



Internet-Mediated Teacher-to-Teacher Knowledge Mobilisation

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Abstract

The study investigates the rise of online platforms that support teacher-to-teacher knowledge mobilisation. The adoption of the interpretative approach focuses the investigation on how the online platforms, their resources and the learning opportunities they provide are conceptualised by teachers in relation to their broader teaching practice, workplace culture and professional learning. The study is framed by two overarching research questions. (1) What is the nature of the knowledge being shared and reconstructed by teachers in Internet-mediated knowledge mobilisation? (2) What is the nature of the learning arising from teacher-to-teacher Internet-mediated knowledge mobilisation?

The study employs a multiple case-study design to investigate two United States based online platforms, which facilitate teacher-to-teacher knowledge sharing. Twenty teachers from across the two cases were selected to participate in the study. A qualitative methodology was utilised. Teachers participated in an individual, face-to-face interview. In the two months following the initial interview teachers completed a weekly journal log detailing their engagement with the platform. Upon the completion of their journal logs, teachers participated in a follow-up interview via Skype. To help to contextualise the individual teachers within the broader case and to enrich their personal stories, observations of the platforms occurred throughout the data collection period.

The study proposes a new theoretical model for how to conceptualise Internet-mediated knowledge mobilisation, the knowledge that is produced and the learning that occurs through the reconstruction process. It emphasises the connection between offline and online contexts and the role the platforms play in breaking down the boundaries between teachers' school-based practice and online resources and learning opportunities. The framework encapsulates the combining of the individual and their contexts of action, together with the platform and the information and knowledge it contains, to determine and shape the operation of the knowledge reconstruction process and the learning that transpires.

Internet-mediated knowledge mobilisation facilitates the development of teachers' personal, practical knowledge by providing insight into the instructional practice of teachers and exposing teachers to new ideas and perspectives, which support the expansion of their propositional structures and episodic knowledge. Access to relevant, teacher-created materials increases the efficiency and effectiveness with which teachers can undertake elements of their practice, while also promoting learning through participation in work-based tasks. Individualism emerges as the dominant mode of engagement and learning in the study, with individual teachers regulating not only how and when they engage but also determining the outcomes they construct from their actions. The Internet, as a knowledge mediator, opens up new possibilities that are not available in teachers' offline contexts. It not only breaks down boundaries between teachers, but it also collapses boundaries between the various settings of teachers' professional practice and learning, effectively merging the offline and online contexts of teachers' work. The dual contexts of the platforms offer specific affordances that help to shape teachers' engagement, while also acting to promote new learning processes that do not exist in offline knowledge mobilisation.

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Chapter One: Introduction

Teachers are key figures for effecting change in schools and their continued professional learning and professional development are considered essential for improving instructional practice, student learning outcomes and school systems. To meet the ever-changing demands and requirements of the job, teachers need to be continually updating their knowledge and adopting new approaches and skills. An OECD (2000) report advises that to keep up with new educational developments and the expectations placed upon them, teachers must adapt their learning and working processes:

Teachers cannot do this by working harder, but by working smarter, which means achieving higher productivity through knowledge creation and application, which in turn is likely to mean re-conceptualising the nature of educational organisations and re-structuring and re-culturing them accordingly. (OECD, 2000: 69)

Teachers require high-quality, targeted professional learning opportunities that not only support the development of their practice but also facilitate the creation and mobilisation of their professional knowledge and expertise.

Opportunities for knowledge sharing and collaboration between teachers are increasingly recognised as essential components of teachers' continued professional learning. Research suggests that the most effective professional learning involves teachers and school leaders learning from experts, mentors and their peers in a collaborative environment, with initiatives sustained over a long period of time and centred upon issues arising directly from practice (Corcoran, 1995; Darling-Hammond et al., 2009; Darling-Hammond and McLaughlin, 1995). Encouraging direct links to be developed between teachers facilitates the sharing of tacit, practice-based knowledge and the exchange of specific expertise, which together with observations of knowledge in action have been found to be the most effective means for transferring knowledge in the workplace (Argote et al., 2003; Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995). As the importance of fostering the effective dissemination of knowledge between teachers has become increasingly recognised and prioritised, discussions of knowledge mobilisation in education have become more prevalent in both the research and policy literature.

1.1 Knowledge mobilisation and teacher knowledge

Knowledge mobilisation refers to the process of transmitting, transferring, disseminating or otherwise communicating knowledge from the developer or creator of knowledge to potential users (Love, 1985). It involves ‘getting the right information to the right people in the right format at the right time, so as to influence decision making’ (ONF, quoted in Levin, 2008: 9). From the 1990s knowledge has been positioned as the most strategically important resource that a firm has (Nonaka, 1994; Nonaka and Takeuchi, 1995; van den Hooff and de Leeuw van Weenen, 2004), and the effective management of knowledge one of the primary occupations of organisations (Davenport and Prusak, 1998; Drucker, 1993). The accelerated pace of informational and technological change requires people today to be engaged in continual self-renewal and knowledge development (Bandura, 2002), with the ability to learn throughout one’s life becoming essential to meeting the changing demands and diversifying requirements of the twenty-first century.

Knowledge mobilisation in education has traditionally been weak, with links between research, policy and practice remaining underdeveloped and underutilised. The knowledge created by teachers has been frequently dismissed as being overly personal and intuitive, lacking the codifiable and systematic nature of academic knowledge. However, it is increasingly recognised that teachers produce and hold ‘specific and legitimate’ knowledge (Hargreaves, 1996), which is beneficial to other teachers (Elmore, 2002; Fullan, 2003; Hargreaves and Fullan, 2012; Little and Bird, 1986; Stenhouse, 1975, 1984). The tacit, situated nature of teachers’ knowledge, which is embedded in their individual professional settings and personal narratives, represents both its strength and weakness. Teachers’ knowledge is intimately connected to the demands and contexts of their work and as a result can provide other teachers with specific and tangible knowledge and insight that is directly relevant to their needs. However, its tacit, situated nature makes it difficult to transfer and to reconstruct in other contexts (OECD, 2000), complicating knowledge mobilisation efforts.

The structure of teaching, the organisation of schools and the scarcity of knowledge dissemination channels have limited past efforts to foster teacher-to-teacher knowledge mobilisation. The isolated nature of the classroom and the rigid timetable of the school day restrict opportunities for teachers to discuss their practice with their colleagues, observe other teachers at work and collaborate on teaching strategies (Darling-

Hammond et al., 2009; Fullan, 1993; Lieberman and Miller, 1990; Little, 1987). However, over the past several decades, teacher networks, sometimes referred to as professional learning communities, have emerged in education – as well as other sectors – to facilitate practitioner-to-practitioner knowledge mobilisation. In education, a teacher network refers to a professional grouping of teachers or schools that work together to share knowledge, resources and learning opportunities. Networks place teachers at the centre of their own learning, encouraging them to take an active role in facilitating the creation and dissemination of their knowledge, and embed teachers' knowledge and learning in the contexts of their work (Corcoran, 1995; Darling-Hammond and McLoughlin, 1995; Darling-Hammond et al., 2009). Studies have identified the potential of networks to expose teachers to new ideas (Huberman, 2001; Katz and Earl, 2007, 2010), to facilitate learning that supports major changes in teaching practices that can increase student outcomes (Katz and Earl, 2010), and to influence and impact the potential for school change (Penuel and Riel, 2007).

Policymakers and researchers alike are positioning teachers as knowledge creating professionals who must take active responsibility for developing, refining, testing and mobilising their professional knowledge (CoEC, 2007; E4E, 2013; Elmore, 2002; Frost et al., 2000; Fullan, 2003; Gates Foundation, 2010; Green, 2014; Hargreaves and Fullan, 2012; Jensen, 2012; MacBeath, 2012; OECD, 2000). Teacher-to-teacher knowledge mobilisation is credited with exposing teachers to new ideas (Huberman, 2001; Katz and Earl, 2007 and 2010), strengthening teachers' practice and improving student learning outcomes (Katz and Earl, 2010; Riel and Becker, 2000) and facilitating changes in school structures (Penuel and Riel, 2007). While the potential of knowledge mobilisation in education is well established, empirical investigation into how the process actually operates and the roles and actions of teachers within it has been limited. Little is known about the nature of the knowledge that teachers share with other practitioners or the tangible products that teachers create in and through their teaching practice that can support the learning of other teachers. Similarly, few studies have investigated how teachers interpret and utilise teacher-created knowledge within their own practice or the types of knowledge or activities that foster the greatest influence on their professional learning and teaching instruction. These questions have been compounded by the rise of digital technologies and the greater availability of the Internet over the past two decades, which has seen knowledge mobilisation opportunities being transferred to the online

space. As more online teacher learning platforms are constructed, new questions are emerging about the role that the Internet plays in the mobilisation of teachers' knowledge.

