

THE ROLE OF COMMUNITY IN TEACHERS' KNOWLEDGE DEVELOPMENT

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Abstract

Technological, pedagogical and content knowledge (TPACK) provides a theoretical lens which attempts to identify the nature of knowledge required by teachers for technology integration in their teaching. While there have been hundreds of studies that have used TPACK to examine what teachers need to know about technology as part of their classroom practice, including the nationally funded teaching teachers for the future (TTF) project, there has been little research specifically on the processes that underpin this knowledge acquisition, especially relating to in-service secondary teachers. This paper describes TPACK and argues that academics have been calling for research into the processes of acquisition for over a quarter of a century. The paper then proposes how the situated learning theory of Communities of Practice may provide a more nuanced understanding of the factors influencing teachers' TPACK acquisition through their socially mediated relationships with colleagues.

Introduction

This paper has its genesis in a current PhD study examining the role of community in teachers' knowledge development. As part of the data collection phase of this investigation, the researcher observed a professional development (PD) session that was designed to introduce new practices to teachers in a Victorian secondary school. Led by an experienced teacher newly appointed to the school, the PD session presented a variety of methods to incorporate digital technologies to enhance the representation of information as part of teaching practice in conjunction with terms or catch phrases for each of these methods. The session was accompanied by a PowerPoint presentation with visual representations of each method and examples of how these could be incorporated into classroom practice.

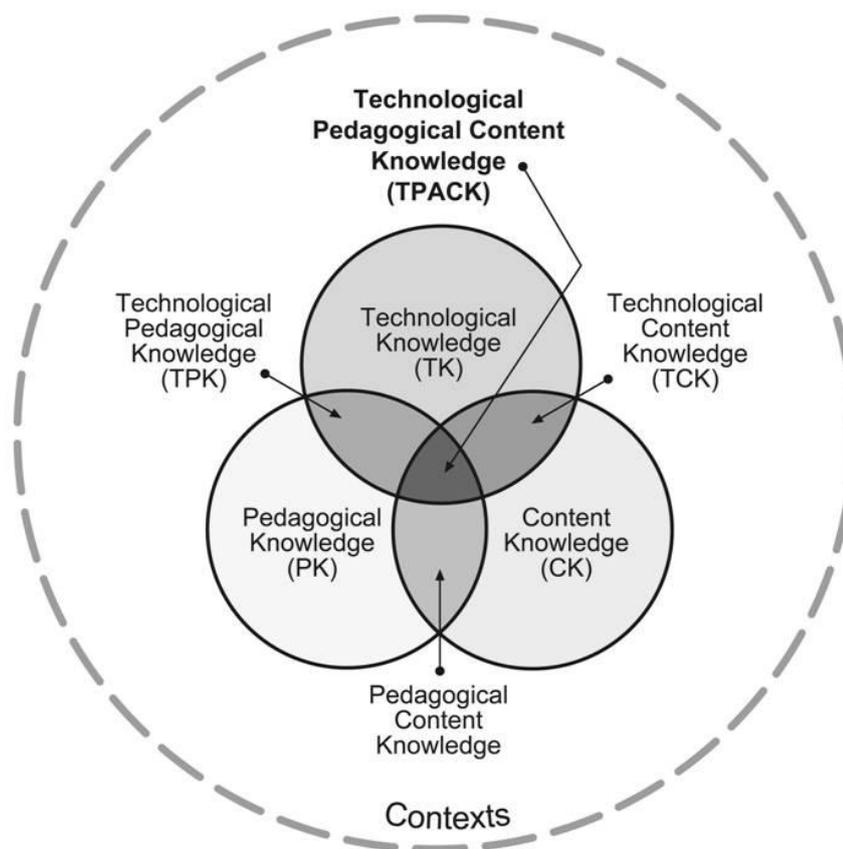
As an experienced secondary school teacher with more than 15 years experience teaching and leading school communities, the researcher felt that the PD session presented a range of practical options for teachers in this school. It was somewhat of a surprise to find that, in subsequent observations and interviews with a range of teachers, very few of the terms introduced in the initial PD session had been adopted by teachers. While some teachers indicated some interest in investigating possible uses of some of the software introduced in the PD session a substantial number of teachers expressed concerns about the effectiveness of the proposed methods of technology integration with others dismissing them outright. This inconsistent pattern of technology integration is well represented in the research literature examining teachers' adoption and integration of technology into their teaching practice (for example, see: Karl, 2011; Mendez-Vilas, 2011; Peeraer & Van Petegem, 2012; Sang, Valcke, van Braak, Tondeur, & Zhu, 2011).

