The Complexity of Technology Use in Education: After Thoughts

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English abstract

The articles in this special issue address different perspectives on the use of digital technologies in schools, and education more generally. Together these articles highlight the complexity that digital technologies have for teachers, teacher trainees, students and indeed researchers. To understand the role digital technology holds for education requires us to look at the range of pressures: to use technology; the ways in which technology can be used for learning and teaching activities; the impacts of and the potential for digital technologies; and importantly how the use of technologies fits within our understanding of what learning is and how it happens. In this commentary I wish to explore some of these complexities in more detail and suggest possible areas for further research and reflection.

Keywords: Digital technologies, role of the teacher, initial teacher training, design for teaching.
The importance of concepts and theoretical positioning

Crucially, until we really understand how digital technologies relate to teaching and learning we will not be able to make the most of them. Theories of learning have existed as long as philosophers and psychologists have concentrated their efforts on it. The introduction of new tools changes the conceptual understandings we have and the different ways in which we can work. The articles by Lund and Hauge, Olofsson et al. and Haugsbakk all consider the different use of terms and the different meanings these terms then have. For Lund and Hauge, because the term “design” has multiple meanings, coming from different disciplinary perspectives, this then has an impact on the focus and paradigm within which developers, teachers and researchers work. They consider the reconceptualization of the Vygotskian concept of zone of proximal development (ZPD) and this then affects how ZPD can be considered in terms of the use of artefacts by learners and teachers – in the case of digital technologies in the classroom (cf. Daniels 2001: 67). This is important because the Vygotskian approach assumes interaction between the learner and others, artefacts, etc.

Suggesting that how learning with digital technologies and ZPD intersect is a very interesting notion and allows the teacher to use whoever and whatever resources are most appropriate for learners in particular contexts. This allows for a very different approach from those teachers who have different understandings of what learning is and how it is achieved. The difficulty we have is that children learn in and outside of school systems. So who is to say that one approach is better than another, if in the end everyone learns? I would suggest it is of monumental importance that we understand the process of learning in different contexts, with different types of learners, with different purposes. By exploring the difficult concepts of didactics and obuchenie, Lund and Hauge are attempting to harness the vision and power of two different learning cultures that could help us better understand the role design has in developing learning environments and how digital technologies may or may not enhance the learning in some way.

Another interesting element from the same article is the point made that “design for teaching is a teacher’s domain whereas design for learning refers to the joint construction used by teachers and learners” (Hauge, Lund & Vestol 2007). This makes a neat distinction for the division of responsibilities within the classroom. It is the teacher’s responsibility to prepare the lesson and supporting material, presumably on the basis of the curriculum as it is set down by the State. It is the learner and the teacher together who make use of the lesson and material to learn.

Other concepts have historically been undefined or too vague to make sense of. Olofsson et al. point out that the terms uptake and use are as undefined now as they have been over the past 30 years. Does use mean frequency of use or length of use? Does uptake mean access? Not so long ago when research discussed the uptake and use of computers one of the critical factors for use was based on access to technologies. That is one area that is now of less importance to researchers as home access to digital technologies is greater than ever and the availability of access at schools, libraries and other public places is much more embedded.

For policy-makers, politicians, the media, and parents the push is always to improve standards; to have a more educated population. The underlying assumption, since the introduction of the first micro-computers, is that using technology will make us faster and better, and that is seen as a good thing. It has been left to teachers and schools to try to unravel the myth of what aspects of technology might be good for education, and learning in particular. However, in spite of 30 years of research on the use of computers in classrooms we still have no definitive answers. The critical issue of how
technologies are used in the classroom and how such use affects learning outcomes continues to be a major area of research endeavour.

The difficulty is that we see a gap between a theoretical concept or model, which promotes an interactive use of technology in classrooms, and the teachers, schools, and school boards, who are more concerned with examination results. This sometimes leads to a conservative approach to the use of new styles of teaching and learning in the classroom and a restrained use of technology.

How to use technology

A dilemma for teachers and schools is how the technology is to be used. Is it to be a bolted on extra where the curriculum could be delivered and received untouched by technology? Is it to be integrated into the curriculum so that the boundaries between traditional and digital resources are so blurred that each is used as and when it is deemed appropriate by the participants? Is technology to be championed over the use of any other type of resources? The role of technology as it is perceived by the participants (teachers and learners, alike) is as important, I would suggest, as the content to be studied and the assessments to be carried out.