1.2 Online platforms for knowledge mobilisation

Opportunities for teachers to collaborate and share knowledge and resources are increasingly available online, through online teacher platforms. Online platforms for teachers have been established by a wide variety of providers, including teacher collectives, for-profit businesses, not-for-profit educational organisations, school districts and state governments, and university departments of education. Their offerings range from formal course-style programmes to more informal learning activities and user-driven initiatives, which provide an assortment of services and knowledge to teachers, including subject websites, social networking forums, and websites where teachers can share teaching resource, lesson plans, action research projects and examples of good practice. This study is particularly interested in online platforms that support the exchange of teacher-created knowledge by allowing teachers to share their expertise, teaching resources and insights into instructional practice with other teachers.

Discussions of online networks suggest that they can foster social capital building (Dede, 2000; Hew and Hara, 2007, Schlager and Fusco, 2003; Schlager et al., 2009) and enable the sharing of experience and good practice among teachers (Riding, 2001; Stoll, 2004). They offer teachers the opportunity to collaborate with other teachers and experts outside their schools (Hunter, 2002) and to discuss their teaching practice and any changes, issues or innovations with which they are engaged (Duncan-Howell, 2010; Lock, 2006). Their online context provides teachers with greater flexibility to access learning opportunities at any place and at any time. They not only open up new resources and the ability to connect with a wider range of people but by giving teachers greater control over choosing how and with what they engage, they also offer more personalised learning opportunities and enable teachers to participate in educational events that otherwise would have been inaccessible (Borko et al., 2009)

Despite the rising popularity of online platforms and the potential opportunities discussed above much remains unknown about how teachers actually utilise the resources and knowledge available on them or how the nature of teachers' engagement

influences their professional learning and teaching practice. Studies tend to position online platforms and learning applications primarily in relation to the professional development literature, with the platforms typically conceptualised as formal professional development activities, which are situated outside the context of teachers' instructional practice (Barab et al., 2003; Borko et al., 2009; Schlager and Fusco, 2003; Schlager et al., 2009). The platforms are understood as external interventions that are applied to teachers. As a result, research tends to focus heavily on identifying the affordances of technology that support teacher learning, paying limited attention to understanding the nature of the learning teachers actually construct from their engagement with technology. The research agenda is further limited by the employment of many of the same frameworks and theories that are used when examining and evaluating traditional, in-person professional development resulting in little consideration being given to the role that context plays in the learning process.

The need to re-evaluate the research agenda is supported by a recent EdSurge (2014) report into online teacher learning. The report suggests that teachers are interpreting their use of online learning opportunities in quite different ways from their offline professional development. Online learning platforms largely reject the formal top-down approach of traditional teacher learning and instead adopt a user-driven, teacher-controlled design. This suggests that to understand teacher engagement and resultant learning greater attention needs to be paid to the actions and thought processes of individual teachers. Little is known about how teachers conceptualise the platforms and the resources they house or how their engagement operates within and in relation to the broader context of their professional practice. This study, therefore, is concerned with investigating how online platforms and the learning opportunities they provide are perceived and made sense of by the teachers who choose to engage with them.

1.3 Adopting the interpretative approach

It is no longer enough to position studies of online learning within the traditional professional development literature or to rely only on a positivist approach that focuses primarily on measuring online behaviour by asking questions such as: who is online?; what do they do online?; and what is the impact? (Bakardjieva, 2011). These approaches tend to focus on what Oliver (forthcoming) has labeled 'technology as a cause', which considers the design and affordances of technology to shape use. This serves to minimise

(or ignore) the importance of people's interpretation of and actions with technology and the role that context plays in shaping individual's engagement with and understanding of technology. Instead it is necessary to develop new understandings of learning and knowledge building, which combine consideration of how teachers conceptualise both the role of the Internet as knowledge mediator as well as how their engagement with online platforms intersects with and influences their offline, school-based practice and professional learning. This requires the construction of new or modified frameworks that accurately reflect how online platforms support the mobilisation of knowledge, how this knowledge is reconstructed by teachers in their school and classroom contexts, and the nature of the learning that arises from teachers' engagement with these processes. Grounding studies in the multiple natural settings of teachers enables the closer examination of the relationship between online platforms and teachers' school-based practices, including how learning operates across and between online and offline settings. To achieve this new direction, this study adopts an interpretative approach (Bakardjieva, 2011; Haythornthwaite and Wellman, 2002; Kling and Courtright, 2003).

The interpretative approach aligns with this study's focus on understanding why teachers are engaging with the platforms and how teachers interpret and construct their engagement in relation to their broader teaching experience, workplace culture and professional learning. It encourages the contextualisation of teachers' actions and understanding within the broader contexts of their workplaces and professional practices, and the examination of the connection between the offline and online contexts of teachers' work and learning and how they navigate their movement between the two spaces. Bakardjieva (2011: 64) explains the insights this approach can provide:

Closely examining users' experiences with the Internet through the phenomenological approach has made it possible to discover how the new medium is construed as an element of subjects' everyday lifeworlds as well as to map out the transformations in the structures of users' everyday lifeworlds brought about in this process.

In this conception, the interpretative approach is connected to what Selwyn (2010) and Oliver (2011) have termed the critical approach to educational technology. Selwyn (2010) suggests that studies of educational technology should focus on examining technologies *in situ*, adopting 'context-rich' rather than 'context-free' research designs that allow researchers to focus on the 'state-of-the-actual'.

1.4 Re-examining theoretical frameworks

By focusing on how and why questions and the relationship between the offline and online contexts of engagement, the interpretative approach enables this study to not only enrich the current literature and research on online teacher platforms and teacher-to-teacher knowledge mobilisation but also to question the theories that have dominated research into online teacher learning: network theory and communities of practice. Online platforms are frequently conceptualised either as social or knowledge networks, or as communities of practice. In both these conceptions learning is primarily considered to be social, arising through interactions and the connections that develop between users or groups of users (Barab et al., 2001; Dede, 2000; Hew and Hara, 2007; Schlager et al., 2009; Schlager and Fusco, 2003). Studies tend to focus on unpacking and interpreting the interactions that develop between users as a means of explaining the nature and impact of the online platforms.

In knowledge or social networks people act as the nexus of engagement, with ties between individual users facilitating the flow of information. Haythornthwaite (2008) suggests that:

Learning is a social network relation: it is a transaction, an exchange between people as one teaches and another learns ... learning depends on interaction between individuals. Examining what interactions occur provides the basis for understanding how a network of learners engage with each other and create a communal whole. (140-141)

Individual users are reliant on their social capital, or on the network of ties they have established with other platform members for access to information and learning opportunities. Knowledge and expertise are embedded within the social network and it is through social ties or connections that individuals are able to access and utilise the resources available. In social networks, knowledge mobilisation and resultant learning are inherently social, with individuals reliant on their ties with other users to gain particular knowledge or expertise.

A second theoretical lens for interpreting online platforms is the theory of communities of practice (see e.g. Barab and Duffy, 2000; Dede, 2006; Granger et al., 2002; Hew and Hara, 2007; Lock, 2006; Schlager and Fusco, 2003; Schlager et al., 2009; Wenger, 1998). Communities of practice, first developed by Lave and Wenger (1991), are largely informal groups of people who interact on a regular basis. They develop around collective learning and focus on accumulating knowledge and expertise within shared areas of interest, through the experiences of the participants (Wenger, 2001).

Communities of practice may be distinguished from other groupings of people by the shared knowledge, beliefs and values and the common histories of their members as well as by the collective learning agendas and shared meaning making they promote between members (Barab, 2001; Barab and Duffy, 2000; Lave and Wenger, 1991). Similarly to what happens in social networks, learning is social, arising from collaboration between members and the collective progression towards common learning goals.

This study questions the overriding dependence on social network theory and communities of practice for investigating and characterising online platforms and knowledge mobilisation. The questioning is two-fold. Firstly, it reflects a discomfort with the insistence of both theories on the exclusivity of social learning and the centrality of relationships and interactions between individual users for facilitating knowledge mobilisation. There appears to be an unacknowledged mismatch between the importance of social connections for facilitating knowledge flows and learning on the one hand and the role of individual mediation and user control of the online learning process on the other. While community building and personal connections undoubtedly play a role in facilitating knowledge mobilisation, this study suggests that these two theoretical frameworks do not entirely capture the nuances and complexity of Internet-mediated knowledge mobilisation. This study further questions the tendency to position and label online groupings as communities and follows Grossman and colleagues' (2000) critique of the indiscriminate use of the term community in education and the 'assumption of collectivity' between users it promotes.

The second area of questioning surrounds the focus of both theories on the front-end of the learning process. Communities of practice and social network theory both focus on the role of engagement for explaining the learning process and give little consideration to the wider implications, impact or outcomes of this engagement. They provide ways of interpreting the actions of individuals and groups online but pay limited attention to how the learning and knowledge building that occurs then is transferred from the online setting to the offline context of practice and implementation. As a result, neither theory is able to capture the entire process of Internet-mediated knowledge mobilisation. Consequently, they provide little insight into how teachers conceptualise and utilise the resources and knowledge that are shared online. Nor do they examine how teachers' behaviour and actions influence their professional learning and practice.

