# From Sputnik to PISA Shock – New Technology and Educational Reform in Norway and Sweden

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## Abstract

The article offers a comparative perspective on how educational policy is influenced by two key phenomena that sent something akin to shockwaves through the Western world, and that in both cases highlighted basic deficiencies within the school system. The case of Norway and Sweden in particular, as well as the role of new technology, is examined. One striking feature is that the patterns of reaction and the measures taken following these shock-generating experiences display a relative similarity. The focus on the pedagogical use of new technology is a key objective, although it forms part of a wider political intervention in education, in conjunction with an upgrading of basic knowledge and skills and a reaction against established pedagogical traditions. To a certain degree, ideals and approaches rooted in the industrial society are extended, a situation that seems problematic when the intention today is to create a school for a new age.

*Keywords:* Sputnik, PISA, new technology, educational reform, comparative perspective

In recent years, supranational organisations have increasingly set the parameters for the development of schools in Western countries in particular directions, with one important example of this being the PISA tests initiated by the OECD. These tests generated shockwaves in many countries, leading to a critical re-assessment of their education systems, and Norway and Sweden were no exception. When the PISA results turned out to be worse than expected, calls for action were heard and political bodies launched various measures aimed at improving learning. A common thread in all this was a firm belief in the pedagogical use of new technology, often accompanied by a questioning of the teacher's undisputed position in the classroom. The need for basic knowledge and skills was underscored, with an emphasis on mathematics, the natural sciences and language. The measures introduced were consistently marked by a critical distance to what was viewed as progressive education or reform pedagogy. One interesting feature is that the patterns of reaction and the measures proposed are surprisingly similar to those seen after the Sputnik shock more than 40 years earlier. In a comparative perspective, it is interesting to note how educational reform on an international level forms part of cyclical movements.

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## Sputnik and PISA

It may seem quite strange to introduce Sputnik as a reference to PISA since, in principle, they constitute two widely dissimilar phenomena. The 1957 launch of the Soviet rockets Sputnik 1 and 2 represents one of the greatest breakthroughs in the history of space, and for the USA this bold achievement meant a resounding loss of prestige, with serious political and military implications. However, soon afterwards, the main reasons for this setback were identified as being within the education system. In this way, both the launching of the Sputniks and the publication of the PISA results may be seen as examples of international events generating heated political debates about fundamental deficiencies in school. Both led to a critical re-evaluation that lent support to comprehensive educational reform, which can therefore be taken as useful points of reference for comparative approaches. It is also noteworthy that the Sputnik shock is still actively used as a reference in current debates on education. This took place in the USA as a result of 15-year-olds in Shanghai taking PISA tests and achieving results far in excess of those of American students. This was described as China delivering the "aftershock" following the earthquake generated by Sputnik (Finn Jr. 2010). Barack Obama has used the experiences from the Sputnik shock to justify measures aimed at boosting research and strengthening scientific subjects in schools (Rønning 2009). References to Sputnik have also been turning up in Scandinavia in debates about learning outcomes in school (Boman 1999).

An interesting point of departure for comparative studies is the clear similarities between the changes generated by both Sputnik and PISA. But a comparison of the reflections in the 1950s–1960s and the years after 2000 has also led to the question of why the patterns of reaction are not more dissimilar given that the school systems concerned are operating in widely different societal contexts. The school of the 1950s and 1960s is part of the golden age of modern industrial society. In contrast, the PISA tests relate to a school with the expressed aim of enabling students to cope with an entirely new type of society, whether we call it post-modern, a knowledge society or something else.

Throughout the article technology is at the centre of attention. "Technology" is used as an overall term covering a multitude of technical solutions and equipment, but mostly referring to the use of computers. In the 1960s, however, the term also included different types of systematised thinking about teaching, and this constitutes an important part of the article. Nevertheless, the decisive question is how the notion of technology is related to pedagogical or didactic reflections, and in this respect it is possible to point out the interesting stability through the years. At the heart of this is a prolongation of instrumental perspectives on technology.

## Comparative perspectives on educational reform

Making comparisons in cross-cultural and transnational environments is, and has been, a demanding undertaking. A number of studies describe how educational reform is deeply rooted in social and historical contexts (Moon and Murphy 1999), which has led to some reservation in carrying out such comparisons. Educational historians have traditionally tended to take only a limited interest in international perspectives, instead concentrating on presenting national versions of educational history (Telhaug 1992). Although there are instances in which historians have described important impulses from other countries (Sæther 1998), this has by no means been a dominant trend. However, due to the clear increase in external influences on educational politics it is necessary to address this wider issue with greater purpose. Further insight is also needed into how fundamental ideas about education are developing in an international perspective, where these ideas originate and how they are incorporated in the strategies of different countries.

