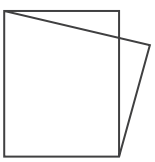
The contemporary faith in educational technology – a critical perspective



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The purpose of this article is to contribute to the discussion about the contradictions between the optimistic faith in improving education through the implementation of technology and the actual realities of educational use of technology. This is done through a summary and overview of the results of three different studies in the field of educational technology that started in 2005 and that is still on going. The aim of these studies has been to contribute to development of a critical perspective on educational technology and thereby contribute to knowledge development about education of today.

There is an inexplicable and excessive optimism surrounding educational technology in that technologies are often viewed as having the capability to solve problems and breathe new life into the educational system (Oliver, 2011). Simultaneously, education policy has been reformed and reworked at a global scale based on a consensus amongst politicians and policy makers that the quality of education is the key to future economic prosperity. Use of educational technology is in many ways intertwined in this argumentation. Digital technology is regarded as a key enabler for the necessary transformation of education needed and is considered a creative experience that in turn has the potential to innovate education. This has also been part of the arguments behind government initiatives and infrastructural school investments in educational technology for the past decades (Bocconi, Kampylis, & Punie, 2013).

The most important finding from the analysis of the articles was the confirmation of what other researchers have shown, namely **"... that research in the field of educational technology is mainly a positive project".**

Researchers in the field of educational technology are also keen to explore possibilities with digital technologies in studies aimed at exploring new and changing opportunities for education and telling stories about the positive influence of technology on education that will be realized in the near future. But, despite more than four decades of research and considerable effort and resources being put in to educational technology there is still a lack of evidence that educational technology meets the optimistic expectations or is capable of enhancing educational standards (Oliver, 2011; Selwyn & Facer, 2013). Moreover, there is also a clear distinction between the optimistic view and the realities of educational technology use in educational practice (Selwyn, 2011b). To make sense of, and understand, the paradox and this contradiction-filled picture and also to contribute to knowledge development in the field has been part of my research interest over the past years. The ambition with this text is to share some of my research results in this area through a summary and overview of three different studies in the field of educational technology that started in 2005 and that is still on-going.

Meta analysis of research of the relations between technology and education

There have been huge investments made through the past 40 years on digital technology in education and on research focussing on this relationship. During this time, and at regular intervals different technologies have promised to deliver a revolution for education. At the same time there is no research showing that this is possible to achieve. This however doesn't seem to significantly affect the positive expectations when the next new technological innovation makes its entrance on the market (Cuban, 2001; Nivala, 2009; Selwyn, 2011b; Selwyn, Gorard, & Williams, 2001). In relation to that I started to wonder about this cyclic nature of educational technology and what the driving force behind this process was? This question was in focus in a relatively broad and structured study of research literature conducted in a large meta-analysis of literature (between 2000-2010) of research in the area of educational technology. The intention was, through a systematic review of research from different schools, to identify patterns and implications with a specific intention to examine the rhetoric around how the rule and nature of technology use in education is constructed by researchers in the field. The result from this study has been presented as a separate paper at a conference in 2011[1] and as a part of my doctoral thesis (Player-Koro, 2012b). The literature review study started with a systematic database search of academic research published in the area of research on educational technology

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to identify articles that in the next step were analysed and categorised. The search resulted in just over 600 articles. A closer examination of the sample revealed that an overwhelming dominance of the articles (about 95%) had its basis in researchers' interest in technologies such as hardware, software and design, and the supposed effects the use of technology could have on learning, teaching and schools. With the use of the categorization made by Oliver (2011), it could be said that the articles in this category were very much built on the idea of affordance – '... the belief that technology shapes society and social practices such as education in some way p.374'. The tale that framed the articles was almost exclusively optimistic and articulated a strong faith in the capability of educational technology to improve and transform education.

Further analysis was made based on a random sample of 100 articles drawn from this category. These articles were read in more detail with particular interest in analysing the optimistic story, or the different discourses that were identified in the texts. Discourse is a theoretical concept that describes linguistic structures expressed in, for example speech, texts and writings that produce and constitute various forms of 'truths'. The analysis made here was in this way influenced by discourse analysis even if discourse analysis per se was not employed (Fairclough, 2003).