1.5 Outline of this study

This study examines and delineates how teachers engage with online platforms as well as the processes teachers use when transferring and reconstructing knowledge from the platforms in their own practice. Furthermore, the study will investigate teachers' perceptions of how their engagement shapes their professional learning and instruction. Focusing on both engagement and outcomes has a dual purpose. Firstly, it enables the study to build towards the development of a new theoretical framework for understanding how teachers interpret and reconstruct knowledge from online platforms in their practice and the impacts this has on their learning and development. This reflects a key concern of this study: the relationship between the offline and online settings of teachers' knowledge reconstruction, learning and practice. Secondly, developing an understanding of the specific nature of teachers' engagement with online platforms, including how they utilise the knowledge gained from the platforms and the impact this has on their professional learning and practice will enable the fine-tuning and potential reconfiguration of online platforms in order to serve the learning and knowledge needs of teachers best.

This dual purpose is reflected in the two overarching research questions framing this study:

1. What is the nature of the knowledge being shared and reconstructed by teachers in teacher-to-teacher Internet-mediated knowledge mobilisation?
2. What is the nature of the learning arising from teacher-to-teacher Internet-mediated knowledge mobilisation?

To answer these questions, this study focuses on two online teacher platforms that have been established by not-for-profit organisations in the United States of America [USA]. Both platforms concentrate on teacher-generated content and are designed to facilitate teacher-to-teacher knowledge sharing. Teachers upload teaching resources – including lesson plans, unit plans, classroom management strategies, PowerPoint presentations, teaching and learning activities and assessments to the platform – which are then accessible to all other users. Users perform keyword searches to locate useful and relevant resources that they can then utilise in their own teaching practice. As well as providing access to teacher-created resources and knowledge, both platforms also

provide opportunities for teachers to form content communities, where they are able to engage with other teachers of their subject or grade level.

The USA provided a particularly interesting case of the wider phenomenon of online platforms and teacher-to-teacher knowledge mobilisation. A 2009 report on the state of professional development in the USA determined that teachers lack access to sustained, continuous professional development opportunities, with most learning taking place in one-off workshops outside of the school setting (Darling-Hammond et al, 2009). Fewer than half of all teachers found professional development opportunities to be useful to their learning and 57% of teachers received just 16 hours (2 days) worth of professional development each year, when close to 50 hours is required to improve skill and student learning outcomes (Darling-Hammond et al., 2009). While professional development provisions remain inadequate, the emergence of online teacher networks and online learning platforms in the USA over the past two decades is changing the landscape by offering teachers new forms and types of learning opportunity. Online platforms have been established by a wide variety of providers, including teacher collectives, for-profit businesses, not-for-profit educational organisations, school districts and state governments, and university departments of education. Their offerings range from formal course-style programmes to more informal learning activities and user-driven initiatives, and provide an assortment of services and knowledge to teachers – including trialling a number of new strategies for transmitting and disseminating knowledge.

The growth of online learning applications and services is matched by the increasing number of USA teachers who are accessing them. A study of USA teachers found that 82% are members of a social networking site (although these may not be specifically education sites) (MMS Education, 2012). Of the teachers who are using these sites, 46% do so to connect with colleagues, 39% to develop professional learning circles and 37% to engage with online professional development (MMS Education, 2012). An EdSurge (2014) study examining the key reasons why teachers utilise online platforms determined that the personalisation of the learning process was central to teachers' engagement. Teachers value the self-directed and informal nature of online platforms, which allows them to leverage the tools and learning opportunities in the ways that best suit their personal needs. Online applications facilitate anytime, anywhere learning and provide teachers with the flexibility to 'mash together' a variety of products and approaches to

support their individual requirements (EdSurge, 2014). The user-centred orientation of online platforms and the personalised learning experiences they offer set them apart from typical offline professional development provisions. However, despite their increasing popularity, there has been little empirical research focusing on how teachers utilise the resources and knowledge available on online platforms or how their engagement influences their learning and teaching practice.

The research adopts a qualitative approach. In order to understand how and why teachers are engaging with online knowledge-sharing platforms and the influence this engagement has on their teaching practice and professional learning, it is necessary to move beyond interpreting quantitative data on how often and with what knowledge teachers are engaging, to connect directly and deeply with the personal narratives of individual teachers. Wenger and colleagues (2002) insist that it is critical to engage with personal stories when investigating how knowledge systems operate because ‘only practitioners can tell how the knowledge was put into action’ (Wenger et al., 2002: 168). The qualitative approach also reflects the inductive nature of this research. There have been few studies, empirical or theoretical, that have investigated in detail how teachers mobilise knowledge among themselves, and even fewer that have attempted to understand how the Internet can support this process. Consequently, this study focuses on developing a theoretical framework of teacher-to-teacher knowledge mobilisation including determining the factors that motivate and limit engagement, the processes teachers undertake when accessing knowledge online and reconstructing it in their practice, and teachers’ perceptions of the influence that their engagement with knowledge sharing has on their practice and professional learning.

The study employs a multiple case study design, with each platform representing a single case. A total of twenty teachers were selected from across the two cases to participate in the study. Data collection took place over a six-month period in order to allow the collection of rich and nuanced data on teachers’ platform use, including any changes in engagement over time. Each teacher participated in an individual, face-to-face interview. In the two months following the initial interview teachers completed a weekly journal log detailing their engagement with the platforms, in order to develop a more detailed understanding of their behaviour. The journal logs also enabled the capturing of data on how teachers implemented the knowledge and resources they found online in their

classroom practice and the thought processes and actions that surrounded this process. Upon the completion of their journal logs teachers participated in a follow-up interview via Skype where they discussed in greater detail the episodes they had recorded in their logs. To help to contextualise each teacher within the broader case and to enrich their personal stories, observations of the platforms and their resources occurred throughout the six month data collection period. The combination of interviews, journal logs and platform observation was essential to the collection of context-rich data, which was essential for enabling the study to more fully understand how Internet-mediated knowledge mobilisation is positioned in relation to the various contexts of teachers' professional practice and learning.

1.6 Structure of the thesis

The thesis is comprised of seven chapters.

Chapter two reviews the literature framing the study's investigation into Internet-mediated teacher-to-teacher knowledge mobilisation and builds towards a justification for the study's adoption of the interpretative approach to explore its dual focus, which encompasses the knowledge that is shared on the platforms and reconstructed by teachers in their practice as well as the learning that arises from teachers' engagement with the platforms and the knowledge reconstruction process. The chapter reviews the literature on knowledge mobilisation both generally and in relation to education and teachers. It establishes the framework for how knowledge and learning are understood in this study and their relationship to teacher-to-teacher knowledge mobilisation. The final section examines the role that online platforms play in facilitating knowledge mobilisation. It critiques the approaches and theories that are most commonly applied to the study of Internet-mediated knowledge mobilisation before setting out the approach that will be adopted by this study.

Chapter 3 discusses and justifies the study's design and methodology. It explores the decisions behind the employment of the qualitative paradigm and the multiple case study design. It identifies and justifies the reasoning behind each of the methods used in the study and outlines the iterative data-analysis process, which involved multiple rounds of analysis, moving from an initial descriptive stage through analytical coding to the creation of links and connections between the data categories. The chapter also explores the

issues of validity and reliability affecting this study and the ethical questions raised through the research process.

Chapters 4 and 5 present analysis of data from both sets of teacher interviews and the teacher journal logs. Chapter 4 examines how teachers engaged with the two platforms and the factors influencing their engagement. It discusses the data from each case independently in order to develop a more detailed understanding of how each platform operates individually as well as to identify where similarities and differences between the two platforms exist. Chapter 5 presents the analysis of data on the outputs of engagement with the platforms. The first section examines the knowledge reconstruction process, focusing on how teachers assess, conceptualise and utilise knowledge and resources from the platforms in their own practice. The second reports the findings on how teachers perceive the impact of their engagement on their practice and professional learning.

Chapter 6 builds upon the previous two findings chapters to synthesise the major themes and to explore, in relation to existing literature, the key ideas that emerged from the data. The chapter works towards the creation of a new theoretical framework for understanding the nature and the roles played by the resources on the platforms as well as the operation and outcomes of the learning processes arising from Internet-mediated knowledge mobilisation. The model developed in this chapter presents an alternative perspective and new framework for interpreting and evaluating the processes involved in, and outcomes resulting from, Internet-mediated knowledge mobilisation.

Chapter 7 sets out the overarching themes and arguments that emerged from the study. The conclusions are organised into five sections, each representing a key idea: (1) the connection between online and offline contexts; (2) the nature of resources and knowledge; (3) the role of experience; (4) knowledge reconstruction as learning; and (5) the nature of learning. These are brought together and framed by the theoretical model constructed to conceptualise the nature of knowledge and learning in Internet-mediated teacher-to-teacher knowledge mobilisation. The conclusions combine analytical generalisations relating to the theorisation and interpretation of teacher knowledge and learning with more specific observations related to and reflecting the unique nature of the two cases, their online platforms and teaching populations. In conjunction with

presenting the key conclusions, this chapter explores the ideas and further questions that arise from the findings and considers how future research efforts may help to provide deeper insight and understanding of these areas.