Even so, there has been an insufficient amount of comparative research, and there is a lack of relevant studies as a basis for comparison. Comparative approaches also raise a couple of basic questions. How can we manage to break down complex social and historical structures so that they are capable of representing relevant global dimensions? How can we arrive at analytical units which are mutually independent and comparable (Schriewer 2006)? Different political and cultural contexts give rise to problems of understanding in comparative research (Engelsen 2003). Hence, it is a challenge to attempt to compare Norwegian and Swedish school reforms, which have historically had clear roots in the desire for social change, integration and nation-building, including developments in American education that have consistently focused on the change of individuals (Dalin 1994). In addition, educational reform is characterised by political negotiations that often end up as "pluralistic compromise statements" that seek to communicate "consensus" and "harmony", which can therefore be difficult to relate to and interpret. Moreover, key concepts such as "pedagogy" and "didactics"[1] are used differently (Engelsen 2003). We must also bear in mind that educational research comprises a variety of traditions and assumptions (Gundem and Hopmann 1998).

The reform concept is also used in different ways when applied to the education system. Despite its central place in general discussions of the school and in research literature, it has no commonly defined meaning. On the other hand, it has proven to be a useful concept for politicians and others with responsibility for changes in the education system. A key reason here is that there has been a general acceptance of the idea that "reform" represents a benefit, and that it conveys a message of efficiency, dynamism and progress. The concept has assumed importance independent of any concrete results achieved (Greenman 1994; Angus 1998). To a great extent, "reform" has also become synonymous with comprehensive changes initiated

by the authorities (Dalin 1994, 220). An obvious consequence of attaching such importance to this interpretation may be that we are less concerned with, or fail to notice, changes and improvements within the existing structure, which in turn can prove important for how we view the position of the teacher. In the first case, the teacher may easily be perceived as being negative with regard to change. Hence, if we instead focus on the processes continually taking place in schools, the teacher is seen to take on a more active and meaningful role (Cuban 1988 and Cuban 1993).

Even though comparative approaches have not been prominent in the description of educational history, it is a widely-held view that the simultaneous introduction of new pedagogical ideas has meant that many European school systems have developed almost in step with each other (Harboe 1997). In a Scandinavian context, there is a consensus that the most significant ideas have come in order from Germany, the USA and Britain (Sæther 1998). It is also possible to identify common structural or external features of educational reform which include the tendency towards cyclical movements, the rapid pace of change characterised by top-down processes and the fact that reforms have had relatively few consequences for educational practices (Cuban 1988). However, these tendencies are not equally prominent in all countries. In Norway, for instance, educational reform has been largely characterised by bottom-up processes through the involvement of teacher organisations and local authorities. This indicates some kind of top-down-up processes. Nonetheless, a radical change occurred during the 1990s when reform initiatives were clearly centralised (Dale, Engelsen and Karseth 2011). In this article, the cyclical nature of reform will play a dominant role. The alternation between centralisation and decentralisation has been described in an international context (Cuban 1988; Steiner-Khamsi 2009), but it has also been pointed out as a characteristic of Norwegian (Bø 2006) and Swedish educational history (Hellström 2011).

The comparison of changes generated by Sputnik and PISA was originally based on my interest in international educational history in general. I was primarily focusing on international tendencies in educational reform, attempting to detect similarities and dissimilarities and how key concepts were being used. The starting point was broad presentations of educational history, as well as national and international policy documents. Through these preliminary studies, two main findings became decisive for the further research approach: 1) the cyclical nature of reform appeared to be a highly universal phenomenon; and 2) combined in part with the first finding was the impact on the educational policy of shock-based experiences in society. To some extent, my project then turned into a critical review of the literature based on these topics, mostly as a comparison between the initiatives taken after Sputnik and PISA and the reform efforts in Norway and Sweden. As part of this, it was quite interesting to see how reactions starting out in definable centres spread out to several countries.