Teachers' knowledge

Researchers have examined the inconsistent uptake of educational technology in schools from a variety of perspectives. Koehler and Mishra (2005), for example, approached this multifarious problem by proposing two questions: firstly, "What do teachers need to know about technology?" and secondly, "How can teachers acquire this knowledge?" In an attempt to answer their first question, Mishra and Koehler (2006) added technological knowledge to Shulman's (1986) pedagogical content

knowledge (PCK) framework resulting in development of technological, pedagogical, content knowledge (TPACK). Suzy Cox (2008) has provided clarifying definitions of TPACK elements and claims that the TPACK occurs when “a teacher’s knowledge regarding technology is multifaceted and that the optimal mix for the classroom is a balanced combination of technology, pedagogy and content” (Cox, p. 1). Mishra and Koehler (2006) represented the TPACK framework as three overlapping circles, each representing an element of knowledge, with TPACK occurring at the nexus of these circles as shown in Figure 1.

Figure: 1



The TPACK framework from <http://tpack.org/>

The impact of the TPACK model has been profound in recent educational technology research and has been used in hundreds of studies examining teachers' use of technology (for example, see: <http://www.mendeley.com/groups/522011/tpack/papers/>).

TPACK acquisition

The second of Koehler and Mishra's (2005) questions, “how can teachers acquire this knowledge?”, has received less attention from researchers. Initially, Koehler and Mishra (2005) examined teachers' technological knowledge acquisition in three different Master's level courses with a learning technology by design approach. This work provided insights into teachers' TPACK development in the context of formal, tertiary study. Additional research has examined TPACK acquisition in

different contexts including pre-service teachers (for example, see: Albion, Jamieson-Proctor, & Finger, 2010), distance educators (for example, see: Archambault & Crippen, 2009) and primary teachers (for example, see: Chai, Koh, Tsai, & Tan, 2011); however, there has been little empirical research that has been conducted into the factors influencing in-service secondary school teachers TPACK acquisition as part of their situated, daily work despite the close connection between work and learning being reported in academic circles for some time (for example, see: Seely Brown & Duguid, 1991).

One of the few pieces of research examining teachers' knowledge acquisition from a situated learning perspective is Karin Forssell's (2011) quantitative study that investigated the influences of social learning networks on the TPACK development and confidence of 307 Californian teachers. This work utilised a learning ecology framework and concluded that the TPACK framework is useful and important when considering teachers' knowledge acquisition. In particular, Forssell (2011) indicated that situated, social learning networks appeared to be particularly important with higher TPACK levels reported by teachers with learning partners located within their school community. However, Forssell (2011) acknowledged that "although this finding answers many questions [it] raises still more" (p.147) that may be answered by "new studies employing other methodologies" (p.147). The remainder of this paper argues that the situated learning framework, Communities of Practice (CoP), may provide researchers with an alternate lens through which the social and relational aspects of teachers' knowledge acquisition can be examined.

Communities of Practice: An alternate framework to examine teachers' TPACK acquisition

The term 'community' is used extensively in studies examining technology adoption and use. In educational contexts, the term 'community' has been incorporated into expressions including 'communities of learners', 'discourse communities', 'learning communities', 'school communities' and 'teacher communities' (Branch, Jones, & Orey, 2010). Confusion resulting from the profligate use of the word 'community' has resulted in some authors arguing that there is no clear definition of community (Cuban, 2004) and others such as Grossman and Wineburg (2010) questioning the value of the term claiming "it is clear that *community* has become an obligatory appendage to every educational innovation" (p. 6).

While one could suggest that researchers examining a 'school community' or a 'community of teachers' would be able to investigate the situated social and cultural factors inherent in these notional constructs, it becomes apparent with such extensive use that the term community requires specific definition. Westheimer (1999) summarised the concerns of scholars considering this issue stating that "researchers could benefit from a stronger conceptualization of communities based in empirical research" (p. 148). Consequently, future research must be critical of which rationalization of community is utilised as a framework.