Chapter Two: Literature Review

This chapter reviews the literature framing the study's investigation into Internet-mediated teacher-to-teacher knowledge mobilisation. It builds towards a justification for the study's adoption of the interpretative approach to explore its dual focus, which encompasses the knowledge that is shared on the platforms and reconstructed by teachers in their practice as well as the learning that arises from teachers' engagement with the platforms and the knowledge reconstruction process. The first part of the chapter is concerned with establishing the academic foundation for the study's focus. It surveys the literature on knowledge and knowledge management together with the literature on the nature of teacher knowledge and teacher learning in order to better understand the challenges facing, and benefits associated with, teacher-to-teacher knowledge mobilisation. The discussion then focuses on the conceptualisations of learning most commonly associated with online teacher platforms and in particular the limitations of much of the current research in this area. The final section synthesises the key themes emerging from the literature in order to outline and justify the approach that is adopted in this study and to present the research questions that frame the research design.

2.1 The nature of knowledge

Any study of knowledge mobilisation requires a working definition or at the very least a working understanding of what knowledge is and how it is generated (Fahey and Prusak, 1998). It is also necessary to have some understanding of how this knowledge is interpreted and utilised, processes that constitute key elements of learning. Developing a theoretical foundation for the interpretation of knowledge for this study is not an uncomplicated or uncontroversial undertaking. As Nonaka (1994) explains, knowledge is a multifaceted concept, which has been subject to various theorisations over time. Knowledge is conceptualised in different ways by different disciplines and often within the same discipline, a phenomenon evident in the scholarship on teacher knowledge.

Aristotle's (2009) three-part taxonomy of knowledge, which distinguishes between *epistêmê* (universal, theoretical knowledge), *technê* ("know-how") and *phronesis* ("practical wisdom"), remains the basis for many contemporary discussions of knowledge. The distinction Aristotle draws between technical, scientific and philosophical knowledge on

the one hand, and practical, tacit and situated knowledge on the other hand, which is built through action and experience in a specific context, is a recurring theme in discussions of knowledge. Louis (1981) established three knowledge bases, research-based knowledge (know what and know why), craft-knowledge (developed through practice), and common knowledge, which roughly correlate with the three levels in Aristotle's taxonomy. Polanyi's (1958, 1966) frequently utilised theory of knowledge reduces knowledge to just two distinct types – explicit knowledge and tacit knowledge. This bipartite division will play an important role in conceptualisations of teachers' knowledge throughout this study.

Tacit knowledge, which may be equated with *techné* and *phronesis*, is deeply personal, and is rooted in action, experience and participation. Its location in the mental modes, personal beliefs and perceptions of the individual makes it hard to formalise or reproduce. Nonaka (1994), following Aristotle, Polanyi and Louis, suggests that tacit knowledge involves both cognitive and technical elements. The technical elements consist of the more concrete, craft-based skills and know-how that are applied, often unconsciously, in and to a specific context. This knowledge is constructed through participation in the acts and contexts of practice. Explicit knowledge, in contrast, is theoretical knowledge or *epistémé*, which is formal and systematic. The codifiable nature of explicit knowledge means that it is easier to transmit and communicate than tacit knowledge.

Knowledge is variously interpreted as being individually held, socially constructed and distributed, or in some situations a combination of the two. In the social constructivism tradition, knowledge does not reside in individual cognition but rather in the social connections and social contexts that are developed between groups of people (Cobb and Bower, 1999; Pea, 1997; Putnam and Borko, 2000). Knowledge is socially embedded in organisations, structures and institutions. In contrast, in the psychological perspective of knowledge, which is adopted in this study, knowledge resides in the individual (Alavi and Leidner, 2001; Kolb, 1984; Nonaka, 1994) and is inseparable from the person that develops, transmits or leverages it (Fahey and Prusak, 1998). Knowledge is personal, value-laden and intimately connected to the perspectives and personal histories of the 'knower' (Alavi and Leidner, 2001; Bandura, 2001; Fahey and Prusak, 1998). This means that while two people may receive the same piece of information and collectively discuss

and enhance it, the way that they interpret, utilise and act upon this information will be different. The decision to emphasise the role of the individual in this study is not to reject the importance of the social context in the knowledge construction process. As will be discussed in greater detail in sections 2.5, 2.6 and 2.7 in relation to teacher knowledge and learning, a distinction is made between the learning process, which often combines both the individual and social mediation of knowledge, and the construction of knowledge arising from the learning, which resides in an individual's cognition. As the following paragraphs will elucidate, while individual, social and contextual factors influence what is learned, the knowledge constructed ultimately is known and held individually.

Knowledge is not dormant or static but rather is created and transformed through action, and consequently is inseparable from human activity and the uses to which it is put (Bandura, 2001; Nahapiet and Ghoshal, 1998; Nonaka, 1994; Nonaka and Toyama, 2003). It is created in a specific context, encompassing the spatial and temporal location of its creator, which is sometimes known as *ba* (Nonaka and Toyama, 2003). Knowledge gains its meaning through its application in specific temporal and spatial circumstances. Davenport and Prusak (1998) describe this intertwining of place, time and the individual when knowledge is created as follows:

Knowledge is a fluid mix of framed experience, values, contextual information and expert insight and provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers (5).

The centrality of action and context to knowledge construction suggests that knowledge must be in a constant state of flux (Fahey and Prusak, 1998). As a knower engages with new stimuli and resources and moves through new temporal and spatial locations, their knowledge will develop.

While the term 'knowledge' is used fairly liberally in this thesis (and is frequently used uncritically in the literature), it is important to differentiate between knowledge and information. According to Davenport and Prusak (1998) information is a message that is designed to change the way the receiver perceives or understands something. For example, a book, strictly speaking, provides its readers with information, not knowledge. Knowledge is constructed through the active employment of information in a specific context of action. Knowledge, therefore, is personalised information that exists in the minds and acts of an individual and is mediated by and developed through their actions,

interpretations, values and beliefs (Alavi and Leidner, 2001) as well as their temporal-spatial context.

In the context of this thesis, the resources shared by teachers on the online platforms are information sources. It is only when a teacher accesses a resource and internalises its content, integrating it with their existing knowledge structures and developing their personal interpretation of its meaning in relation to their specific context of action, that knowledge is constructed. Hargreaves (1999) provides a useful description of the differences between information and knowledge during the transfer (or mobilisation) process:

Transfer is difficult to achieve for it involves far more than *telling* or simply providing *information*. If one teacher tells a second teacher about a professional practice that the first finds effective, the second teacher has merely acquired some *information*, not knowledge. Transfer occurs only when the knowledge of the first teacher becomes information for the second, who then works on that information in such a way that it is set within, and becomes part of, his or her context of meaning and purpose and pre-existing knowledge. Transfer is the conversion of information about another person's practice into one's personal knowledge (131-32).

This concept of personal knowledge mentioned by Hargreaves is central to this study's understanding of teacher knowledge and will be explored in greater detail in section 2.6. It further will play an important role in discussions of knowledge reconstruction and learning in Chapters Five and Six.

2.2 Knowledge Mobilisation

Discussions about the importance of knowledge and knowledge management (of which knowledge mobilisation is a subfield) have become increasingly prevalent in a range of disciplines over the past three decades. The ability to access, assimilate and utilise information and knowledge, and to construct new knowledge is considered by many to be a pivotal skill for the twenty-first century (Drucker, 1994; Hargreaves, 1999; Hood, 2002; OECD, 2000). The strategic value of knowledge to the success of an organisation was increasingly recognised over the 1990s (Nonaka, 1994; Nonaka and Takeuchi, 1995; van den Hooff and de Leeuw van Weenen, 2004), and the effective management of knowledge emerged as one of the primary occupations of organisations (Davenport and Prusak, 1998; Drucker, 1993).

Although intimately concerned with the dissemination and transmission of knowledge, education has traditionally been weak in knowledge management. Nearly thirty years ago Little and Bird (1986: 495) observed:

In most schools, there is no substantial body of shared and handed-down wisdom about teaching, the means to accumulate it, or the means to transmit it to novices ... teachers inherit the same images of teaching that we all do, struggle toward proficiency virtually alone, and accumulate as much skill and wisdom as they can by themselves. Superb teachers leave their marks on all of us. They leave no marks on teaching.

The absence of a common knowledge base and the paucity of structures to facilitate its development are described by Hargreaves (1998: 13):

Today's dominant models for creating, disseminating and applying professional knowledge for teachers are now almost entirely inappropriate and ineffective, a serious waste of material and human resources, adding to the low morale and the serious shortage of teachers.

Despite the limited knowledge management tradition, there is growing appreciation of the value of knowledge mobilisation in education, and new structures and mediation channels are emerging to support knowledge mobilisation efforts. Research over the past decade has demonstrated the importance of teachers in effecting change in school systems and improving student learning outcomes (Hattie, 2009; Mourshed and Barber, 2007). Academics, policy makers and practitioners are increasingly recognising the need to provide teachers with opportunities to learn new skills, to update their knowledge and to integrate innovations into their classroom practice (CoEC, 2007; Hargreaves, 1999; Hogan and Gopinathan, 2008; Katz and Earl, 2007; Love, 1985; Mourshed and Barber, 2007; OECD, 2000).

