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Teacher perspectives on ICT: A learning ecology approach

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ABSTRACT

This paper aims to contribute to teacher professional development (TPD) on ICT by exploring socio-cultural factors such as places, activities and relevant others, which constitute teachers' complete sets of contexts that provide opportunities for learning. This set of contexts is defined as "learning ecology". An important aspect of learning ecology is the development over time of how people cope with their learning environment. By result, analysing a person's learning ecology entails investigating the start and development of teachers' ICT use, related beliefs and attitudes, and relevant others influencing this development. Our research question reads: What lessons can be learnt for TPD on ICT from knowledge of teachers' learning ecology, with an emphasis on sparks of interest, beliefs, relevant others, and pathways of participation? This question is answered by biographical interviews that in a narrative manner map life trajectories related to ICT. Following existing research we opted for ICT minded and non-ICT minded pre-service and in-service teachers. The results show the importance of a number of TPD aspects: siblings and friends for the ignition and development over time of types of ICT-use, the importance of informal learning approaches and development of bridging social capital, and the creation of ICT rich social environments. The biographical interview may serve as a tool to find elements in the narratives such as reflection on ICT use, learning trajectories and resulting pedagogical beliefs, which foster TPD.

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1. Introduction

Recently we witness a call for Teacher Professional Development (TPD) on educational use of information and communication technology (ICT) in both research and practice. This call is powered by amongst others, a push of technologies such as tablets, interactive writing boards or online information systems (Twining, Raffaghelli, Albion, & Knezek, 2013). Furthermore, this call is supported by intensive yet diverse use of these technologies among young people (Van den Beemt, Akkerman, & Simons, 2011), and the persisting promise of ICT for education (Laurillard, 2008). This need for TPD goes together with the professional uptake of ICT by teachers lagging behind requirements from everyday practice related to computer technologies (Mumtaz, 2000). The resulting complex demands force teachers to relate to ICT (Twining et al., 2013); a situation they often feel uncomfortable with and that urges TPD on this technology (Kreijns, Van Acker, Vermeulen, & Van Buuren, 2013).

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One strain of research in the context of TPD on ICT reveals teachers' pedagogical beliefs and early experiences as factors in the adoption and use of these technologies (Ertmer, 2005). It is argued that those beliefs and experiences are influenced by broader socio-cultural factors (Twining et al., 2013), such as schooling or family structure. This paper is an effort to add to effective ways for TPD by exploring socio-cultural factors that affect teachers' use of ICT. Understanding these socio-cultural factors influencing attitudes and use of ICT is important because it supports (re-)design of work environments that enhance professional learning (Lohman, 2006).

1.1. Teacher professional development on ICT

This paper defines teacher professional development (TPD) as the process by which teachers acquire knowledge, skills, and values (Hoyle & John, 1995) related to a specific domain, in this case educational use of ICT. This often-implicit process (Hoekstra, Beijaard, Brekelmans, & Korthagen, 2007) is influenced by teachers' preferred learning approaches, such as imitation, peer learning or trial and error (Cassidy, 2004). The effectiveness of these learning approaches can be associated with 'social capital', the benefit from connections with others that may provide useful information or emotional support (Putnam, 2000).

Increasingly TPD is seen as an active, lifelong process characterized by informal, practice-based, reciprocal learning (Clarke & Hollingsworth, 2002; Scheerens, 2010). Specifically for TPD on ICT pedagogical beliefs and experiences (Ertmer, 2005), perceptions and attitudes (Twining et al., 2013) play a role. In this context, research shows teachers' uptake of ICT to be related to available resources, rewards, and a supportive and collegial school culture (Agyei & Voogt, 2014; Mumtaz, 2000; Uluyol & Sahin, 2014). Furthermore, other factors influencing ICT uptake are self-efficacy of teachers (e.g. Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Jamieson-Proctor, Burnett, Finger & Watson, 2006; Teo, 2015), and authentic learning experiences outside school (Valtonen et al., 2015). Similar to preferred learning approaches, teachers' ideas about curriculum and instructional practice influence their educational use of ICT (Ertmer, 2005). Teachers appropriate specific types of ICT according to their knowledge and pedagogical beliefs (Pepin, Geudet, & Trouche, 2013). However, this appropriation is not a unidirectional relation since the possibilities and limitations of the applied tools (affordances) shape the teachers behaviour, and in turn, the tools are shaped reciprocally by teachers (Remillard, 2005).

1.2. ICT minded and non-ICT minded teachers

Diversity in teachers' use of learning resources leads to diversity in giving substance to TPD, and to diversity in beliefs and attitudes related to ICT use (Twining et al., 2013). Research shows that teachers who display pedagogical attitudes directed towards lifelong learning, also make intensive educational use of ICT and feel more confident about their ICT competencies compared to other colleagues (Voogt, 2010). Other studies show a relation between, amongst others, high levels of self-efficacy, open-minded and explorative upbringings, positive beliefs and attitudes toward ICT and high innovation mindedness of teachers (Thurlings, Evers, & Vermeulen, 2015). Starting from the idea of a relation between self-efficacy, learning experiences, relevant others, beliefs, attitudes and adoption of ICT, we interpret this characterization of teachers as a difference between ICT mindedness and non-ICT mindedness. We infer that ICT minded teachers show higher levels of open-mindedness, self-efficacy, beliefs and attitudes compared to non-ICT minded teachers.

1.3. Learning ecology

The scope of our exploration includes school and out-of-school places, people and activities. This complete set of contexts found in physical or virtual spaces that provide opportunities for learning, is also defined as 'learning ecology' (Barron, 2006; Bronfenbrenner, 1979). An important aspect of learning ecology as a concept is the development over time of how people make use of learning resources, for example to obtain ICT skills. Bronfenbrenner (1979) while explaining the concept, explicitly refers to the development of competences to make use of those resources. Furthermore, learning ecology allows for a systemic perspective, including all life domains and associated beliefs (Looi, 2001). By result, analysing a person's learning ecology in this context entails investigating the start and development of teachers' ICT use, related beliefs and attitudes, and relevant others influencing this development.

This approach raises the issue of what methods deliver useful insights when analysing a person's learning ecology. How can the sparks that ignite interest for and first use of specific types of ICT, and the subsequent development ('pathways') of this use be mapped? To answer these questions we need to search for ways to chart changes in a person's learning ecology, which could be useful for advancing theories of learning and have practical applications for assessing the productiveness of educational interventions related to TPD (Barron, 2006). Barron (2006) brings the work by Bronfenbrenner (1979) on learning ecologies into the context of ICT use by proposing a research agenda. This research agenda, evolving around first experience, development and learning approaches related to ICT, might be a possible solution to our questions. Could accounts of the three aspects, first experience, development and learning approaches, be a fruitful approach for mapping ignition and pathways of ICT use? Because surveys lead to a snapshot, could for instance stories of life experiences resulting in narratives be a solution? Subsequently, could the difference between teachers in ICT mindedness guide our exploration of narratives of first experiences and development of ICT use?

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