From one perspective, the methodology may be described as a comparison based on thematic or content analyses. However, the analyses are not grounded in a belief in documents as "containers of content" or a meaning that may be easily found and addressed (Prior 2003, 3). In this way, the approach is influenced by discourse analytic perspectives. Meaning then becomes something that is constructed within a text by the use of language, and which to a great degree is marked by the context. In particular, two discourse analysts have inspired my work. The first is Reinhart Koselleck, who has focused on the role of key concepts in societal meaning construction (Koselleck 2004). One important implication for the subsequent discussion here is the importance of how, for instance, the concept of "reform" is positioned. The second discourse analyst who has influenced me is Norman Fairclough and his contributions regarding "re-contextualisation". Fairclough in his work with Chouliaraki (1999) have taken a lot of interest in what takes place when initiatives or texts developed in one context are transferred to another. In their version, re-contextualisation involves a combination of colonisation and active adaptation (Chouliaraki and Fairclough 1999), and I have found this approach highly relevant when addressing the initiatives introduced in the wake of Sputnik and PISA.

## Sputnik and modern industrial society

Although there had been rumours, the launch of the first Sputnik rocket on 4 October 1957 came as a total surprise. When Sputnik 2 was launched on 3 November of the same year, the shock was only intensified. This was a much bigger and more advanced rocket, and what attracted the most attention was the presence on board of a dog named Laika. To convey the sense of shock, some people have drawn comparisons with the attack on Pearl Harbour in 1941. There were urgent demands for action on all fronts, including political, military and educational, and vast resources were invested. Gradually, there were visible results, chiefly in the field of American space exploration, an endeavour that was crowned with the 1969 moon landing (Tronstad 1987). But as a direct result of the investment in the military sector, technological innovations appeared in a long list of areas, with the development of the Internet being one of them (Nordal 2010). In addition, quite a few IT pioneers had their projects funded via military budgets, and the focus on technology was also of great importance in school, strongly influencing new approaches to teaching.

### Educational technology and modernisation of the education system

In general terms, the Sputnik shock had significant consequences for the education system as it was in this field that the main cause of the USA's resounding loss of prestige in the hands of the Soviet Union was thought to lie (Rutherford 1997). The effects were felt throughout the Western world, including to a great extent in both

Sweden and Norway. A very important element among the measures implemented was the development of educational technology. On the whole, this was taken to mean teaching with the help of different technical means, or as the "technification" of teaching. The appellation "teaching machines" occasionally applied to some of the technological devices indicates this.

Another crucial aspect of educational technology of the 1950s and 1960s was that it formed part of a comprehensive political approach to teaching involving the large-scale modernisation of the education system based on the core values of modern industrial society. It has been emphasised that education was the only sector that had not taken part in the modernisation of society and thus still remained in "a crude handicraft stage" (Pressey 1960, 51), and schools could no longer be restricted to "the blackboard-and-textbook stage of communication" (Tickton 1970, 10). B. F. Skinner, the person who spearheaded the new educational technology, expressed the aim of making education "more efficient" (Skinner 1958, 969), which attracted widespread attention. Educational technology was tried in the USA and Britain on a large scale, but also found a foothold in many other countries. In 1961, the major American suppliers of language laboratories had customers in approximately 60 countries (Bjerstedt 1963). Interest in educational technology also became widespread in Sweden (Korsen 1975), manifesting itself in a flurry of experiments, reports, books and the establishment of a dedicated journal, *Undervisningsteknologi*. We know that Skinner visited Sweden and gave seminars at some universities. Optimism and belief in progress were predominantly linked to science and the application of new technology, and the development took place under the clear influence of the USA. With a broad definition of educational technology, activities within the field were found more or less in all Swedish universities (Wallin 2005).

In comparison, activities in Norway were more limited, although trials were conducted in language laboratories where arguments for the use of new technology in education were predominant. This approach is clearly manifested in the National Curriculum of 1974 in which language laboratories and different kinds of pre-programmed and self-instructional teaching materials are described as alternatives (KUD 1974). However, it is in the field of adult education that teaching aids such as this seem to have had the most practical effect (Bull-Njaa 1978). They have had a long-term effect on how distance education has been conducted in Scandinavian countries. In a Norwegian context, it is also important that educational technology obtain unreserved political support. In the Long-term Programme for 1970–1973, we find great expectations as to what "the technical development" could give by way of "increased productivity." This involves the rationalisation of teachers' performances through the use of "additional helping factors" such as technical teaching aids and new methods (FD 1969, 25–29).

The position of the teacher therefore came to be challenged, with both pedagogical and economic arguments being advanced. As manifested in the long-term programme, there is a presumption that teaching materials for self-instruction will reduce costs and more generally transform the educational sector from being labour-intensive to capital-intensive (Bull-Njaa 1978, 11). An official report from the Swedish government (SOU 1971) highlights in much the same terms how the increased use of radio and TV might replace teacher-led teaching (Wallin 2005, 448). It is also pointed out that a machine can do a better job of teaching: "It is infinitely patient, for example, it is never angry, it is incorruptibly fair (…)" (Bjerstedt 1963, 16). The result is clearly the diminution of the teacher's position, with authority being partially delegated to "the pedagogical technology expertise" (Dale 1973, 51–52). A new teacher ideal is launched, that of "the teaching engineer", one who is concerned with teaching processes and the design of machines as well as the programming of teaching material (Stolurow 1961, 149).