CoP is distinctly different from other, often superficial or obligatory uses of labels incorporating the concept of community. Wenger's (1998) specific conceptualisation of the term community follows a different notion to that of other researchers. Wenger specifically states that "a community of practice is not merely a community of interest. ... Members of a community of practice develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems – in short a shared practice" (pp. 2-3). However, they "are connected by more than their ostensible tasks. They are bound by intricate, socially constructed webs of belief, which are essential to understanding what they do" (Brown, Collins, & Duguid, 1989, p. 34).

A CoP in this sense has its origins in Lave and Wenger's research in situated learning in the 1980's and the term was first coined in the seminal book *Situated Learning: Legitimate Peripheral Participation* (1991) which places emphasis on learning in a shared, situated and culturally mediated

context. Wenger's (1998) subsequent and more detailed examination of CoP provided a greater insight into the factors that underpin this complex socially mediated practice and it is in this work that the distinction is made between a CoP and other forms of 'community'.

This distinction has been highlighted by other researchers using CoP as a theoretical lens including Skerrett (2010) who stated that "communities of practice are groups of people that are mutually engaged in a joint enterprise and who share a common repertoire... for engaging in their work" (p. 648). CoP's differ, therefore, from other definitions of 'community' as membership of a CoP is not necessarily based on formal notions of membership rather a sense of belonging to the particular community which is reflected in mutual engagement, a joint enterprise and shared repertoire (Wenger, 1998).

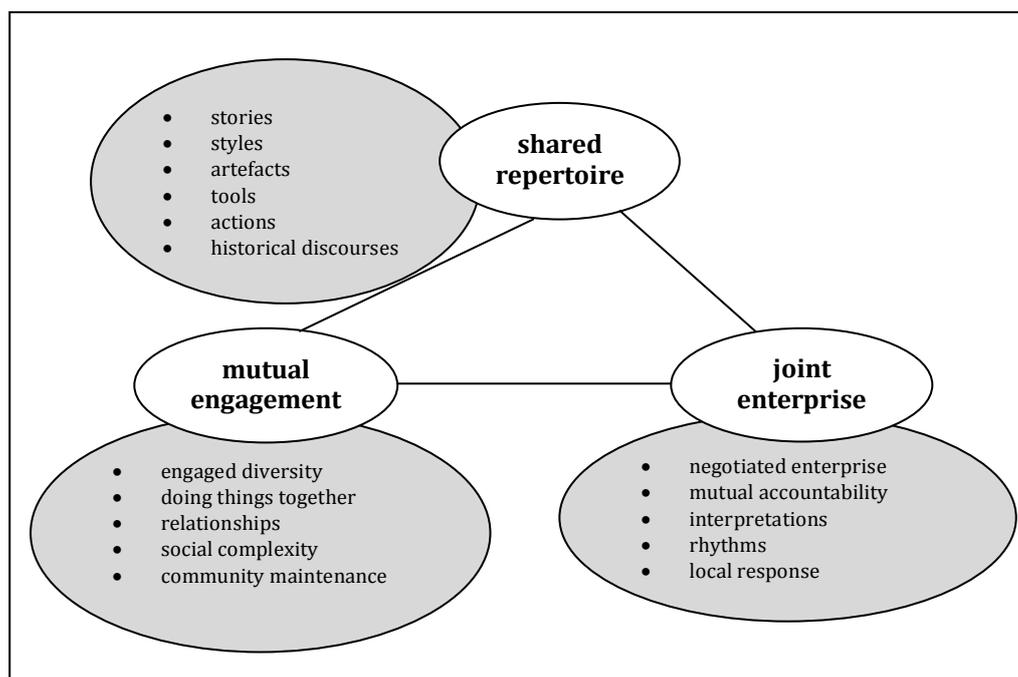
Mutual engagement, joint enterprise and shared repertoire

Mutual engagement in the context of a CoP is dependent on participants doing things together and allowing them to develop a sense of belonging. This sense of belonging in turn influences a participant's perspective of the practices within the community and enables them to take on a new meaning. The development of this common frame of reference or joint enterprise then forms the basis of common understandings within the CoP for identifying and prioritising activities and resolving problems as they occur (Wenger, 1998). An example of mutual engagement in secondary schools can be found in the ways in which teachers respond to the general norms that are specific to teaching, such as the standards to which teachers are accountable, when they justify pedagogical decisions and judgments.

