

Student Teacher ICT Use: Field Experience Placements and Mentor Teacher Influences

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Prepared for the OECD ICT and Teacher Training Expert Meeting

Paris, France, October 2008

As more technology is placed in school classrooms, the need for knowledgeable teachers to use these tools effectively becomes a pressing issue. Preparing future teachers who know how to integrate effective use of information and communication technologies (ICT) in their curriculum remains a challenging goal for teacher preparation programs. Teaching with new and emerging ICT is a complex task. Recent frameworks have identified that teaching with technology is much more than simply using computers for instruction. Effective technology integration in learning activities demands an understanding of how ICT tools relate to content area topics and pedagogy. In addition to pedagogical content knowledge (PCK), student teachers need opportunities to begin developing technological pedagogical content knowledge (TPCK) to understand what technology to use, when to use it and how to use it to support student learning.

In addition, recent revisions of National Educational Technology Standards for Students (NETS for Students 2007) and Teachers (NETS for Teachers 2008) have "raised the bar" for effective technology use from an emphasis on basic productivity skills to development of creativity and innovation, communication and collaboration, research and information fluency, digital citizenship, critical thinking, problem-solving, and decision-making with ICT. It is no longer enough to simply teach word-processing, Internet searches or presentation skills. Students need to acquire digital age literacy skills and learn how to responsibly use technology as a learning tool for acquiring content area information, solving problems, sharing knowledge, creating original works and innovative ideas, cultivating higher-order thinking, developing global awareness, and communicating and collaborating on learning tasks with multiple audiences beyond the classroom walls.

As higher education faculties work collaboratively toward integrating these skills with ICT throughout their courses, key areas of concern are the field placements where student teachers have opportunities for practical experiences in school classrooms. Field experiences are critical periods in teacher preparation (Guyton & McIntyre, 1990). They offer valuable junctures where preservice students can connect and explore the relationship between theories learned in university courses and the reality of classroom practice. In particular, the student teaching field experience is a critical component in the preparation of student teachers as means of establishing ICT practices they will use in future settings (Strudler, McKinney, Jones & Quinn, 1999). The experience provides a hands-on opportunity for student teachers to put what they know into action as they transfer, apply and refine the theory they have learned into lessons for their students. It is in this critical pe-

riod that they construct their understanding of teacher practice. Careful selection of these sites and the mentors who will work with the student teachers should be a prime concern in teacher preparation programs; for within these placements, the technology contextual factors and the mentor teacher influences are pivotal pieces that determine whether or not student teachers gain experience in teaching with ICT.

The purpose of this paper is to provide insight into those aspects using a "black box" metaphor to examine portions of the "inner workings related to ICT use" that occur during field experience placements and affect student teacher use of ICT tools. It is not intended as a comprehensive review, but rather a focused look at selected research with specific data from students who have completed their student teaching field experience. For it is in listening closely to the voices of the student teachers that we can identify factors that enable or disable (Bullock, 2004) their use of ICT during development of their teaching practice. Culling from these studies there are several recurring factors that directly impact student teacher use of ICT during their experience and warrant further investigation while providing direction for questions we should be asking. The following sections address technology contextual factors and mentor teacher influences.

Technology Contextual Factors

The aspects of field experience context that relate to ICT in teaching exhibit a complex interactive relationship among a variety of factors such as access to tools, support systems and participants. Each student teaching placement is a unique context. Two experiences in the same school can be quite varied, resulting in different outcomes for student teachers' ICT use in teaching (Bullock, 2004). Technology practice is affected by general contextual factors that influence use such as access and support for ICT tools, and the support and guidance from the mentor teacher. While survey data can provide a broad overview and descriptive information on the number and types of ICT tools that are available at various sites, it is limited in providing specific information on how and when those tools are used at the site. We know from research that the technology context at those sites does affect whether student teachers use ICT in their teaching (Bullock, 2004; Dexter & Riedel, 2003; Grove, Strudler & Odell, 2004). Several key technology contextual aspects noted across studies are: an expectation to use technology during field placements, access to ICT tools, and technical support.

