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TEACHERS' AND STUDENTS' UNDERSTANDING AND USE OF ICT FOR TEACHING AND LEARNING – COMBINING DIFFERENT PERSPECTIVES AND METHODOLOGIES IN RESEARCH ON TECHNOLOGY-ENHANCED LEARNING

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More than half of the 14,000 students currently studying at the University of Gävle (HiG) are enrolled in courses that are totally or partly online based. In 2015, a university-wide project on technology enhanced learning (TEL) (Steffens et al., 2015) was initiated. The project focuses on course and programme development and is divided into four sub-projects, all of which contribute to the overall goals of project.

AIMS of the project

The aims of the project are to: (a) restructure teaching facilities and integrate digital technologies, (b) develop technology supported teaching methods, (c) integrate campus and distance education, (d) enhance teachers' and students' digital skills and (e) increase collaboration with relevant external actors.

These aims are achieved through the work of four project groups.

The *digital environment group's* (1) main focus is on digital tools for learning and the physical arrangement of learning spaces. The *collaboration group's* (2) main focus is on the maintenance and development of collaborative relationships and connections with communities in higher education for e-learning. The *education and professional development group* (3) focuses on issues such as professional development, learning design and the implementation of ICT in different courses and subjects. The *research group* (4) focuses on different issues connected to TEL.

One of the main principles of the project is that the above areas are interlinked and interdependent and that the different experiences and skills of each group and its members contribute to a broader perspective of TEL.

This poster focuses on the research conducted by the project's research group. Taking a multidisciplinary approach, the research focuses on issues and aspects of teaching and learning in higher education that contribute to multifaceted knowledge. The overall aim of the research is to generate knowledge about how conditions for teaching and learning change

when the use of technology increases. The four research studies that are initiated are described below.

Study 1: Lecturers' and students' agency in encounters with digital media in higher education

This research study focus on issues related to lecturers' digital teaching practices and students' digital technological use in their everyday lives and for learning purposes.

Digital practices are defined as the different contexts in which lecturers teach and students participate in digital media (such as learning management systems, forums, communities etc.). Previous research shows that students' own digital practices are not always made use of in higher education (Buzzard et al., 2011; Kelm, 2011).

A controversial issue in the Swedish higher education context is the discourse on students as customers. The perception of students as customers and "buyers" of ready-packaged content from lecturers is problematic. This view of what higher education stands for clashes with traditional academic views emphasizing critical thinking, reflection, self-directed learning, collaborative and individual learning etc.

In this study, the concept of agency is important in that it reflects "the capacity of actors to critically shape their own responsiveness to problematic situations" (Emirbayer & Mische, 1998; p.971). In the different perceptions of students' and lecturers' tasks and roles in teaching and learning, especially in TEL, all the actors have to display agency in order to manoeuvre in the educational and digital contexts. Notably, agency is not something that people have, but is something that people achieve (Biesta & Tedder, 2006).

Aim

The aim of the research project is to study: (a) students' use of digital technology in their everyday practices and in relation to teaching situations and (b) how lecturers' agency is played out in teaching and learning when trying to facilitate TEL.

Methodology

In spring 2017 an online survey involving up to 200 students will be conducted in order to generate knowledge about (a) students' everyday experiences of digital practices and how these are utilized in higher education and (b) how higher education challenges and develops students' digital skills and knowledge. In the same period, interviews with lecturers at the university will be conducted in order to generate knowledge about lecturers' (c) everyday teaching practices with digital technologies and (d) the perceived challenges and development of teaching in relation to their use.

