS, economic historian, the purpose of the "position paper" was to analyze the state of the art of social research and its future.

The model fits exactly with the technocratic developments from Vannevar Bush to today's medicalized culture of research: interdisciplinary, statistical, and (now) oriented to biomedicine. Regarding complexity and statistics, the introduction to *Vital Questions* states: "As this volume shows, social scientists are contending with the analysis and understanding of many complex problems. They are often using vast data-bases and statistical techniques" (ESF, 2009, p. 3). Further, the position paper emphasizes interdisciplinary teamwork with regard to biology:

> Europe's social scientists look forward to working even more closely with scientists in other fields, to exploit recent advances in understanding of the human genome, the workings of the brain and the complex systems which characterise so many biological systems. (p. 3)

This biological understanding is seen as the very basis of social science: "At the same time, our greater understanding of the human body, at the molecular and other levels, poses great challenges in understanding human behavior – the topic that lies at the centre of all the social sciences" (p. 3).

One of the strategy papers in *Vital Questions* (ESF, 2009) was devoted to education; it was written by Manfred Pretzel, an educational psychologist, former director of the Leibniz Institute for Science and Mathematics Education in Kiel, and current director of the School of Education of the Technical University of Munich. In "Challenges Facing the Educational System" (ESF, 2009, pp. 30–33), Prenzel writes that today's politicians want to base their decisions in education more and more on empirical evidence and rely on the social sciences, which have created "new test conceptions and evaluation models," and further a "great number or reliable and valid indicators for lesson and school quality" and "models which allow characteristics of social and cultural background to be surveyed and interpreted" (ESF, 2009, p. 30). These developments have allowed "a systematic education-monitoring system," on both national and international levels, which is important because it was recognized that education in "a global knowledge-society" is of crucial importance; education has become a "prominent production factor of the further development both of the individual and that of society" (p. 30). Globalization causes the needs for more and better education across the lifespan.

Under these conditions, the need for "evidence-based educational policy" (ESF, 2009, p. 33) requires test programs such as PISA, standardization, and further evaluations. The model for the future in education can be found in the "health sector," Prenzel points out in accordance with the dominant medicalized culture:

> However, educational research is still a long way away from medical research in its scope and magnitude of funding. At present, educational research is first and foremost capable of providing descriptive knowledge which identifies problem situations and challenges. This knowledge is highly relevant for evidence-based educational policy as it provides reference points for political decisions. (p. 33)

What was needed to serve the dominant "paradigm" was much more money for this kind of research detecting effective correlations between single factors of the system:

> Studies (for example, with longitudinal designs) which identify causally relevant conditional factors and thus provide explanatory knowledge are particularly helpful in this area. However, these studies are very complex and expensive. There is a special demand for studies providing knowledge of effective measures to achieve specific aims under given conditions in an educational system. In order to obtain this type of technological knowledge, systematic experiments in the laboratory and in the field are necessary, together with cleverly planned intervention studies. (ESF, 2009, p. 33)

The education system is the medicalized system that can be explored through large-scale assessments of its outputs and by "intervention studies" (ESF, 2009, p. 33) that are monitored by large-scale assessments and aim at the identification of "causally relevant conditional factors" (p. 33). The overall aim is to produce "technological knowledge" for "political decisions" (p. 33).[6]

Although Prenzel's contribution stresses the importance of education for democracy ("Educated populations are thus fundamental to Europe's democracies") (ESF, 2009, p. 30), democracy as condition and aim of education is being blinded out. Prenzel talks about "political decisions" (p. 33), but never about "political deliberation" by informed citizens. Decision-makers are to work with the test experts and obviously not with lay people or professionals. The medicalized research paradigm suggests this de-democratization, for if the system is not to be understood and interpreted and if the experience of the professionals (teachers) and parents is too individual and fallible, then the only relevant information is based on empirical intervention studies based on the model of clinical research to generate statistically verified – that is evidence based – knowledge. This is the medicalized technocracy *par excellence*, and its roots go back to the Cold War avant-garde in the 1950s. Their slogan was: "That democracy is best, in which people participate least" (as quoted in Gilman, 2003, p. 48), because one should trust the experts not among the professionals, but among the scientists in their laboratories.