Together with other more general trends pulling in the same direction, the Sputnik shock has had a clear effect. In the first instance, this concerns the development of modern industrial society since educational technology is linked to ideas of social modernisation. On a more general basis, John Kenneth Galbraith sees technology as the most powerful force in social development (Galbraith 1968). And it is in this symbiosis in the modern industrial state, between belief in progress and optimism on behalf of science on one hand and technological development on the other, which may help to explain why Sweden went further than Norway in adopting the new technology in education. In the eyes of the world, Sweden was the model of the modern industrial state (Sejersted 2004) and, not least, it was the major industrial concerns that led the way. These included Volvo, whose training activities were largely characterised by "a systematic model of work and an organization", which were clearly inspired by educational technology (Wallin 2005, 446). Educational technology came to be part of Swedish societal development and in this context teachers were seen as "the social engineers of the classroom" (Lundahl 2003, 127).

There is a striking difference in Norway where educational technology did not gain the same foothold. The main explanation of Norway's differentness has been the broad cooperation and extensive compromises in the early years following the Second World War with respect to both education and politics in general. This included an educational policy in which student-centred approaches went hand-in-hand with socio-economic arguments (Telhaug 2007). Logically, this should have made the schools less receptive to educational technology. It might also be worth reflecting on as to whether this can partly be seen as a result of a more conservative attitude to modernising education. However, this does not satisfactorily account for the differences between Norway and Sweden. A material explanation may be more

reasonable: Norway was simply insufficiently economically and industrially developed to start using the educational technology.

### Criticism of progressivism – a focus on core subjects

The Sputnik shock lent support to the development of technology-based teaching methods in harmony with the core values of the industrial society. This thrust towards the implementation of educational technology was simultaneously part of a more comprehensive policy for the development of schools. In essence, this took the form of suppressing tendencies towards reform pedagogy or progressivism, of emphasising the need for basic knowledge and skills and of focusing on mathematics, natural sciences and languages. In the years prior to the launching of Sputnik, progressivism had reached a dominant position in the USA (Ravitch 1983). In a situation in which the nation was perceived to be under threat, it was deemed important to put an end to experimentation in schools. A number of ambitious federal initiatives were intended to ensure this. These initiatives were headed by politicians, but other parts of American society were quick to demand results, including parent associations, which voiced dissatisfaction with students' proficiency, and the universities, which reacted because they thought that the intended students had an insufficient level of required knowledge. Voices were heard calling for greater rigour in subject learning, and a "curriculum reform movement" grew in strength that sought to emphasise "the essential core of knowledge", a "precision of language" and "basic concepts" (Harbo 1997). Mathematics, the natural sciences and foreign languages were the subjects given the greatest emphasis since they were the vital areas of knowledge in the battle for the conquest of space. But they also comprised the core subjects in a strategy aimed at building the modern industrial society. The importance of, and the prestige attached to, "the pure and applied sciences and mathematics" totally overshadowed "the arts and humanities". Drama and art were doomed to lose against "an electronic accelerator or a computer center" (Galbraith 1968, 327), and the USA spearheaded this drive, followed by Sweden and, lagging a little behind, Norway.

### Unanimous but limited criticism of educational technology

However, the educational technology of the 1950s and 1960s was greeted with almost unanimous and loudly expressed criticism by radical pedagogical theorists (Løvlie 1984). Erling Lars Dale states that the prevailing view represents "an engineer's understanding of teaching", with the USA and Sweden as its champions (Dale 1973, 26). Jon Hellesnes follows this up and voices strong misgivings, asserting that even "innocent" aid such as an overhead projector can be part of an attempt at rationalisation (1975, 154). Corresponding criticisms are also clearly heard in the USA, with educational technology being seen as a threat to human values and as part of the industrialisation of teaching that excludes any critical or pedagogical reflection

(Bjerstedt 1963). With reference to Swedish debates, Erik Wallin describes "a development from Skinner to Freire, from social engineering to individual considerations, from control to freedom" (2005, 453).