While there is general agreement about the importance of knowledge and knowledge sharing in education, there is little consensus around how to structure these processes or indeed what to label them. Knowledge management, a term originating in organisational literature, often is used to label the field of research and practice concerned with the processes surrounding the creation, mediation, transfer, application and recreation of knowledge. According to von Krogh (1998) knowledge management involves the effective identification and leveraging of the collective knowledge that exists within an organisation (or between a set of organisations) that allows the organisation to compete at a higher level. Davenport and Prusak (1998) further suggest that knowledge management involves one or more of the following aims: (1) making knowledge visible, and therefore, presumably more accessible; (2) developing knowledge-intensive cultures where knowledge sharing is promoted; and (3) building a knowledge infrastructure to support interaction and collaboration between people.

A range of terms – knowledge sharing (Liao et al., 2007; Widen-Wulff and Ginman, 2004), knowledge transfer (OECD, 2000; Ozga, 2004; Szulanski, 1996), knowledge utilisation (Hood, 2002; Love, 1985), knowledge mobilisation (Hogan et al., 2011; Levin, 2004, 2008, 2011) and knowledge exchange (Collins and Smith, 2006) have been employed in both organisational and education literature to describe more specifically the processes through which knowledge is created, transmitted and reapplied. There are no consistent definitions for each of these terms resulting in considerable overlap in their meanings and usage and little consensus as to the appropriate context for their employment. Alavi and Leidner (2001) suggest that at a minimum all terms encompass the four key processes in knowledge management – creating, storing/retrieving, transferring and applying knowledge – however, this is not strictly accurate. Distinctions may be made between the scope and specific focus of each term.

Knowledge sharing focuses on two processes, the externalisation of knowledge by the knowledge owners and the internalisation of knowledge by the knowledge reconstructors (Hendricks, 1999; Soule and Applegate, 2005), but it is not concerned expressly with the transmission or mediation of knowledge. In contrast, knowledge transfer focuses on the construction and dissemination of knowledge but not on its utilisation by the recipient. Love (1985) defines knowledge transfer in education as ‘the process of transmitting, conveying, disseminating, or otherwise communicating knowledge from the developer, producer, organizer, or interpreter of research [or other forms of knowledge] to potential users’ (Love, 1985: 348). Knowledge mobilisation, in contrast, encompasses the full spectrum of knowledge management from knowledge construction to knowledge transmission and, importantly for this study, knowledge reconstruction and implementation.

The Ontario Neuroforma Foundation (ONF, 2008) defines knowledge mobilisation as ‘getting the right information to the right people in the right format at the right time, so as to influence decision making’ (quoted in Levin, 2008: 9). This is similar to Hassan and Crawford’s (2007) conceptualisation of knowledge mobilisation as the active use of the knowledge that is being disseminated. Levin (2004), who focuses on knowledge mobilisation in education, identifies three components that enable successful knowledge mobilisation: good quality, well-communicated research; an ability and willingness to utilise knowledge; and effective mediating mechanisms to link the two. He suggests that

the flexibility offered by the term, compared with other terms ‘that seem to imply one-directional and linear movement from research to practice’, is well suited to the ‘multidimensional, longer term and often political nature’ of the educational knowledge context (Levin, 2008: 9).

Knowledge mobilisation is employed in this study to provide an initial structure for examining the nature of knowledge being shared and learning occurring on online teacher platforms. A focus on knowledge mobilisation facilitates the investigation into the construction, dissemination or transmission and reconstruction of knowledge resources. By encompassing both the knowledge sharing and the knowledge reconstruction processes, knowledge mobilisation enables the investigation of both the online context of the platforms where the information is gained and the offline context of teachers’ work, where information is transformed into new knowledge and is implemented in practice. The OECD (2000), in their report on knowledge management in the learning society, establishes a model of knowledge mobilisation [Figure 2.1], which extends the traditional three stage framework to encompass seven key processes:

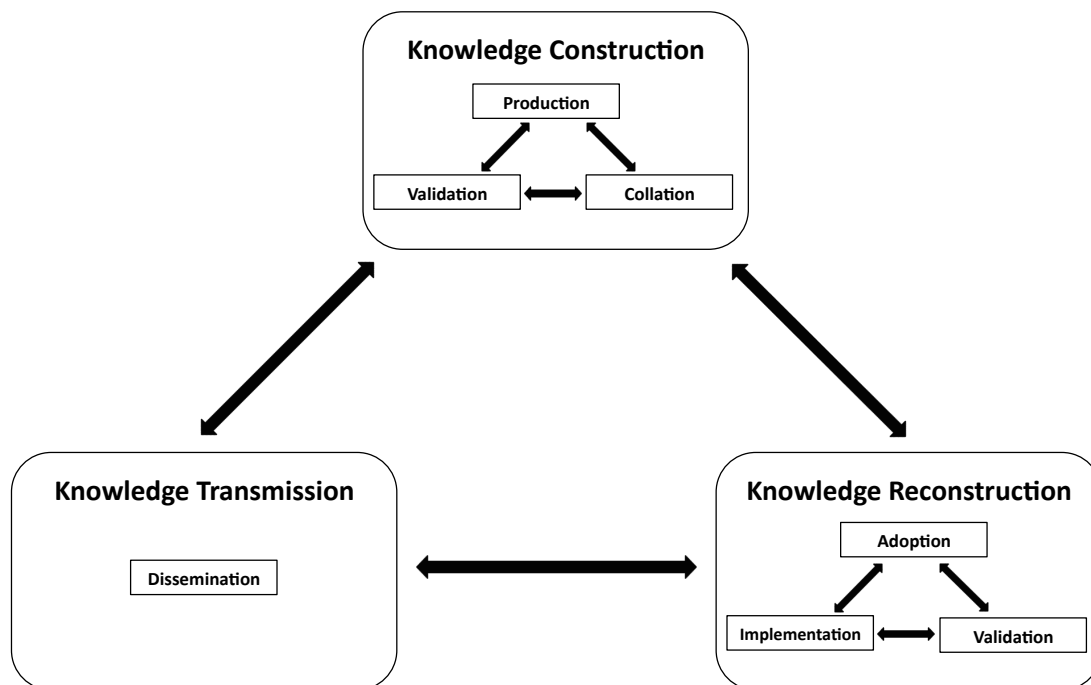


Figure 2.1 Knowledge mobilisation diagram adapted from the model developed by the OECD (2000)

production, validation, collation, dissemination, adoption, implementation, and embedding. This model serves as a useful starting point for structuring this study's investigation into Internet-mediated teacher-to-teacher knowledge mobilisation by providing an initial understanding of the basic stages that make up the mobilisation process. It is important to note, however, that the seven processes presented here may appear iteratively, and in certain situations particular stages may be absent altogether (Hogan et al., 2011; Levin, 2008; OECD, 2000) and that the model offers a generalised framework for the knowledge mobilisation process, which may not accurately reflect how the process operates when teachers share resources and knowledge online.

Stage one: knowledge construction

a) production: The knowledge creator constructs knowledge, which may be either explicit or tacit in nature.

b) validation: The knowledge creator validates or legitimises the knowledge before sharing it with others. In education, validation is often pragmatic, rather than scientific, with knowledge validated through its successful employment in practice.

c) collation: The knowledge creator collates their knowledge into a form in which it can be shared easily. Collation is determined by the mode and medium of the dissemination channel and the form of the knowledge. It generally requires one or more of Nonaka's (1994) four knowledge-creation processes – socialisation, externalisation, internalisation, combination – to occur.

Stage two: knowledge transmission

d) dissemination: Knowledge dissemination may take a variety of forms – written, diagrammatic, verbal, video – and may be located in a range of contexts including person-to-person interactions, conferences, books or reports, professional development training and virtual settings.

Stage three: knowledge reconstruction

e) adoption: The knowledge receiver must first select and then assimilate or adopt the knowledge they access into their own knowledge base. In doing so they create new knowledge that is relevant and appropriate to their context of enactment. Cohen and Levinthal (1990) developed the term 'absorptive capacity' to describe the ability of an individual to utilise existing knowledge actively in order to create new knowledge.

Absorptive capacity is defined as ‘the ability to recognise the value of new information, to assimilate it, and to apply it’ (Cohen and Levinthal, 1990: 128).

f) implementation: Once adopted, knowledge is actualised through action, practice and reflection before it becomes knowledge of one’s own (Nonaka and Toyama, 2003). Knowledge that has been adopted may never be implemented (OECD, 2000). As Levin (2008: 6) states:

Knowledge by itself is not enough to change practice, since practices are social and therefore reinforced by many elements such as norms, cultures, and habits. Simply telling people about evidence and urging them to change what they do is clearly ineffective.

g) embedding: For knowledge to change from being a transitory innovation to a sustained and routine part of one’s practice, a complex embedding process must occur. Knowledge that is integrated into and embedded within a person’s cognitive schema (Hakkarainen and Paavola, 2007; Sfard, 1998) often differs in form and function from the original knowledge. This change reflects the social and contextual mediation of knowledge during the knowledge mobilisation process and the importance of the individual knower and their specific context of action to the utilisation of knowledge.