The most important finding from the analysis of the articles was the confirmation of what other researchers have shown, namely "... that research in the field of educational technology is mainly a positive project". The analysis showed that the majority of the articles were based on a well-recognised 'general ICT impact' discourse that seems to be the most prevalent discourse in the vast majority of research" (Player-Koro, 2012b p.57). This discourse tells overwhelmingly optimistic stories about the changes that the successful integration of technology in education will bring about. These stories are based on an underlying belief that use of educational technologies will improve teaching and learning, and solve pedagogical and educational problems. The logic behind this argumentation is that technology has built-in properties that will improve learning, which in turn often is related to arguments and conclusions about enhanced teaching and education and the importance to prepare students for 21st-century work and citizenship. In this way the argumentation is intertwined with a 'narrative' about the 'new' information society and assumptions, in line with the so-called Human Capital Theory, that

emphasizes that education has being positively correlated with economic growth and development (Olaniyan & Okemakinde, 2008).
An example where the causal power attributed to technology is evident is, for example, in expressions and descriptions such as 'technology-enhanced learning', 'learning technologies' or a previously used term 'computer assisted learning' (Selwyn, 2011b). Deterministic and positive claims about technology and the improvement of education could also be traced as established by the IT industry, where part of their marketing strategy has been to redefine educational goals and problems in ways that can be solved with the use of new technology (Cuban, 2001; Nivala, 2009; Player-Koro & Beach, 2013; Robertson, 2003; Selwyn et al., 2001).
Moreover, the examination of ten years of academic study of educational technology also made visible another troublesome phenomena in the research field. That is the story of the coming revolution of education that new technological tools will bring about. The history of research on educational technology seems to be a long history of what Gouseti (2010) describes as a well-known pattern '... of hype, hope and eventual disappointment that has characterised the discussion of educational technology over the past 30 years or so' p. 351 (Gouseti, 2010). This pattern typically starts with research studies aimed at focusing on exploring emerging technologies that in the next phase is followed by studies (mostly small case studies) aimed at identifying and exploring immediate effects on the act of learning and that often is based on an optimistic desire for reforming education. In the wake follows bigger studies (ex surveys) noting that despite all the potential opportunities that the technology could bring about, little impact on teaching and learning is actually achieved. This in turn leads to divert attention to studies about implementation and to what is influencing the use of technology in education. Shortcomings are seldom attributed to technology itself but rather to schools', teachers' and students' lack of ability to make effective use of it. When the next technology emerges the cycle starts all over again; the initial excitement for previous tools or applications usually fades away leaving little or no room for critical evaluation of how it may best be used in educational settings (Cuban, 2001; Selwyn & Facer, 2013).
It could be argued that the literature review study showed that the 'general ICT impact discourse' in many ways could be regarded as a dominant discourse. A dominant discourse is characterized by its ability to provide a particular way of understanding and talking about a phenomenon (in this case about the role of technology for teaching, learning and education) while excluding others. The rhetoric often contains arguments that provide idealised solutions to diagnosed problems (Ball, 1990). These kind of dominant mind-sets also affect the ability for dissenting voices to be heard. This is visible in articles where researchers with critical or negative analyzies are ignored by the research field or accused of being 'luddite', 'technophobic' or 'naysayers' (Nichol & Watson, 2003; Rushby, 2005; Selwyn, 2011a).
Taken together, the results from this meta-analysis of literature gave me both the arguments and reasons to scrutinize the technological deterministic and economistic spirit in this dominant discourse.
(1) First by asking if it may be that this picture from research that ends up in disappointment is the result of an unrealistic portrayal of education technology that leaves no room for critical and rational approaches to technology use in education?
(2) Second by asking if the unrealistic expectations actually lessen the chances of successful implementation of educational technology?
Or put in another way, if the picture distributed through the dominant 'general ICT impact discourse' illustrates unrealistic expectations about the effects of technology use rather than an investigation about what really happens in educational practice always risks ending up in disappointment. This may also lessen the chances to see what is actually going on and what benefits and constrains educational technology may have for teaching, learning and education. Because of that an important ambition for me has been try to distance myself from this uncritical optimist-rhetoric and instead focus on what actually happens with teaching, learning and education when teachers and student work in a digital environment with the intention to try to contribute with an analysis of the different and often competing demands and traditions that restricts teachers' structuration of their pedagogical practices.

Traditional education with digital technology

The above mentioned intentions worked as a point of departure in a two-year study of four upper secondary schools

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that have invested in so called 1:1 laptop initiatives. 1:1 laptop initiatives are global activities where every teacher and student who is part of these investments are provided with a digital device for learning purposes and where the digital infrastructure of the schools are expanded. The investments could be seen as the latest of school reforms and an effort in Sweden and elsewhere to push for integration of educational technology in schools.