A common thread in this criticism is the tendency to reduce educational technology to a politically-justified technification of teaching. Because of this, critics readily ignored the possibility of educational technology having at least two different implications. First, the concept is associated with the use of teaching equipment and technical aids, while in the other and wider sense the emphasis is on systemic thinking, planning and organising (Bull-Njaa 1978, 6–7). The latter interpretation is almost indistinguishable from a traditional understanding of didactics. This association tends to be underplayed by critics or summarily dismissed as techno-cratic, misanthropic thinking. Rejection is made easier by the dominant political version of educational technology, with its emphasis on productivity and efficiency. But this critical stand tends to overshadow efforts to develop a more pragmatic approach. In an American context, psychologist Jerome Bruner is one of those who urge "a middle way". Bruner underscores the need for systemic thinking and combines this with a clear learning perspective in which the student is central. He does not underestimate the contradicting views, but stresses for his own part that responsibility lies with the teacher, including the use of new technological systems (Bruner 1960). A greater degree of systemic approaches is correspondingly clear in theoretical and didactical reflections in a Scandinavian context (Eriksson 1974; Dale 1974), but attracts little attention.

## A pedagogical intermezzo and teachers as software developers

The dominant educational policy of the 1950s and 1960s was open to criticism, a trend that continued to grow throughout the 1970s. It is possible to see this as part of a radical social change in which reactions to the established industrialised society are expressed. Questions are raised about the basic belief in progress and economic growth (Qvortrup 1998). Protests were heard against centralisation, bureaucratisa-tion, large companies and institutions, which have been described as the dismantling of the social democratic order and a "mind change" in the entire Western world (Sejersted 2005). Erik Wallin argues that the technological approach served as the "prolonged arm of the state" and became a threat to intellectually critical reflection (2005, 451). The age of educational technology was supplanted in the 1970s by a progressivist dialogic pedagogy in both Sweden and Norway (Englund 1992; Løvlie 1984).

In the centre of the international debate on education were British pedagogical theorists (Telhaug 1992) whose ideas were very influential in Scandinavia. At the heart of the prevailing approach was a decentralised model in which schools were almost elevated to the level of research and development institutions since school reform was to be based on critical self-improvement. We see clear evidence of this in

the new National Curricula in Sweden in 1980 and Norway in 1987. The Norwegian curriculum has been described as a "celebration of decentralization" (Solstad 1997, 35) in which teachers are allowed considerable freedom to choose both methods and syllabus, including a basic wish to develop teacher professionalism (Engelsen 2003; Daun et al. 2004).

Similar reflections can be seen as part of the offensive move to introduce computers into schools in the 1980s. The social importance of computer technology was no doubt a major factor, but the first White Paper about "computer technology in schools" in Norway, issued in 1984, allowed considerable room for the teacher's pedagogical craftsmanship. The possibilities and limitations of computer technology were discussed in broad terms, and teachers were presented as key actors defining the premises for the development of new technology, active participants and discussion partners for school management (Haugsbakk 2010). An illustrative example was the development of pedagogical software, which followed the Canadian pattern of a "bottom-up strategy". Teachers played an active role and their ideas and preferences were taken into account (Dahl 2002, 268). A corresponding trend was seen in Sweden as funds were allocated to various local school development projects in which one or more teachers developed pedagogical software. Teachers were involved in explorative projects aimed at finding constructive ways of using computer technology in schools, and a broad approach to technology prevailed whereby the importance of computer technology for people and society, its basic premises and consequences formed a part (Riis 2000a).

## PISA and the new knowledge society

Many of today's debates on educational policy revolve around PISA, which has attracted attention throughout the Western world as a critical external stimulus for change. A common experience of shock over poor test results led to support for a coordinated effort aimed at reforming educational policy in various countries in a manner and scope never seen before. The PISA results helped to focus attention on learning outcomes and learning perspectives more generally, both of which have become key elements in debates at the public and academic levels.

The economic arguments in the educational context clearly came to the fore in the 1990s and were not restricted to developments from the turn of the century, although an important difference is that adaptation to prevailing international trends was seen in sharper focus. Key elements were the initiatives coming from the EU and OECD, with a milestone being the Lisbon Strategy approved by the EU in 2000 with the aim of making the EU the world's most knowledge-based and competitive economy by 2010 (Birkeland 2008). However, many of the basic measures introduced in the wake of Sputnik were repeated, and new technology was also allotted a highly important role in school.