2.3 Knowledge mobilisation in education

Knowledge mobilisation describes the movement of knowledge into active use, in any setting and with any combination of actors. In education, however, it is primarily associated with efforts to bridge the gap between research, policy and practice and in particular to strengthen the contribution of research to policy and practice. This work has been driven by Levin (2004, 2008, 2010, 2011), whose research focuses on the role that research knowledge can play in shaping education policy and practice. While Levin (2010) argues that his research represents a new field of inquiry, he is actually applying a new term to a pre-existing phenomenon. There is a long history in the education literature of calls for research to play a greater role in shaping teachers’ practice.

The traditional view of knowledge creation and mobilisation in education considers knowledge production to be the domain of academic researchers housed in universities. Lytle and Cochran-Smith (1994) label this ‘outside/in’ knowledge mobilisation. Despite the perceived value of academic research and the view that the mark of a true profession is its grounding in research and continued engagement with new research (Carnegie Task Force on Teaching as a Profession, 1986; Labarree, 1992; Levin, 2010), efforts to mobilise research knowledge in education have been largely ineffectual and teaching

continues to lack an established, consistent, codified knowledge base (CoEC, 2007; Hargreaves, 1996; Hargreaves, 1998; Lortie, 1975; Love, 1985; Mehta and Teles, 2014; OECD, 2000). In his review of knowledge utilisation in education Love (1985) contends that the knowledge produced by education researchers is not used effectively, or in many cases at all, by teachers. Two primary issues have been identified to explain the limited success of ‘outside/in’ knowledge mobilisation. The first is the nature of the knowledge produced by academics, which often has limited applicability or relevance to practitioners in schools. The second is the inadequate mediation and dissemination channels available to transmit research knowledge to teachers and schools.

Researchers in education are focused primarily on theoretical problems and issues of methodology that are derived from the foundation principles of education – psychology, sociology, philosophy and anthropology (OECD, 2000). Research knowledge is designed to conform to traditional conventions of high-status university research and journal publication standards (Hargreaves, 1996) rather than to cater to the specific and practical knowledge required by teachers. Hargreaves (1998: 16) argues that the academic structure and the research it produces too often is ‘devised not to be applicable to, or have serious bearing on, any policy or practice: it has become academic self-indulgence’. Kennedy (1997) further contends that research is uninformed by practice and consequently is irrelevant to the needs of practitioners and inaccessible to teachers. This view is supported by Elliot (1991) who claims that the generalised, epistemological knowledge and abstract theory produced by researchers is often seen by teachers to negate their professional culture and craft knowledge, which is acquired tacitly through experience in the classroom. Huberman (1983) neatly summarises the lacuna between academic research and the needs of teachers:

Research evidence is an unlikely source of practitioner information, not only because it assumes an underlying order but also because the ways in which the theoretical or scientific sources talk and write about instrumental practice are uncongenial: the two frames of reference collide. (497)

The perceived irrelevance of much knowledge generated by researchers is enhanced by limited and often ineffective dissemination channels. Little and Bird (1986) suggest that research has much to offer teachers but the absence of relationships and direct communication channels between researchers and teachers means that much of the knowledge generated by researchers does not reach teachers in a relevant or usable form and furthermore, teachers lack the support to make use of the research findings. The

Commission of European Communities' [CoEC] (2007) report highlights the weak tradition in education of making new techniques known and available to practitioners. Cooper and colleagues (2009) add weight to this claim, suggesting that most teachers do not engage directly with research and instead rely on various mediating structures such as professional associations, their schools and the mass media to receive research knowledge. The poorly developed nature of many of these mediating structures makes this problematic (Coburn et al., 2009; CoEC, 2007).

The primary method for disseminating knowledge to in-service teachers is through professional development initiatives. These traditionally took the form of workshops, one-off courses and conferences, which occurred outside the school context. A one-size fits all model of knowledge transmission was favoured, with little appreciation or thought given to the needs of individual teachers or to the diversity of the school settings in which teachers operate. Recent research suggests that the most effective professional development involves teachers and school leaders learning from experts, mentors and their peers in a collaborative environment, with initiatives sustained over a long period of time and centred upon issues arising directly from practice (Corcoran, 1995; Darling-Hammond et al., 2009; Darling-Hammond and McLaughlin, 1995).

Lortie (1975), in his seminal sociological study of teachers, describes the result of poor knowledge mobilisation between research and practice:

Teaching has not been subjected to the sustained, empirical and practice-oriented inquiry into problems and alternatives which we find in university-based professions. It has been permitted to remain evanescent. [69]

Lortie goes on to explain the corollary of the gap between research and practice:

[T]o an astonishing degree the beginner in teaching must start afresh, uninformed about prior solutions and alternative approaches to recurring practical problems [70] ... Teachers are largely "self-made"; the internalisation of common knowledge plays only a limited part in their movement to work responsibility. [80]

Although Lortie was writing nearly four decades ago, his assessment of the issues facing knowledge mobilisation in education continues to apply to today's situation. The CoEC's (2007: 6) more recent assessment of the knowledge mobilisation context in education reinforces many of the same themes as Lortie:

There is a need to further develop a culture of reflection and evaluation, so that research and evaluation can contribute better to pedagogical innovation and the improvement of educational practice.

While knowledge mobilisation in education is associated most frequently with the role and dissemination of research knowledge, the term may also be applied to the mobilisation of teacher-created knowledge. There is increasing recognition that knowledge users and not just researchers must play a central role in the creation of knowledge and the fostering of innovation (Von Hippel, 1988). Organisational literature places individuals at the centre of knowledge creation and innovation in organisations (Fahey and Prusak, 1998; Moss Kantor, 1983; Nonaka, 1994). Studies show that managers and professionals rely more on their own experiences and the advice of colleagues than on research evidence (Dobbins et al., 2007; Maynard, 2007). This finding has been replicated in an education-based study, which found that teachers rated professional journals and university coursework as less trustworthy than advice and ideas offered by their colleagues (Landrum et al., 2007). The sharing of tacit, practice-based knowledge through conversations detailing specific experiences and observations of knowledge in action have been found to be the most effective means for transferring knowledge in the workplace (Argote et al., 2003; Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995). In light of the apparent potential of practitioner knowledge, this study is reappropriating the term ‘knowledge mobilisation’ to describe the processes surrounding the creation, dissemination and reconstruction of teacher knowledge.

2.4 Teacher-to-teacher knowledge mobilisation

Appreciation for the role that teacher-created knowledge plays in the professional learning of in-service teachers has had a chequered history both in the education literature and in practice. Despite growing recognition of the value of teacher-created knowledge, the mobilisation of this knowledge is often hampered by the absence of established and effective mediation channels and the enduring perception that teachers’ knowledge lacks the validity and legitimacy of research knowledge (Hargreaves, 2000; Lieberman and McLaughlin, 2000). Ozga’s (2004) warning about the lack of recognition surrounding the role practitioners play in education knowledge mobilisation is supported by Sachs (2003), who contends that teacher knowledge does not yet form an essential part of the professional project. The knowledge created by teachers is often dismissed as being overly personal and intuitive, lacking the codifiable and systematic nature of academic knowledge (Fullan, 1981; Hargreaves, 1996; Jackson, 1968; Lortie, 1975; Sachs, 2003). Fullan (1982) suggests that this in part may reflect the view that teachers’

knowledge is irrelevant and unhelpful to other teachers because it is produced and grounded in the specific contexts of each individual teacher's practice.

An increasing number of education studies, however, have demonstrated the importance of collaboration and knowledge sharing between teachers for classroom development and the creation of new knowledge (Hargreaves, 1998; Little and Bird, 1986; McLaughlin and Talbert, 2001). Studies have found that teacher collaboration leads to increases in student achievement (Little, 1981; Little and Bird, 1986; McLaughlin and Talbert, 2001) and the reduction of behavioural issues in the classroom (Little and Bird, 1985). Creating strong teacher communities has also been linked to improved teacher satisfaction (Nias, 1989), a stronger sense of efficacy and self-belief in teachers (Ashton and Webb, 1986) and an enhanced capacity in teachers to support change and school reform (Fullan and Hargreaves, 1992; Little, 1984).

Revisionist accounts of educational knowledge production (promoted by authors such as OECD, 2000; A. Hargreaves, 1996; D. Hargreaves, 1999, 2000; Hogan et al., 2011) contend that knowledge production in education is multi-modal, involving both academics housed in universities and practitioners in schools. Revisionists claim that teachers produce and hold 'specific and legitimate' knowledge (Hargreaves, 1996), which is beneficial to other teachers. Hargreaves and Fullan (1992) argue that teachers do not simply deliver the curriculum; they develop and reinterpret it, and what teachers believe and do is crucial to shaping teaching and learning in schools. Relationships between teachers and their colleagues are pivotal to shaping teachers' actions and practice (Hargreaves, 1992; Little and Bird, 1986). Traditionally, however, the structure of teaching, the organisation of schools and the scarcity of knowledge dissemination channels have limited knowledge mobilisation between teachers.