The overall ambition with the research study was to make visible, describe and analyse how everyday teaching and learning is organised in technology rich schools in order to see how (or perhaps if) education is changed or made more innovative when the school is digitized. Ethnographic methods based on participant observations were used. The data production involved several different data sources that have enabled an analysis through analytical juxtaposition. The various data sources, in which the survey results have been reflected upon in relation to both the analysis of interviews and observations and in relation to theory, have provided a rich picture of both the daily teaching and learning as well as of the context surrounding teaching at the local schools under study.

The main findings from the two years of study in 1:1 schools can be summarised as follows:

1. The results from the survey evidenced that digital technology was frequently used in the classrooms. This can be exemplified with the survey results from 2013 where 201 out of 239 (84%) of the teachers answered that they used digital technology more than once a week in their teaching. 40% used technology on a daily basis and 4 % never used technology (Player-Koro & Beach, 2015).
2. The teachers reported that search features, text production and distribution of educational material and of the computer screen (a new tool shift for communication from black/whiteboard to computer and projector) were the main reason for using technology (Player-Koro & Tallvid, 2015).
3. The learning management system played an important role and was frequently used as an arena to collect, share and disseminate information between teachers and students (Player-Koro & Beach, 2015; Player-Koro & Tallvid, 2015).
4. Another clear finding that was found and verified several times in the different data sources was that teaching and learning was structured in a traditional way, through a fairly conventional regionalisation and appropriation of space. The results from the survey for example showed that both while educational technology was being used and when they were not used in teaching, teaching from the front of the classroom, where the focal point was around the teacher, the whiteboard or the projector, was the most common way of organising the lessons. The second most common way of organising classroom work was through individual work where

students were supposed to work with tasks (Player-Koro & Beach, 2015).

In summary one can say that the 1:1 initiatives have resulted in a high frequency of use of educational technology and that the digital infrastructure is important and frequently used for the organisation of the education. This has also changed some working methods but in many senses these changes are more a replacing of traditional media than a representation of revolutionary changes in pedagogical principles of organisation and communication or transforming educational power relations.

These findings are also in line with previous studies aimed at evaluating 1:1 initiatives that have repeatedly shown a considerable lack of evidence regarding the transformation of education and enhancement of educational standards (Balanskat, Bannister, Hertz, Sigillò, & Vuorikari, 2013; Goodwin, 2011; Larkin, 2011; Tallvid, 2015). A difference between our findings and those of others however, still exists. In other research, the suggestion often tends to be that the full potential of the use of educational technology has not yet been reached, but that it can be (Bocconi et al., 2013). The point in this research has been, as described earlier, to stress the need to look behind the current ways of thinking about technology and contribute to the development of a critical perspective on educational technology. This means, for example, that the use of technology should be analysed and understood in the educational context and in relation to the complex web of policy demands, different expectations and requirements that teachers are obliged to take into consideration. Therefore, we have also, through theoretically informed analysis of interviews and observations in classrooms and meetings, analysed the discourse that appears to structure educational practices with the adaption of 1:1 initiatives.

The main findings from these analyses reveal that technology use in classrooms could be characterized as a form of conservative modernisation in a context of educational reform that is structured by neo-liberal and neo-conservative movements toward high stakes performativity (Ball, 2003). These performativity demands, are clearly pressed on teachers through, for example, the field for policy production in their teaching and learning in ways that could be considered to have highly traditionalising effects. The effects have been such that although the teachers at these schools have a positive attitude towards the use of technology, and despite them stating that digital technology are useful tools in their professional work, they have remained highly traditional in their basic pedagogical perspective and activities. One example of this that was mentioned in focus groups meeting was the new curriculum for secondary school, together with the increasing demand made by national tests. The examination-based performative discourse are what are emphasized the most by the teachers and these demands rather than the infusion of digital technology were what contributes the most to the structuration of their working activities and their planning and enactment of educational activities (Player-Koro & Beach, 2015; Player-Koro & Tallvid, 2015). Additionally, no signs have been given that the use of technologies have played a significant part in education innovation or in a change in their views of education or of education to pupils and for society. This does not mean that teaching has not changed. The point is instead that the introduction of educational technology seems to lack the potential that is often referred to, namely that of transforming education culture and making teaching and learning significantly more effective (Oliver, 2011; Selwyn & Facer, 2013). Indeed, instead IT seems to be used within established power structures and relations that are in practice reinforced not challenged (Player-Koro, 2012a; Player-Koro & Beach, 2015; Player-Koro & Tallvid, 2015). Moreover, the IT-industry have made vast profits from the sale of computer hard- and software to schools in 1:1 laptop initiatives as well as in other similar ventures with the use of a techno positivistic marketing strategy were technology provides schools and education with the solution to educational problems (Player-Koro, 2012a; Selwyn & Facer, 2013).