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Study 2: Teachers' understanding and enactment of practice in online and blended educational contexts

The knowledge that teachers need to develop is referred to as a "didaktik" knowledge in the German/European tradition (cf. Kansanen 2009) and as pedagogical content knowledge (PCK) in the Anglo-Saxon literature (Shulman, 1986; 1987). However, in what Castells (2011) describes as a network society, teachers are faced with new challenges and opportunities. Koehler et al. (2014) argue that teachers' development and integration of a new knowledge domain is not simply a matter of adding this "technology knowledge" to existing knowledge, but involves a reframing and reconceptualization of their existing professional practices and knowledge. They refer to this amalgam knowledge as technological pedagogical content knowledge (TPACK). The TPACK framework has been widely accepted as a useful theoretical construct. However, there is a need for research on the development and manifestation of TPACK in different disciplinary contexts (Koehler et al., 2014).

Aim

The aim of this sub-project is to study: (a) how teachers reframe and reconceptualize their practices and the kind of knowledge that is needed in online contexts (b) how teachers practices are manifested when ICT is used to create (intended) added pedagogical values in educational designs (c) the characteristics of educational designs regarded as adding pedagogical value

Methodology

Three higher education teachers of different courses and subjects in three different departments participate in the study. A design-based research approach is applied, where one of the participating researchers engages in so-called design conversations with the teachers. As is characteristic of DBR, this researcher does not only observe and interview, but also acts as a "co-designer" on the understanding that the teachers are the context experts and the final decision makers (McKenney & Reeves, 2012; Plomp & Nieveen, 2013).

The data consists of recorded design conversations, educational designs and the artefacts used in the educational designs, the researcher's/co-designer's field notes and recorded "field-note conversations" between the researcher/co-designer and the other researcher.

Expected outcomes

The study is expected to contribute knowledge about how teachers' knowledge and practices are understood and manifested in online and mixed higher educational contexts.

Study 3: Researching and developing student nurses' drug calculation skills in an explorative design comprising digital technologies

This study is partly experimental in nature. It focuses on the challenges involved in student nurses' development of accurate drug calculation skills. Challenges like this are not specific to

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nurse education at the University of Gävle, but appear to be universal (cf. Wright, 2009). However, it has also been claimed that written drug calculation tests do not accurately evaluate the skills involved in drug calculation, in that they are decontextualized from healthcare settings (Wright, 2005; 2012). It has also been claimed that this problem is more imaginary than factual, given that in practice nurses have been shown to handle drug calculation well (Wright, 2009).

Aim

The aims of this sub-project are to: (a) deepen the understanding of the challenges and mistakes that student nurses make in drug calculation exams, why they occur and how they might be prevented, (b) explore how the teaching and examination of drug calculation can be made more effective and contextualized and whether digital technologies can help in this.

Methodology

A multiple design method is employed using empirical data from written examinations, analyses of the set tasks and interviews with student nurses.

Expected outcomes

It is expected that the study will contribute knowledge about why (some) student nurses find it difficult to pass exams and that sufficient knowledge will be developed to facilitate the exploration of an experimental design for teaching and learning that includes digital technologies.

Study 4: Situating ICT in teacher education programmes at the University of Gävle

Integrating ICT as an integral part of teacher education programmes has been addressed as the most significant factor in determining the future level of ICT use in teaching and learning practices (Davis, 2010). According to the Swedish Higher Education Act, ICT should be embedded across entire educational practices in teacher education programmes (Government Bill, 2009/10:89). Numerous teacher education programmes have made extensive efforts to prepare and empower teacher education students' ICT competences so that ICT-based technologies are seamlessly woven into the teaching and learning process. Most schools try to enhance teachers' digital competences by in-service education and expect newly qualified teachers to be adequately trained to use digital technologies in their educational practices. However, in reality it would seem that many newly qualified teachers do not have the necessary skills for this (see Chigona, 2015; Koehler, Mishra, Akcaoglu, & Rosenberg, 2013).

Aims

This study focuses on understanding why a large number of the newly qualified teachers in teacher education institution remain underprepared to use digital technologies in their

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educational practices, despite an increased investment in the provision of digital technologies in these institutions.