The issue of policy-makers, stakeholders and the learner

There is a real dilemma between the perceived important status of digital technologies in national and school policy documents and the curriculum as it exists. This dilemma is the focus of Haugsbakk’s article as he looks at the changing Norwegian policies on the use of digital technologies in schools over the past 30 years. It is interesting that the Norwegian policies which Haugsbakk refers to all point to a benefit in the use of technologies and an importance in terms of learning. This is similar to the conclusion reached by different countries in other parts of the world. “It [technology] has great potential to enhance student achievement and teacher learning, but only if it is used appropriately (e.g., Cognition and Technology Group at Vanderbilt, 1996; President’s Committee of Advisors on Science and Technology)” (Bransford 2000: 206). Unfortunately, the American policy-makers and stakeholders are not able to tell us how this is to be accomplished. One wonders at the tensions between ascribing to a national policy and at the same time having such large regional differences that make it, at best, impossible or inappropriate to follow through or, at worst, to water down the national policy to too low a level.

Technologies in the classroom and the role of the teacher

Olofsson’s et al. thematic area of uptake and use of digital technologies in schools in relation to policy raises two of the ongoing debates in education. First, what is the relationship between the role of the teacher (and his or her own use of technology) and the requirements of the curriculum, which may, or may not (depending on where you live) include a technological component. Teachers’ roles and responsibilities have changed dramatically in relation to the use of new technologies. On the one hand they are charged with delivering a curriculum, often developed many years previously, and on the other hand teachers must be up-to-date and knowledgeable of what technology might offer and what technologies their students are using. This dilemma puts great demands on teachers continually to update their own technological skills but often to develop new pedagogical skills to best incorporate the use of digital technologies into their curriculum in a meaningful way for the students. This discussion relates directly to the article by Haugerud on the needs for teacher trainees to learn the craft of teaching with and through the use of digital technologies.
Olofsson reports on McGarr’s 2009 Irish study that there is lack of research concerning the disconnect between uptake and use of technologies in school and how this then changes school structures and the theories used to underpin teaching and learning. This is true, not just for researchers in Ireland, but for researchers everywhere.

Using technology in school and at home

One of the interesting findings reported in several studies of in-school and out-of-school uses of digital technologies is that there is a large difference in how young people use technology in school compared with how they report using it out of school (e.g., Facer, Furlong, Furlong & Sutherland 2003; Sutherland, Robertson & John 2009). In school, teachers control young people’s use of technology by specifying both the activity and often the way the activity is to be carried out (e.g., “you will produce a Power Point presentation”). In addition, as most classrooms are governed by a timetable, young people’s use of technology, in school, is often constrained by the length of a class session. This use of technology contrasts with home use where young people are able to choose the application, the length of time they spend on it, the range of tasks they wish to accomplish, and on how they approach them. Studies of home use suggest a much more creative, free-flowing use of technology where the user follows his or her own interests.

Training teachers – the next generation

The needs for trainee teachers to learn the craft of teaching with and through technology are the focus of the articles reviewed by Haugerud. In this review article the author stresses that trainee teachers, and I would suggest all teachers, need to know much more than just the technical skills to use digital technologies. They also need to work fluidly within their subject and classroom context. The more complicated development of confidence and competence is in knowing how to “integrate or combine a technical proficiency with a broader view on how teaching and learning should be conducted”. In many ways what is being suggested here is the need to support trainee teachers to acquire the confidence and flexibility to use technology as and when they feel it is appropriate rather than to use technology because it is expected. Indeed, this brings the circle back to Haugsbakk and the drivers and pressures which schools and teachers feel, not just from national and local policy documents but from parents and the media, generally, which suggest that the more time we spend using technologies the better things will be. The problem is that the “thing” that will be better is never defined.

Summary

What the articles in this special edition show is that using digital technologies for learning requires well-trained teachers, working within technology-rich environments, which encourage them to design learning activities in appropriate ways for the potential of learning to occur within the context of a particular classroom, and without inappropriate or over expectations placed on all participants from governments and other stakeholders. Norway and other Scandinavian countries are often held up as models for the rest of the world when it comes to innovative educational practices, especially for those involving the use of digital technologies. What these articles show is that there is still much work to be done but the questions and issues being addressed by these researchers will have an impact on not just the future of the use of digital technologies in Norwegian schools but on schools and countries around the world.
References