## A digital school in a learning society

Expectations as to what technology could offer in an educational context had risen considerably throughout the 1990s, and in the key planning documents in both Norway and Sweden we find highly visionary ideas of what schools could achieve through the use of information technology (KUF 1994; SOU 1994). From the end of the 1980s, more or less similarly worded national action plans for investment in information technology were drawn up in various countries (Buland 1996), including in Norway and Sweden. Moreover, the schools' plans for implementing new technology were subordinated to these national plans (Haugsbakk 2010). The new element that appears around the turn of the century is that plans for the educational use of ICT more openly become part of an overall political drive encompassing a long list of measures directed at schools. This was to occur in parallel with trends in which social perspectives are increasingly coloured by what are perceived as the distinctive features of a new society, including individualisation and self-realisation as basic premises, the need for flexibility and continuous change. Not least, it concerns how learners are to become responsible for their own learning, while also having expectations as customers in an educational market. This is a society characterised as a learning society in which new technology has a comprehensive role and is integrated into everything we do and in all contexts.

The supreme importance of the new technology is affirmed in the Lisbon Declaration of 2000, which came before the PISA shock. The new post-PISA element is that technology is included in a desired joint policy in which technological visions play a key role, thus helping to sharpen the focus on technology in schools. An important consequence of this can be seen in the Norwegian National Curriculum of 2006 in which the use of digital tools is incorporated as a fifth basic skill in addition to the ability to express oneself orally, to read, to write and to do arithmetic (KD 2006). The Norwegian governmental action plan for the use of new technology in schools states that digital competence is to play a key role in school at all levels and that the "pedagogical use of ICT promotes the learning outcome" (UFD 2004, 19). We discern the contours of a school permeated by ICT at all levels and in all contexts. This finds a clear expression in the vision of a "digital school" in which digital skills and digital competence are hallmarks of the everyday work of students and teachers in consistently positive ways (ITU 2005). This is wholly in line with the OECD's DeSeCo (Definition and Selection of Competencies) report of 2002. The report is the result of a four-year project conducted among the member countries of the OECD, which has become an important common international frame of reference for those working in the field of education. "The ability to use technology interactively" is identified as a key competence (OECD 2005). In Sweden as in Norway ICT is to be integrated into all aspects of the school, and the students shall be prepared for a world permeated by new technology (Jedeskog 2007). The new National Curriculum of 2011 is carefully

based on the EU's identified key competencies, in which "digital competence" is one of eight (Skolverket 2009).

At the same time, it is clearly an instrumental perspective of technology that is being perpetuated. The national planning documents describe a number of new features in teaching, technology and social development, but basically contain a highly traditional understanding of technology. The instrumental perspective finds expression in both the conviction that an investment in technology will ensure better learning results and that this will also contribute to economic development in society at large. Bernt Gustavsson (1998) is among those who have pointed out the similarities between the mechanistic view of knowledge that followed the educational technology in the 1960s and the views that prevailed throughout the 1990s, and this trend has continued. Gunilla Jedeskog (2007) identified basic notions of simplification and increased efficiency in the Swedish national planning documents on ICT in schools, which to a large degree matches the view of technology as expressed in the industrial society and the reform efforts made after Sputnik. It is further rooted in technological optimism, a firm belief in progress and the politicians' ability to handle social development (Haugsbakk 2010; Qvortrup 1998).

## Similarities with the post-Sputnik measures

In the 21$^{st}$ century, the pedagogical applications of new technology, like in the post-Sputnik years, have been given a high priority. As in the 1960s, the arguments in favour of new ICT solutions are given added force by being part of a general and offensive political strategy for the educational sector. A concomitant aspect of this is to strengthen the level of basic knowledge and skills as a reaction to what has been perceived as a school dominated by reform pedagogy and experiments. Mathematics and the natural sciences are seen as the most useful subjects in the drive for growth and development, and languages are regarded as critical to the acquisition of these core subjects. This policy has been followed up in the national curricula in Norway and Sweden, with the Norwegian National Curriculum of 2006 being fully adapted to European objectives (Elstad and Sivesind 2010). Norwegian planning documents affirm that the EU objectives laid down in the Lisbon Strategy "largely coincide with our own" (KD 2009). The OECD also concludes that a common view of, and approach to, education among member countries has been widely developed (OECD 2009). Hence, "accountability" has correspondingly been put on the agenda in European countries (Langfeldt 2008). The new National Curriculum in Sweden in 2011 confirms this impression, but additionally reflects the developments that have taken place in the EU since the Norwegian National Curriculum was launched. The focus has shifted from basic skills to key competencies (Utdanningsdirektoratet 2011).