The involvement of the IT-industry could also be related to the on-going marketization and privatisation of State education that is going on across the globe through a form of private sector involvement consisting of business, social enterprise and philanthropy that operates through global policy networks (Ball, 2012). 1:1 initiative and the past decade's focus on educational technology in educational policymaking are examples of this kind of public to private transformation in education. Redistribution of educational policymaking towards informal policy networks has meant that policy processes have become increasingly diffused and hidden from view. To understand this and what consequences it will have for education has been part of my research during recent years.

Educational technology and the influence of private actors on national educational policymaking

The educational systems have been thoroughly transformed by the new form of governance constituted by policy networks and have shifted from a uniform and centrally regulated educational system to one evidencing decentralisation and deregulation of decision making. Sweden has gone further and faster in these directions than most other countries (Arreman & Holm, 2011; Lindvall & Rothstein, 2006). Global policy networks have been involved. They have involved companies that sell digital equipment and/or training to schools and municipalities as well as to higher education and teacher education. The private sector involvement in state education has been made possible through new policies based on neo-liberal arguments that have opened the door for global edu-business to increasingly enter State education with significant changes in 'how public service and policy get 'done'' (p. 2). Private firms are for instance not only very active in schools, they are also active in selling education products (books, furniture, computers etc.) and other services, including policies. The effects of this are rarely visible in public debate, but are nevertheless both a way to profit from taxpayers and a way to reduce national government's ability to steer their education system, which in turn also affects the values and practice of education. Through these networks new voices and new modes of governance have entered into policy processes (Ball, 2012).

1:1 laptop initiatives could be seen as an example of how this form of neo-liberalism works and has therefore been a point of departure for our research. Two main tasks have been set in the research. The first one focuses on the generation and circulation of some of the key policy ideas. These have been accomplished by mapping the main actors and related sets of overlapping policy networks that join up government, trade unions, and key individuals and e-businesses. The second one has focused on the main discursive elements that flow through these networks. Here we have looked in particular at the driving discourse that describes the problems of schools and teaching and offers solutions for professional knowledge needs in terms of IT-services and consultancy.

The methodological design used in this research is Network ethnography. This is a synergistic research design between social network analysis and ethnography, called network ethnography (Howard, 2002). This methodological approach has also been used in research by Ball (2012) to track and map global policy networks through the Internet. With the use of these methods we have tried to identify, explore and observe relationships and interactions and capture the meaning of community symbols and keywords. In addition, we have used interactions in virtual space to try to understand the culture that is emerging between actors and between politics and organisations. The picture that emerged during the analysis was that educational policy actors in Sweden are and have been strongly connected with the private market of educational technology for decades.

Taken together, the research presented here could be seen as an evolving endeavour of knowledge development in the field of educational technology. Based on these results it could be argued that the specific rhetoric or discourse ('the general ICT impact discourse') that was identified in a meta-analyse of research in the field of educational technology is clearly an economically based discourse that operates in private economic interests primarily. This argument is partly made through studies of educational practices that have made investments in 1:1 laptop initiatives that evidenced how the 'general ICT impact discourse' takes pedagogical discourses hostage in the process of the valorisation of first ideas and then profit. Finally, studies of global educational policy networks made visible how policy actors have important implications for how we think about what educaional technology means for education today. So, in conclusion, we can say that the IT industry has for a long period of time been the driving force behind the optimistic tale about the faith in- and promises of technology. During the past decades they have gained more power due to globalisation and the changing policy landscape. The technology optimistic discourse has in this way become a marketing strategy based on an over-trust in science that shapes policy and public investment in the interests of private corporations. Based on this and in relation to findings in research, our claim is that a process of false marketing has taken place within where technology is claimed to solve problems and create educational change and effectiveness when it doesn't. And it does so in ways that it cannot and as far as we know never has. ◆

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ENDNOTE

[1] Presented at the 2011 ECER conference in Berlin (Player-Koro, 2011).