The knowledge created and accumulated by teachers across their careers remains predominantly in the possession of the creator, with few structures to facilitate its mobilisation (Barab et al., 2001; Fullan et al., 2006; Hargreaves, 2000). The tacit nature of the knowledge that teachers create combined with the contexts in which it is constructed present a complex set of factors that have an impact on the transmission of this knowledge. The 'egg-crate' model of instruction (Darling-Hammond et al., 2009), where teachers work primarily in isolated classrooms with limited opportunities to discuss their

practice or to collaborate on teaching strategies, acts to limit knowledge mobilisation. Within a typical workday teachers have few opportunities to observe other teachers at work or to engage in collective knowledge building activities or dialogue with other teachers. This is exacerbated in the USA, where in 2009 lower secondary school teachers had 151% more teaching hours than the OECD average (OECD, 2011). According to Lieberman and Miller (1990: 11), the isolation of teachers and teaching in individual classrooms has led to the development of 'remote, oblique and defensively protective' relationships between teachers, where privacy rules interactions and knowledge is not freely or openly available or shared. Fullan (1993) explains that this is the result of the history and evolution of schools where teachers were given little time in the day for collaboration or the sharing of ideas and knowledge, and has resulted in the absence of the habit of sharing or receiving information in schools.

Lortie's (1975) observation that teachers must learn their craft afresh continues to hold true today. Little (1987: 502) has reflected that the absence of mediating mechanisms to enable the mobilisation of teachers' knowledge has resulted in teachers leaving 'no legacy of insights, methods and materials at the close of a long career'. While there is growing recognition among scholars that teachers possess and construct knowledge within and for their practice, the personal knowledge of teachers is not disseminated actively or widely. Foray and Hargreaves (2003: 13) explain the restrictions hampering knowledge mobilisation:

Teachers have had few natural incentives to attempt to diffuse their findings either to colleagues in their own school or subject specialism, or to schools elsewhere or to different subject specialists ... there is little consensus on the methods that are most appropriate to investigating 'what works', and no system for disseminating outcomes in the form of professional knowledge transfer.

The 'localness' of teaching and teacher knowledge also complicates mobilisation. 'Localness', a term borrowed from Davenport and Prusak (1998), describes how difficult it can be to codify, transfer, recreate and reuse knowledge constructed in a specific setting in a new context. Teacher knowledge is context-rich. Teachers create knowledge and teaching strategies that are relevant to the unique settings of their individual classrooms and schools and may not be directly applicable to a new setting. Teacher knowledge mobilisation, therefore, involves issues of transfer (disseminating knowledge from one person to another) and transposition (disseminating knowledge from one place

or context to another). The OECD (2000: 76) neatly summarises the issues of transfer and transposition facing the mobilisation of knowledge between schools:

There may be marked differences in the character of the schools, the background of the students, the values of the teachers and so on. What works in one school may not work in another school because of these differences in context. Moreover it is more difficult for two teachers in different schools to find opportunities to tinker together, which is so helpful to successful transfer.

The localness of teacher knowledge also complicates the knowledge validation process. The validation of teacher knowledge is generally informal and personal, requiring individual teachers to make judgements about the impact and value of their knowledge (Hargreaves, 1999). Evaluation is based primarily on whether the knowledge works in an individual teacher's practice. Therefore, knowledge validation is inseparable from a teacher's ongoing practice and the validity of a teacher's knowledge may not hold in other contexts.

Despite the issues that face teacher-to-teacher knowledge mobilisation efforts, the growing recognition of its importance has led both to the development of new channels that support the mobilisation of teacher's knowledge, these will be explored in section 2.10, as well as increased research into knowledge mobilisation. Much of the literature on teacher-to-teacher knowledge mobilisation falls into one of two categories. The first includes much of the literature reviewed in this section. It consists of theoretical discussions focused on the supposed benefits associated with creating knowledge mobilisation opportunities for teachers and the limitations current and historical structures within education impose on knowledge mobilisation efforts. The second are studies on the barriers to and motivations influencing knowledge mobilisation efforts and behaviour (see for example Ardichvilli et al., 2003; Chen and Hung, 2010; Hsu et al., 2007; Lin and Chen, 200; Wasko and Faraj, 2009). While this research has provided a foundation for understanding the potential of knowledge mobilisation, it has produced little insight into how the knowledge mobilisation process actually operates or the influence that engagement in the mobilisation process has on the teachers' practice and learning.

There has been comparatively little empirical research in education or other fields that examines how organisations or individual actually create and manage knowledge (Levin, 2008; Widen-Wulff and Ginman, 2004), what knowledge is shared (Christensen, 2007) or how the knowledge is reconstructed and reemployed by others. In their review of the

literature on knowledge dissemination in the health sector, Mitton and colleagues (2007) found eight-one papers that met their quality standards. However, only eighteen were empirical studies of the effects of the knowledge transfer process. A similar finding was determined by Hemsley-Brown (2004) in her review of the research in management studies. She concluded, 'there was little empirical research evidence to indicate which strategies were effective in increasing research use by managers, or practitioners' (Hemsley-Brown, 2004: 540). Holtshouse (1998) suggests that research needs to be developed in three key areas: firstly, how tacit knowledge can be accessed and utilised; secondly, how to structure the knowledge flow optimally to facilitate maximum impact; and thirdly, 'how to make knowledge, which by its nature is fuzzy and intangible, visible and concrete' (279). These claims continue to hold and provide useful direction for research efforts in 2014.

In education there is an absence of sound empirical work that investigates what actually occurs during each stage of the knowledge mobilisation process or the influence that participation in each stage has on teachers or on education more generally. While knowledge theoretically lies at the heart of all studies of knowledge mobilisation, most studies fail to develop a sophisticated conceptualisation of knowledge that is specific to the contexts of the study. The limited discussion of knowledge is compounded in education-based knowledge mobilisation studies by the limited understanding of the nature of the knowledge teachers share with other teachers. As James and colleagues (2006) explain:

Whilst much is unknown about the institutional conditions that help teachers to learn new classroom practices, there is even less understanding about how knowledge is created and shared across schools (102).

To understand Internet-mediated teacher-to-teacher knowledge mobilisation it is necessary to develop not only a sound understanding of the knowledge teachers create in their practice but also an understanding of how this knowledge is evaluated and used by other teachers and of the learning processes teachers employ when reconstructing knowledge in their practice – key foci for this study. In order to establish a foundation for examining the nature of knowledge and learning teachers construct from their engagement in Internet-mediated teacher-to-teacher knowledge mobilisation, the following sections will review the literature on teacher knowledge and learning.

2.5 Teacher knowledge

Despite lengthy discussions and multiple studies, there remains little consensus about what constitutes the knowledge base for teaching, or about how this knowledge is created and used. Lieberman and Miller (1990), in their discussion of the social realities of teaching, claim that ‘the knowledge base of teaching is weak; there is no consensus about what is basic to the practice’ (154). Their claim continues to be supported by many education commentators and scholars in the US (see for example Goldstein, 2014; Mehta and Teles, 2014). As Lieberman and Miller observe, in order to develop a knowledge base for teaching it is necessary to have a robust understanding of the various roles teachers assume and the tasks teachers perform in their practice as well as to assess the skills and knowledge that are required to fulfil these roles. Jackson (1968) in his sociological study of life in the classroom, observed that teachers have:

the tendency to approach educational affairs intuitively rather than rationally. When called upon to justify their professional decisions, for example, my informants often declared that their classroom behaviour was based more on impulse and feeling than on reflection and thought. (145)

The absence of a codified knowledge base that satisfies the needs of all practitioners, identified by Jackson nearly fifty years ago, continues to define teaching today (Green, 2014; Levine, 2006; Mehta and Teles, 2014). Levine (2006), in his report on the state of teacher education in the USA, suggests that these issues are becoming increasingly significant because teachers today ‘need to know and be able to do things their predecessors did not ... [teaching] is a fundamentally different job than that of past generations of teachers’ (11). Discussions of teacher knowledge have been hampered by not only by the absence of agreement about the types and forms of knowledge teachers require for their work but also by the past rejection of teacher-created knowledge as lacking legitimacy and validity. The near exclusive focus on the movement of knowledge from research to practice in the current literature continues to minimise the role and potential of teacher-created knowledge.

A number of scholars have attempted to identify and delineate the components of teacher-created knowledge. Elbaz (1983) suggests that teachers’ knowledge includes knowledge of self, knowledge of the milieu of teaching (the social structure of the school and its community), knowledge of subject matter, knowledge of instruction (including child development, learning theory and social theory) and knowledge of curriculum

development. Hargreaves and Fullan (1992) build upon Elbaz's conceptualisation, suggesting that teacher knowledge encompasses:

[D]eeper knowledge of and greater confidence in teaching their subject; developing better expertise in classroom management so that more time can be devoted to instruction; knowing how to teach mixed ability classes; being aware of and becoming proficient in new teaching strategies like cooperative learning; and becoming knowledgeable about and able to respond to the different learning styles of their pupils.