It is also interesting to look at how the position of the teacher has been depicted. The prevailing views of educational technology in the 1960s foreshadow a reduced role of the teacher whereby the teacher could be replaced by technological solutions

that in some cases are regarded as superior. This view underwent a radical change in the 1980s when the teacher was largely seen as an important agenda-setter for technological development in schools. In present-day rhetoric, this position has shifted once again as there are grounds for asserting that the teacher has been relegated to the side-lines with respect to the use of new technology in schools. Generally speaking, in the Norwegian planning documents the teacher seems to hold the status of a recipient of ready-made solutions emanating from technological experts outside the school. Pedagogical craftsmanship is set aside and the positive arguments for technology are formulated in general and slogan-like terms with no counterarguments (Haugsbakk 2012). A corresponding shift is seen in Sweden from the 1980s, where the teacher has a clearly participative role, to the greater centralisation of responsibility in which the Swedish Knowledge Foundation ("*Stiftelsen för kunnskaps- og kompetensutveckling*" in Swedish) assumes an important role and "beacon projects" are in focus (Riis 2000a, 16). A review of the revised version of the National Curriculum of 1998 underscores how the teacher's role seems to have become "diluted" (Riis 2000b, 26) since key visions and expectations were formulated without any significant participation by the teacher (Fahlén 2000). There is thus reason today to claim that increased faith in technology is concomitant with reduced trust in the teacher, as was the case by virtue of the measures following Sputnik.

However, it is more controversial to assert that a diminished position of the teacher applies more generally in education policy. The prevailing planning documents are seen by some as giving the teacher an enhanced status (Telhaug 2007). This is a complex question because it touches on a wider discussion of what decentralisation implies. However, in an international context, researchers throughout the 1980s and 1990s argued that management by objectives could be seen from the teacher's point of view as an overruling (Covaleskie 1994; Monsen 1996). Decentralisation is therefore not synonymous with teacher influence and, furthermore, the understanding of decentralisation has changed. While from the end of the 1960s to the mid-1980s decentralisation was largely based on the need for democratisation and a belief in bottom-up initiative and renewal, decentralisation measures have later tended to be rooted in the aspirations of central authorities toward the efficiency improvement and rationalisation of the public sector (Karlsen 2006). It is also clear that decentralisation initiatives are being addressed to different parties than in the past. The Norwegian National Curriculum of 1974 primarily had the individual teacher in mind, and the curriculum of 1987 addressed the teaching body in general, while today's curriculum emphasises the responsibility of the school owners (Engelsen 2008). Studies of the general discursive traits in current planning documents have also shown that they contain quite one-sided learning perspectives at the cost of reflections on teaching, few and vague descriptions of the teacher's role and dominant external perspectives

on the school (Haugsbakk 2010). Altogether, there is good reason to claim that the overall position of the teacher appears to have been diminished.

## Prelude to the PISA shock

It is thus possible to deduce a number of similarities in the measures aimed at the educational sector after Sputnik and PISA, although there are also important differences. One of them is that PISA was preceded by a lengthy run-up phase foreshadowing what was to come. The measures warranted in principle by the PISA shock can be recognised to some extent as a continuation of measures implemented throughout the 1990s. As noted above, this largely relates to the drive towards new technology in schools. We must therefore ask why it is that the perception of shock has come to dominate.

In both Norway and Sweden, the elements of reform pedagogy in the 1980s were soon countered by socio-economic arguments (Englund 1992; Telhaug 2007). Partly as a parallel, the catchphrase in the USA was "back to basics" (Harbo 1997), and the OECD issued specific recommendations that an investment should be made in knowledge and education as a basis for economic development (OECD 1989). Margaret Thatcher's 1988 school reform and the 1983 American report on education, *A Nation at Risk*, were part of the same movement (Carter and O'Neill 1995). It was also an important aim of the Norwegian reforms in the 1990s to improve Norwegian competitiveness in the world market (Monsen and Tiller 1991). However, unlike the normal trend in Western Europe the Norwegian National Curriculum of 1997 was characterised by prescribing methods and syllabi in detail, whereas Swedish educational policy followed the prevailing trend of deregulation and decentralisation. In Sweden local authorities were given an increasing amount of responsibility for the planning and administration of public services, including for education. Management by objectives was affirmed by the new National Curriculum approved in 1994, which put an emphasis on centrally defined goals. The role of the central government shifted "from planning the inputs to evaluating outputs" (Miron 1998, 153), and contained within this there was clear market adaptation and openings for privatisation (Svensson 2001).