The joint enterprise of a CoP involves participants responding together to the organisation's needs and goals. In the context of this current research into the practices of secondary school teachers it is interesting to note Wenger's (1998) suggestion that individuals within a CoP do not need to have a uniform understanding of their enterprise for it to be a collective product and that "the power – benevolent or malevolent – that institutions, prescriptions or individuals have over the practice of a community is always mediated by the community's production of its practice" (Wenger, 1998, p. 80). Despite these caveats, examples of the joint enterprise of teachers in secondary schools can be found in research literature. Cobb, et al (2003) provided an example of involving secondary school mathematics teachers whose joint enterprise was ensuring students understood central mathematical ideas and were able to perform well on the assessments of mathematics achievement.

As the members of the CoP engage with each other in their socially negotiated practices they develop a shared repertoire which "includes routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions or concepts that the community has produced or adopted in the course of its existence, and which have become part of its practice" (Wenger, 1998, p.83), in essence a unique social history that includes not only the tools, concepts and language associated with mutual engagement in a joint enterprise but also a communal memory of action that informs and shapes future directions of the CoP. The interrelationship between the elements of mutual engagement, joint enterprise and shared repertoire in a CoP is summarised by Wenger (1998) in Figure 2.

Figure: 2



Dimensions of practice as the property of a community.

Despite researchers investigating the impact for shared repertoire, mutual engagement and joint enterprise in school CoPs, no empirical research has been found that has used this approach to examine the effect of these dimensions on teachers' TPACK acquisition nor is there literature reporting on Wenger's (1998) notion of identity as a factor influencing teachers TPACK development.

Identity

Mutual engagement, joint enterprise and a shared repertoire in a school community are inevitably implicated in the development of secondary school teachers' socially mediated, communal knowledge base and also in a teacher's identity in a CoP. As Wenger (1998) pointed out, "the formation of a community of practice is also the negotiation of identities" (p.149) and "issues of identity are an integral aspect of a social theory of learning and are thus inseparable from the issues of practice, community and meaning" (p.145). Identity in this sense is defined socially, that is, it is produced through participation in a community.

Research has investigated the impact of practicing teachers (old-timers) on pre-service teachers (new-comers). For example, Ottesen (2006) argued that pre-service teachers are exposed to the authentic experience of teaching within the socio-cultural environment during their teaching placements, albeit, for a comparatively short period of time. The common practice of exposing pre-service teachers to the practices of teachers for comparatively short periods of time might not allow student teachers to fully engage in and understand all of the nuances of the socio-cultural environment of the CoP. Lave and Wenger (1991) would describe this as legitimate peripheral participation; however, the knowledge, stories, histories, and shared repertoires gained by pre-service teachers during their internship program could provide a valuable foundation in student teachers' identities formation which will be carried into their teaching practices. The importance of identity formation for teachers was also highlighted in a mixed-method study by Özgün-Koca, Meagher, and Edwards (2010) who investigated the pre-service teachers and changes in their identity from "learners of mathematics to teachers of mathematics" (p.10) in an undergraduate CoP.

A new-comer to a secondary school does not necessarily have to be new to the teaching profession

merely new to the particular social and cultural contexts that bound the work of teachers within a particular school. Old-timers can provide new-comers with information about local practices that have evolved to meet the institutional demands of their particular school, while a new-comer may provide old-timers with information about pedagogical practices from other CoP's that they may have been, or are currently, members.

The socially mediated formation of knowledge highlights a key understanding regarding CoP theory and the development of teachers' TPACK. Teachers' knowledge of what it is to be a teacher, particularly their technological and pedagogical and content knowledge, is formed in a negotiated, socially mediated environment but this knowledge development is also influenced by the acquisition of identity within the community.

Conclusion

This paper began with an anecdote describing the introduction of information to a group of practising teachers and the resulting inconsistent pattern of acceptance and performance of this knowledge. According to research literature this is not uncommon and, as such, academics have been calling for investigations into the processes underpinning teachers' ICT knowledge acquisition and especially implementation for more than quarter of a century. While there have been a number of attempts to understand this challenging problem, using general adoption-diffusion models as a frame of reference, little research has specifically examined the socially mediated influences on teachers' knowledge acquisition and no research reports teachers' TPACK acquisition from a CoP perspective. The description of the attempt to broker new information to a school community introduced at the start of this paper is one example from a PhD study that is currently attempting to consider shared repertoire, mutual engagement, joint enterprise and identity formation from a CoP perspective on teachers' TPACK development.

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