Outlook

Over the last 200 years, the educationalized culture has grown and led to the expansion of the education system. It has increased educational sensitivities and thus reform activities in the field. The obvious gap between increasing expectations of education and its actual limitations has increased the pressure on reform(s); reform has become the normal condition of education, led by those who are seen as able to provide evidence. These are not lay people, curriculum researchers, philosophers of education, or education professionals. The saying, "the fight for education is too important to be left solely to the educators" (OECD, 1961, p. 35), is very informative. Technocracy is a system of faith, and systems of faith always produce Messiahs, be they Sir Michael Barber, chief education advisor at Pearson PLC, a British multinational publishing and education company, or Andreas Schleicher, a German statistician and division head and coordinator of PISA and the OECD Indicators of Education Systems program, working with a network of disciples in the individual countries.

However, this shift might turn out to be an unintentional *timeo Danaos et dona ferentes* ("I fear the Greeks, even those bearing gifts"), because it simply involves a massive reduction in the possibilities and areas of reform, which is already a contradiction of evolutionary biology, for according to evolutionary biology, survival chances grow proportional to the diversities of adaptation. Largely excluding professionals and concerned parties (parents, the public) and of other forms of research in education from politics affects the set of mutual relations between professional experience, politics, and

research, which were the central pillars of school development over the last 200 years. But it was the deliberations between these involved actors that have formed the background of the resistance and expansion of the educationalized culture. Their attempt was always to understand the education system (or the *Bildungswesen*) from their points of view and to evaluate it against their cultural ideals and to trigger reforms. Where the gap between ideal and perceived status quo appeared to be too large, it represented a practice of permanent negotiation with regard to what today is called "input steering."[7] This creative energy is lost when the education system is not understood as a cultural system but as an organistic system, one which discloses its secrets only in fragments and by statistical evidence, which means that accordingly the scope of reform is narrowed down to benchmarks, standards, and intervention research, representing the ideal of "output steering." Health is, of course, as desirable as democracy is. Health is not negotiable, however, whereas negotiation is the essence of democracy, and creativity is an at least helpful element in finding solutions between competing ideals. It includes acceptance of unpredictability, the no-go topic for planners and forecasters.

Notes

1. This is a revised version of a paper presented at Teachers College, Columbia University, in New York, on 1 April 2014, and at the Research Library for the History of Education in Berlin, Germany, on 11 December 2013, and at the international conference "Critical analyses of educational reforms" in Stockholm, on 18 September 2013. I thank Inès Dussel for her helpful comments on the occasion of the Stockholm conference.
2. I use "paradgim" in quotation marks because the way I use it differs to some degree from Thomas Kuhn's use. Whereas Kuhn describes paradigms as inflexible and not in mutual interdependency with the theories but as "disciplinary matrix" (Kuhn, 1977, p. 319), I emphasize their function more fundamentally as systems of reasoning. This way, it more closely resembles what Foucault would call *dispositif*, developed already in his inaugural lecture of 1970 (Foucault, 1970/1972).
3. The proximity of Bertalanffy's "general systems theory" to the feedback loops described in Norbert Wiener's *Cybernetics* (Wiener, 1948), published in the same time period, is evident. Wiener developed his analysis on "Control and Communication in the Animal and the Machine" (subtitle of the book) in the intersection of biology and technology at Harvard Medical School, and summarized their collaborative research during war time with physicists, medical scientists, mathematicians, and statisticians. This research program had also been initiated by Vannevar Bush during the war.
4. The phenomenon of medicalization of society is older, of course, and can be traced back to the nineteenth century. An indicator of this transformation may be seen in the rising public and academic interest in hygiene, a movement that at least in France was congenially absorbed by the discoveries of Louis Pasteur, resulting in the process of the *Pasteurization of France* (Latour, 1984/1988). The popular media reacted immediately by disseminating (medical) results of research to the broad public, creating a medicalized discourse on health, nutrition, posture, and use of time heading to an effective "productivization" of the human body. In this context, school healthcare with its focus on hygiene became more and more a "normal" element of school life, but without fundamentally changing the taken-for-granted idealistic doctrines of education.
5. The ESF was founded in 1974 as an independent, non-governmental, non-profit organization. It facilitates cooperation and collaboration in European research and development, European science policy, and science strategy and has an annual budget of over 50 million €.
6. A broader discussion of Prenzel's paper is found in "*Diskussion, Die Zukunft der Bildungsforschung*" (Discussion: The Future of Education Research) in *Zeitschrift für Pädagogische Historiographie*, *2/2010*, pp. 96–114.
7. There are no doubts that these negotiations were always conducted in specific power relations, too, and not in democratic paradises. But they nevertheless included more different actors than today's policy of "output steering" does, especially in those political cultures with a strong tradition of local participation.

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