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Frank G. Bate

University of Notre Dame Australia, frank.bate@nd.edu.au

Dorit Maor

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## **TPACK and the real world: How useful is the framework?**

Frank Bate  
Senior Lecturer, School of Education  
University of Notre Dame  
[frank.bate@nd.edu.au](mailto:frank.bate@nd.edu.au)

Dorit Maor  
Senior Lecturer, School of Education  
Murdoch University  
[d.maor@murdoch.edu.au](mailto:d.maor@murdoch.edu.au)

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### **Abstract**

This short paper describes a recent longitudinal study set in Australia which examined the extent to which early career teachers used information and communication technologies (ICT) in their classrooms. The study, which tracked 35 teachers through the first three years of their teaching, found a range of personal and socio-cultural factors that impacted on the extent to which ICT was used. In addressing personal factors such as teachers' beliefs, knowledge and skills, the research drew upon the work of Mishra and Koehler (2006) to consider the inter-relationships between teachers' technological, pedagogical and content knowledge (TPACK). The use of TPACK as an analytical framework was at the same time insightful and perplexing. This paper reflects upon the usefulness of TPACK in making sense of how two of these 35 participants used ICT.

### **Introduction**

Teachers constantly engage in pedagogical reasoning processes to create learning experiences that are of value to their students (Shulman, 1987). Through pedagogical reasoning teachers combine their knowledge of how students learn with content-specific knowledge, the synergy of which creates learning environments that are in tune with the particular needs of their students. This in itself is a great challenge (Maor, 2006). However, the emergence of networked and mobile technologies suggests that teachers are also required to acquire a level of technological competency to make connections with contemporary students. This adds complexity to teachers' pedagogical reasoning processes (Webb and Cox,

2004; Mishra and Koehler, 2006). This paper explores these ideas, discussing the extent to which two research participants (both primary school teachers) combined their technological, pedagogical and content knowledge in practice. The paper also considers how students in these classrooms actually used ICT to enhance their learning.

## **Research procedure**

The study used a mixed method approach in response to seven research questions that focused on the knowledge, beliefs, dispositions and skills of participating teachers. Both qualitative and quantitative techniques were adopted over a three year period. These techniques included a questionnaire that was administered at the inception and conclusion of the research (n=35 and n=20 respectively), annual semi-structured interviews (n=56) and classroom observations (n=30). Broadly, the questionnaire focused on pedagogical beliefs; interviews centred on how pedagogical knowledge, ICT dispositions and skills contributed to student learning; and observations examined pedagogical approaches to using ICT in the classroom including how participants overcame various technical and administrative barriers. The combined result of the research method was a rich data-set that provided strong evidence on how early career teachers applied their technological, pedagogical and content knowledge to their classroom context. This paper discusses the experiences of two participants - Nick and Rashmi.

## **Findings**

In year 3 of the study, when asked *what knowledge is required for effective teaching*, 84% of participants replied in terms of either pedagogical knowledge (46%), content knowledge (28%) and/or knowledge of student needs (10%). Technological knowledge does not appear to have been on the radar of early career teachers. Nick and Rashmi, for example, made no distinction between technological knowledge and pedagogical knowledge with the former generally being likened to a “tool” that could be used as part of a teacher’s pedagogical arsenal. Whilst Nick generally adopted student-centred approaches to using ICT in the classroom, passing the locus of control to students themselves, Rashmi was more inclined to use a teacher-centred style typically using ICT in whole-of-class sessions to present information or to play games/quizzes. Both teachers felt that their use of ICT was carefully thought-out, responsive to the needs of their students, and (importantly) in tune with TPACK.

## **Significance of the study**

The study found difficulties in applying TPACK to the real world of teaching and learning. For example, the underlying beliefs that teachers held about teaching and technology tended to shape their knowledge and action. In much the same way as we would not expect a reading of *The Lord of the Rings* to change our beliefs about the existence of hobbits, teachers in this study only developed new knowledge of ICT within the context of their beliefs. Certainly for Nick and Rashmi, pedagogical beliefs were found to be fundamental to the way in which their knowledge and use of ICT found expression. Teachers also did not differentiate between technological and pedagogical knowledge. Cox and Graham (2009) see technological knowledge as temporary, morphing into pedagogical knowledge as an emerging technology becomes ubiquitous. However, many teachers are unaware of emerging technologies. Distinctions between emerging and embedded ICT are also highly contextual.

## **Conclusions**

This research found that early career teachers hold a wide variation of beliefs, knowledge, perceptions of what ICT is, and how these can be harnessed in the classroom. The TPACK framework has gained much attention in the educational literature and has added sophistication to educational design including how student learning can be optimised through synergising important knowledge-types. The focus on the overlap of these knowledge-types has been particularly useful. This paper attempts to build upon and strengthen TPACK by making a case for (a) greater specificity on what constitutes technological knowledge and (b) consideration of teachers underlying pedagogical beliefs in the model. The usefulness of the TPACK framework in the ongoing professional development of teachers depends, to a large extent, upon an understanding of what technology is in the eyes of the teacher, and how the use of technology is expressed within a teacher's belief system.