Methodology

In order to explore how digital technologies are integrated into teacher education in higher education institutions, a sequential explanatory multiple sources design consisting of two distinct phases will be implemented (Creswell, 2012). In this design, a number of course syllabi in a programme will be analyzed. Interviews with key actors, including students, teacher educators and gatekeepers, will be conducted in order to contextualize and deepen the analysis of the syllabi.

Expected outcomes

The study is expected to deepen the understanding of how student teachers are pedagogically trained in ICT in teacher education institutions.

Concluding remarks

The four research studies in the project investigate how students and teachers understand and use educational ICT. This is done by using different methodologies and from different perspectives. It is expected that the research studies will contribute to the broader and more inclusive project perspective by their specific aims and generate knowledge that will contribute to the multifaceted field of TEL.

References

1. Biesta, G., & Tedder, M. (2006). *How is agency possible? Towards an ecological understanding of agency-as-achievement*. Working paper 5, Learning Lives: Learning, Identity and Agency in the Life Course. University of Exeter, England.
2. Buzzard, C., Crittenden, V. L., Crittenden, W. F., & McCarty, P. (2011). The Use of Digital Technologies in the Classroom: A Teaching and Learning Perspective. *Journal of Marketing Education, 33*(2), 131-139.
3. Castells, M. (2011). *The Rise of the Network Society: The Information Age: Economy, Society, and Culture* (2nd ed., Vol. 1). Malden, MA: John Wiley & Sons.
4. Chigona, A. (2015). Pedagogical shift in the twenty-first century: Preparing teachers to teach with new technologies. *Africa Education Review, 12*(3), 478-492. doi:10.1080/18146627.2015.1110912
5. Davis, N. (2010). Technology in Preservice Teacher Education. In P. Peterson, E. Baker & B. McGaw (Eds.), *International Encyclopedia of Education* (3rd ed., pp. 217-221). Oxford: Elsevier.
6. Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology, 103*(4), 962-1023.

ISBN 978-615-5511-18-9

7. Kansanen, P. (2009). The curious affair of pedagogical content knowledge. *Orbis Scholae, 3*(2), 5-18.
8. Kelm, R. (2011). Social Media. It's what students do. *Business Communication Quarterly, 74*(4), 505-520.
9. Koehler, M. J., Mishra, P., Akcaoglu, M., & Rosenberg, J. (2013). The technological pedagogical content knowledge framework for teachers and teacher educators. In R. Thyagarajan (Ed.), *ICT integrated teacher education: A resource book*. New Delhi, India: CEMCA.
10. Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 101-111). New York: Springer.
11. McKenney, S., & Reeves, T. C. (2012). *Conducting educational design research*. London: Routledge.
12. Plomp, T., & Nieveen, N. (Eds.) (2013). *Educational Design Research: Introduction and Illustrative Cases*. Enschede, Netherlands: SLO Netherlands Institute for Curriculum Development.
13. Regeringens proposition, (2009/10:89) Regeringens proposition 2009/10:89 om lärarutbildning m.m. [Government Bill, 2009/10:89 regarding teacher education etc.] (Stockholm, Gotab) (in Swedish).
14. Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*, 4–14.
15. Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*, 1–22.
16. Steffens, K., Bannan, B., Dalgarno, B., Bartolomé, A. R., Esteve-González, V., & Cela-Ranilla, J. M. (2015). Recent Developments in Technology- Enhanced Learning: A Critical Assessment. RUSC. *Universities and Knowledge Society Journal, 12*(2). 73-86.
17. Wright, K. (2005). An exploration into the most effective way to teach drug calculation skills to nursing students. *Nurse Education Today, 25*, 430–436.
18. Wright, K. (2009). The assessment and development of drug calculation skills in nurse education – A critical debate. *Nurse Education Today, 29*, 544–548. doi: 10.1016/j.nedt.2008.08.019
19. Wright, K. (2012). Editorial. Drug calculation skills – Are we running scared? *Nurse Education Today, 32*(8), 838. doi: 10.1016/j.nedt.2011.06.001

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