In contrast to Norway, Sweden has had a long history of tests and international comparisons (Marklund 1992), and followed up the OECD's work in this area into the 1990s. The Norwegian authorities took few initiatives in this direction. It is therefore understandable that the first PISA results evoked more shocked reactions in Norway than in Sweden. The Swedes were more used to this type of ranking (Lundahl and Pettersson 2010). Nevertheless, there is reason to ask questions. Norway participated in the TIMSS study (Trends in International Mathematics and Science Study) in the 1990s, with poor results for Norwegian students. This being so, it is perhaps a little strange that the Norwegian authorities should also have had great expectations from the PISA survey. It may be of interest in this case to

investigate other causes for these shocked reactions, including the role and function of leading media (Elstad 2010). It may also be interesting to see how and to what extent PISA was used as part of a political game. A further noteworthy element is that Norway now participates in all PISA educational tests and is among those with the greatest faith in the OECD's testing and monitoring regime (Sjøberg 2007). With a long experience of this, Sweden evinces a more reserved attitude.

## Concluding comments – New technology as a response to external threats

It is interesting to see how the most coordinated and persistent moves toward the pedagogical use of new technology in recent decades have come about in response to shocked reactions or external threats, and we see clear examples of this after Sputnik and PISA. After an interval of more than 40 years, politicians in Western countries are seen to be taking concerted and surprisingly similar actions in the school sector. These historical examples reinforce the perception that reform in education is comprised of elements in cyclical movements. This takes the form of pendular swings between centralisation and decentralisation, periods in which politicians elect to undertake specific collective interventions and periods in which they leave schools with a greater freedom to manage their own affairs. In certain phases, the education system is incorporated as an active force in social development, while in other periods it is not so much.

From a system theoretical perspective, the unambiguous political interventions in schools can be seen as the political system's attempt to include education in the logic of its own system. Like other differentiated social systems, the education system is a closed and self-referential system, which in theory is intended to function within its own limits. But when the political system experiences threats or challenges, it can react in various ways, including the attempt to form closer links between education, work and productivity (Rasmussen 2004). It is natural to see the reactions to the Sputnik and PISA shock as part of this since in these situations a sense of fear arises that permeates the Western world, finding expression in definable common reactions. In the terminology of Chouliaraki and Fairclough (1999), this may be partially understood as a "colonisation" of the education system. Eric Mangez and Mathieu Kilgers describe a similar trend based on Pierre Bourdieu's field theory, in which they see the development of PISA as "part of a broader transformation of equilibria within the field of (education) knowledge" and as "a move from its autonomous pole towards its heteronomous pole" (Mangez and Hilgers 2012, 190). In this way, academics are subordinated to economic and political interests.

A striking feature that comes to light when comparing the reactions to Sputnik and PISA is how comprehensive the similarities are. To a great extent, this can be seen as a continuance of the ideals of the industrial society, a situation that must be regarded as problematic since the expressed objective is to develop a school for a

new age. There is still apparently an urge to communicate a fundamental belief in objective and scientific truths, in both progress and development. A view of technology is perpetuated which in substantial respects is synonymous with simplification and increased efficiency. By contrast, a new, more distinct emphasis on student and learning perspectives can be said to harmonise with the concept of a new society distinguished by individual freedom and self-realisation. Even so, there are few indications of the increased complexity and challenges that follow these developments. The difficult and uncertain aspects are not thematised; consequently, an insufficient amount of attention is being paid to the dual nature of technology today. On one hand, technology enables us to handle the new complexity, implying in a certain sense a simplification and increased efficiency, whereas on the other hand technology brings more complexity that must be addressed. The core subjects given priority after both Sputnik and PISA are important, but they offer us little help in managing the doubt and uncertainty prevalent in today's society. In addition, they make little contribution to reflections on the questions raised about accepted truths and the dramatic change in society that has taken it from having clearly defined centres to the state of being "polycentric" (Qvortrup 1998). The entire problem lies perhaps in a deficient understanding of what the uniquely new features of the knowledge society and digital technology are, and in such a situation it may be regarded as being the safest to turn to measures familiar from the management of previous crises.

Comparative perspectives are demanding, but may provide new and appealing points of departure for evaluating educational policies. It is interesting to see how the approaches to the pedagogical use of new technology in Sweden and Norway from the 1980s to the present day have predominant and increasingly common traits. The differences with regard to the educational technology in the 1960s can probably best be explained by material factors. Today, however, this may constitute a common explanation of the visionary plans in both Norway and Sweden regarding the practical use of technology in schools. The economic basis has been sound and the political will has been present to a large extent. Now as then, the challenge is how to anchor the use of new technology in pedagogical craftsmanship.

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# Note

1   All translations from Norwegian and Swedish are by the author.

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