Computers & Education 90 (2015) 1–12

Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

A case study of developing ICT-supported pedagogy through a collegial practice transfer process

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ARTICLE INFO

Article history:
Received 17 March 2015
Received in revised form 31 August 2015
Accepted 1 September 2015
Available online 7 September 2015

Keywords:
ICT-supported pedagogy
Cooperative/collaborative learning
Elementary education
Improving classroom teaching
In-service teacher training
Case study

ABSTRACT

A collegial practice transfer process between more- and less-experienced teachers was examined in two cases that sought to encourage teachers to use information and communication technology (ICT) in a pedagogically meaningful way. Collegial practice transfer aims to offer new models for in-service teacher training. The process included guiding sessions, training materials presenting authentic pedagogical examples, and try-outs in the classroom. The success of practice transfer was examined through comparing the classroom practices of more- and less-experienced teachers applying the Pedagogical Infrastructure Framework, and through analyzing the tutored teachers' self-reported experiences in interviews. The process provided flexible support and gave self-confidence to the less-experienced teachers. Technology use was successful, but the tutored teachers designed less coherent tasks and weaker support for pupils' collaboration, knowledge construction and metacognition than their more-experienced colleagues. When tutoring, underlying educational ideologies and reasons should be explicated in addition to practical issues of classroom orchestration and technology use.

1. Introduction

Schools and teachers still face major problems in implementing the new digital technology in teaching and learning, in spite of extensive efforts by educational administrations (e.g., EC, 2013; OECD, 2011). There are individual schools in which technology is used widely, and teachers who have updated their pedagogical practices, but the majority of schools and teachers have not adopted new ways of working (Jimoyiannis & Komis, 2007; Orlando, 2009). Technology is still mainly used for supporting traditional teaching methods, such as information sharing, or doing simple exercises (OECD, 2010a; EC, 2013). Advanced pedagogical practices with the new technology do not spread by themselves, technology is often implemented within existing educational structures, methods and curriculum, and technology does not work as a catalyst for educational reforms (Ilomäki, 2008).

Voogt, Fisser, Pareja Roblin, Tondeur, and van Braak (2013) wrote a review about the new expertise that teachers need in order to adopt digital technologies in teaching. They concluded that each educational setting is an intertwined combination of content, pedagogy and the potential of technology; a teacher should master all these domains. Too often individual teachers are asked to make major changes in their teaching with new technology without proper and sufficient support. It is also a

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http://dx.doi.org/10.1016/j.compedu.2015.09.001
0360-1315/

challenge to develop teachers' professional competence through conventional training, because new knowledge and practices are difficult to adopt when separated from the authentic teaching situations (Krumsvik, 2008). In typical ICT training programs for in-service teachers, technology, pedagogy, and subject domain content are studied separately, which does not provide teachers with competencies for integrating them in a successful way into their classroom practice (Hyo-Jeong & Kim, 2009). Karagiorgi and Charalambous (2006) concluded that the pressure to maintain the existing classroom environment and the existing culture is very strong. Wang (2006) and Zhou (2007) stated that one-time-only workshops and hands-on training are not effective in making teachers comfortable with using technology; rather, follow-up programs or mentoring are necessary after the initial training. Teachers would benefit from concrete examples of using ICT in teaching and support should be provided for them in situ in their everyday classroom situations (Condie, Munro, Seagraves, & Kenesson, 2007; Putnam & Borko, 2000).

In order to find new methods for in-service teachers' ICT training, a European-level project Fostering ICT Usages in Pedagogical Practices (FICTUP; see http://www.fictup-project.eu) was created to advance the usage of ICT as a pedagogical tool across different context and subjects. In the project, a practice transfer model was applied, where experienced teachers supported their less-experienced colleagues in implementing digital technologies in their teaching through authentic examples and guidance. The main aim was to disseminate pedagogical practices, which are based on experienced teachers' well-tried and cultivated practices, which represent ambitious pedagogical approaches, and which are closely linked to the pedagogical objectives of the school in question. In the present study, the practice transfer model was tested in two case studies in Finnish elementary schools.

1.1. Teacher collaboration and sharing of expertise as means for developing ICT-supported pedagogy

Fogarty and Pete (2010) listed features that are important for successful professional learning of in-service teachers: the development practices should, e.g., be job-embedded (everyday support in the workplace available), collegial (professional collaboration), interactive (active involvement and hands-on activities) and practical (connections and applicability in everyday work). In a national innovation project for Dutch teachers, Bakkenes, Vermunt, and Wubbels (2010) found that teacher learning and experiments in practice go hand in hand, and that informal learning did not bring as positive results as organized learning, especially reciprocal working with a peer or a collaborative project team. Jones and Vincent (2010) reported results from two projects where teachers were supervised by colleagues mentoring the use of Interactive White Boards (IWBs) in their teaching. The results from the projects indicated that the support from the peer mentor helped to reduce the teachers' fear of the technology and its unexpected consequences in the classroom.

Starkey (2010) sought to identify what were the barriers and enablers influencing the integration of digital technologies into teaching by digitally able newly-qualified teachers. According to the results, crucial influential factors in the school context included: school policies and structures which promoted and provided access to digital technologies, encouragement to new teachers in developing their sense of agency, and the support of a mentor with relevant pedagogical content expertise.

Collegial collaboration practices are not relevant only for supporting professional learning of individual teachers. When aiming at more profound and sustainable change in the quality of teaching through ICT, teachers in the same school should share knowledge, experiences and best practices as well as create new innovative pedagogical methods together. Schools should create deliberate visions and strategies about using ICT as well as encourage the collaboration and engagement of the teaching staff in the development work (OECD, 2010b). Application of the practice transfer process investigated in the present study is one effort to find effective ways to promote pedagogical development work and disseminate pedagogical ICT-related innovations inside a school.

1.2. A framework for examining pedagogical practices in the classroom

In the present study, the success and challenges of practice transfer are evaluated by examining how the participating more- and less-experienced teachers designed and conducted a pedagogical unit with ICT, complemented by their own reflections on the process. Because teachers' own descriptions or self-reflections often give an incomplete or too positive view of their pedagogical methods, we chose to examine authentic classroom practices with pupils. We believe that it would better reveal how the less-experienced teachers adapt and implement the practices they have been introduced to by the more-experienced teachers.

A teacher's task in technology-rich collaborative settings is both to 1) establish the underlying educational conditions for the collective effort (*overall design*), and, 2) to participate in the working process as a guide who provides adapted, situation-specific guidance to the learners (*scaffolding*) (Lakkala, Muukkonen, & Hakkarainen, 2005). In the present study, both the overall design and the scaffolding practices in the classroom were included in the analyses.

In pedagogical practices that include the rich use of technology and activities that rely on the students' active engagement and collaboration, the examination of the educational setting requires taking an overarching perspective on the pedagogical set-up. The requirement to take the complexity of such learning settings into account in educational research has been stated by various researchers (e.g., Puntambekar, Stylianou, & Goldstein, 2007; Scardamalia & Bereiter, 2006). In the present study, we apply the *Pedagogical Infrastructure Framework*, which has been developed for describing the central elements in the teachers' pedagogical practices representing technology-enhanced, collaborative knowledge creation (Lakkala, Ilomäki, & Kosonen, 2010). The idea for using infrastructure as a metaphor is adopted from studies emphasizing how the orchestration of collaborative learning is *indirect*, that is, setting up background conditions for social and cultural practices but not