Expectations to Use Technology

While we would like to assume that all student teachers would want to use ICT during their student teaching, it can be overlooked unless there are clear expectations for ICT use in content area lessons. In a surprising finding of a survey with 210 students, 30% noted: "They were neither required nor expected to use technology" (Dexter & Riedel, 2003). Another study indicating that many mentor teachers still do not have adequate technology skills noted that if student teachers are not empowered to use technology skills they may not use them (Willis & Sujo de Montes, 2002). Student teachers who believe they are not adequately prepared may view it as an unfair additional challenge (Bullock, 2004). So establishing clear expectations for ICT use whether by university faculty,

a university supervisor, the mentor teacher or a combination of sources is a factor that needs to be identified.

Access to ICT Tools

Insufficient access to ICT is clearly noted as an obstacle preventing successful implementation of technology (Kay, 2006). Student teachers have noted that access and age of computers were a hindrance to successful integration (Doering, Hughes & Huffman, 2003). Access levels can vary greatly across sites. Configurations can include from one or several computers in a classroom, access to a portable laptop cart for classroom use or access to a computer lab in the building. Student teachers with a single computer in the classroom noted development of personal productivity skills such as keeping grade books, lesson planning and delivering presentations but few opportunities to develop, and learn how to facilitate lessons that involved student use of technology with content-area topics (Dexter & Reidel 2003; Grove et al., 2004), while those with access to computers during class noted higher frequencies of their students' use of technology (Grove et al., 2004).

Technical Support

For student teachers who may be unfamiliar with new labs, new tools, or different software versions, providing technical and instructional support is a key factor for successful integration of technology (Bullock, 2004; Dexter & Riedel, 2003; Doering et al., 2003; Grove et al., 2004). While student teachers may have good personal productivity skills, their knowledge of how to use ICT for instruction is often limited. Technical support for instructional use can come from cooperating teachers, other on-site personnel, or university resources. One study noted that instructional support was a significant predictor of whether or not student teachers had their K-12 students use technology (Dexter & Riedel, 2003)

Mentor Teachers

Mentor teachers are an important link in the process for developing 21st century teachers. Their beliefs and actions have direct impact on what student teachers do and learn during their field experience. They provide guidance in terms of pedagogy and "real world" classroom experience (Kay, 2006). Doering, Hughes, and Huffman (2003) identified the student teacher's placement with a mentor teacher as a "crucial cog" in the preparation of student teachers to use ICT in teaching. The mentor teacher's technology skill level, ability to model technology-integrated lessons, and support for and during student teacher lessons with ICT (Grove et al., 2004,) are salient factors that can enable or disable a student teacher's use of technology (Bullock, 2004). Students placed with mentor teachers who do not use technology can be hindered in their efforts to integrate technology (Doering et al., 2003) or even motivated not to use technology (Willis & Sujo de Montes, 2002).

One of their most valuable tasks is mentoring student teachers and helping them connect use of appropriate ICT tools to support student learning of content area topics (Grove et al., 2004). The situation is compounded because many student teachers have not experienced learning content area subjects with these new and emerging ICT tools during their childhood education so they have not traditionally learned processes or approaches for *learning how to learn with ICT*. In addition, their models of teaching drawn from those experiences as students do not entail scenarios of how to use ICT in the instructional process (Russell, Bebell, O'Dwyer & O'Connor, 2003). Thus, the technology skills, ability to model technology integrated lessons, quality of technology mentoring, and support from the mentor teacher are important influences in determining future student teacher teaching practice with ICT (Bullock, 2004; Doering et al., 2003; Grove et al., 2007).

Summary

Preparing student teachers to use ICT in teaching is clearly a complex process with a myriad of factors interacting to impact the outcome. It is clear that greater collaboration is needed between teacher preparation programs and their school district partners that provide field experience settings and mentor teachers in order to identify factors for optimal placements for student teachers so that they will learn to teach effectively in digital classrooms. In addition, greater collaboration can result in implementation of joint ICT development projects such as: a) developing communities of technology-using teachers in urban schools (Radinsky, Lawless & Smolin, 2005), b) creating teams of university faculty, clinical faculty and preservice teachers to explore and develop effective uses of ICT in K–12 classrooms (O'Bannon & Nonis, 2002), or c) supplementary virtual field experiences using video conferencing (Karchmer-Klein, 2007). Clarifying our current international status regarding ICT in initial teacher preparation is a welcome step toward improvement.

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