Teacher knowledge also includes emotional qualities. Sachs (2003) claims that beliefs and values lie at the centre of teachers' construction of their professional identities and their understanding of how to be, how to act and how to understand. Fullan (1993) argues that at its core teaching is a moral professional and knowledge of self (Elbaz, 1983) and the moral and emotional disposition of a teacher (Hargreaves and Goodson, 1996) are essential components of a teacher's knowledge. Cooper and MacIntyre (1995) identify two strands of teachers' craft knowledge: one that deals with the affective concerns of teaching and is focused on interpersonal and social interaction; and the other that is concerned with the technical elements of teaching, incorporating learning theory, subject knowledge and pedagogy.

The complex variety of ideas, skills and understandings that make up teacher knowledge are accumulated from a range of sources. Elbaz (1983) and Hargreaves and Fullan (1992) consider teacher knowledge to include knowledge developed within the context of a teacher's practice as well as knowledge derived from research and theory that is developed outside a teacher's classroom practice. Stenhouse (1984) argues that good teachers recognise what needs to be done in their practice and are able to draw upon the ideas of educational researchers to support their work. However, the knowledge that they gain from external knowledge sources is only useful when it is internalised by the teacher and amalgamated into their classroom practice in a way that is relevant and meaningful. Teachers' knowledge is deeply personal and intimately connected to the nature and contexts of their practice. It enables teachers to perform their various professional tasks, including: instructional planning and preparation; classroom instruction, which incorporates knowing what to teach (subject matter and curriculum) as well as how to teach it (pedagogy); interactions with students; behaviour management; assessment and feedback; and collaborating with colleagues.

Shulman (1987) established seven categories of knowledge that are required by teachers: content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of

educational contexts and knowledge of educational ends, purposes and values. He further identified the four major sources of this knowledge: (1) scholarship in content disciplines; (2) the materials and settings of institutionalised educational process, which includes curricula, textbooks, school organisation and the structure of the teaching profession; (3) research on schooling, social organisations, human learning, teaching and development together with other social and cultural phenomena; and (4) the wisdom of practice itself. Like Stenhouse (1984), Shulman (1987) argues that though it comprises different types of knowledge and is derived from a range of sources, all teacher knowledge is understood, developed and incorporated into professional practice through a teacher's engagement in the acts of teaching.

Similar to Shulman's (1987) four sources of knowledge is Cochran-Smith and Lytle's (1999) three-part taxonomy of teacher knowledge construction. The first level is 'knowledge-for-practice'. This refers to knowledge developed externally by researchers and policymakers, which is primarily explicit and general in nature. Before this type of knowledge can be integrated into classroom practice, it must be individually interpreted and adapted to a teacher's specific context and internalised. The second level of the taxonomy is 'knowledge-in-practice', which represents the largely tacit knowledge that teachers develop through the acts of teaching. It is embedded in the contexts and acts of practice, and consequently is personal and specific in nature. Knowledge-in-practice is often developed as teachers reflect on their actions. The third level, 'knowledge-of-practice', places teachers at the centre of knowledge production. It assumes that the knowledge teachers need to teach effectively is generated when teachers treat their classrooms and schools as research spaces. Teachers conduct inquiry projects into their practice, as well as interrogating and interpreting the knowledge and theory produced by others, to create knowledge that is applicable and relevant to their teaching context. In contrast to Shulman (1987) and Stenhouse (1975) who consider teacher knowledge to be amalgamated from various sources, Cochran-Smith and Lytle's three types of knowledge are mutually exclusive.

2.6 Personal knowledge

The concept of personal knowledge appears to be connected most closely to the nature of the knowledge that teachers share on the platforms and also construct from the resources shared on the platforms in this study. It is used in this study to encapsulate the

multifaceted nature of teacher knowledge. Eraut (2000: 114) defines personal knowledge as ‘the cognitive resources which a person brings to a situation that enables them to think and perform’. According to Eraut and Hirsch (2007) personal knowledge encompasses codified knowledge in personal form, know-how or knowledge of skills and practice, personal understandings developed from experience in the workplace, accumulated memories of past events that direct future actions, personal expertise and tacit knowledge, self-knowledge, and the attitudes and values that shape a person’s approach to their work. For Kennedy (1983: 193), personal knowledge is ‘the organised body of knowledge that ... [people] use spontaneously and routinely in the context of their work ... a special domain of knowledge that is relevant to one’s job’. This is similar to Elbaz’s (1983: 1) contention that ‘teachers hold a complex, practically-oriented set of understandings which they use actively to shape and direct the work of teaching’. Personal knowledge is conceptualised in this study as the individually held, context-specific, practical knowledge teachers develop from a range of sources and depend upon to accomplish their work.

In conceptualising teachers’ knowledge as personal knowledge there is no attempt to distinguish between different types of knowledge or knowledge gained from different sources. Knowledge from multiple sources – theoretical, explicit knowledge from research and policy, tacit knowledge from experience, personal values and beliefs and knowledge of the context – is used simultaneously and in differing combinations to inform a teacher’s professional practice. Though derived from multiple sources, teacher knowledge is only realised as personal knowledge when it is employed in practice. It is through the acts of teaching and reflection on experience that teachers bring together information and knowledge from multiple sources and develop their own personal, professional knowledge. The individual knower and their context are pivotal to knowledge construction. The changing nature and contexts of a teacher’s work and the varying stimuli they encounter both inside and outside the classroom means that their personal knowledge is evolving constantly. Furthermore, a teacher’s prior experiences and personal history contribute to the personal knowledge they construct (Abdullah and Tallib, 2012; Clandinin, 1989). Connelly and Clandinin (1988) suggest that personal practical knowledge is grounded ‘in the teacher’s past experience, in the teacher’s present mind and body ... in future plans and actions [and] found in the teacher’s practice’ (25).

Fuhrman (1994: 140) explains, ‘the meaning of [knowledge] is constructed by the user ... individuals translate findings through the lens of prior knowledge and understanding, making sense of new knowledge in the context of daily activities’. Therefore, personal knowledge is information that has been internalised, so that it changes the mental modes (beliefs, values, perceptions) or actions (practice, behaviour) of the teacher. This process of internalising and constructing new knowledge represents learning. Consequently, in order for teachers to create personal knowledge, learning must occur.

2.7 Learning and knowledge

Knowledge is a product of learning. It is acquired and created through a range of processes, which collectively, and at times individually, represent learning. Illeris (2007) defines learning as,

Any process that in living organisms leads to permanent capacity change and which is not solely due to biological maturation or aging (3)

Illeris importantly notes that the process of change he describes is not static but rather is added to, subsumed or otherwise altered over time as individuals encounter new situations and acquire new knowledge. Siemens (2006) explains that knowledge is not a passive entity but is reshaped and adapted continually to reflect new environments and information. This aligns with Eraut’s (2000) belief that learning occurs ‘when existing knowledge is used in a new context or in new combinations’ (114). While knowledge is conceptualised here as being individually constructed and held, both the individual and their socio-cultural context shape learning. A teacher’s professional learning comes from internal drive and personal agency while also being distributed across numerous resources, materials and people (Drent and Meelissen, 2008; Spillane, 1999) and shaped by the individual’s connection to and interaction with their environment.

Eraut (1994) suggests that learning does not occur when an individual encounters an idea or information but rather through new input or use. It is through being enacted that an idea gets reinterpreted and acquires new meaning, which is specific to the individual and their context. This moves beyond the learning as acquisition metaphor (Sfard, 1998; Hakarainen and Paavola, 2007) to the conceptualisation of learning as construction. Hakarainen and Paavola (2007) suggest that in this conception:

Learning is seen as analogous to innovative inquiry through which new ideas, tools and practices to support intelligent action are created and the knowledge being developed is significantly enriched or changed during the process.

Learning therefore occurs within the internal psychological setting of the individual (thinking) as well as through the actions of an individual, which are situated within a particular environmental context (Illeris, 2007).

The intertwining and interdependence of individual and contextual factors for the integration of new ideas in a teacher's practice is captured by Zhao and Frank's (2003) ecosystem model of teacher development with technology. While the model is designed in relation to a teacher's technology integration, the manner in which it combines individual and contextual factors seems relevant to the integration of any information or innovation. Zhao and Frank (2003) present a model of dynamic interactions whereby species have individual autonomy while also having to adapt to one another and the wider context within a structured system. Drawing on their ethnographic-style study of teacher learning, Hodkinson and Hodkinson (2005) reinforce Zhao and Frank's model, suggesting that teacher learning involves a complex set of inter-relationships between the individual teacher, their departmental culture and the regulatory contexts within which teachers and their department are situated.

2.8 Internal and external learning factors

As learning is embedded within the individual as well as situated in the environmental and social contexts in which the individual operates, factors relating both to the individual and their environment shape how teachers engage with learning opportunities and the knowledge, skills and expertise that they construct from these opportunities. Eraut (2004) in his study of learning in the workplace, identified two categories of factors influencing the learning process – learning factors and context factors. Learning factors are associated primarily with the individual learner and include the perceived challenge and value of the work to the individual, the presence of feedback, support and trust, and an individual's confidence, commitment, personal agency and motivation to learn. Context factors relate to the broader workplace environment and consist of the allocation and structure of the work, the nature of an individual's encounters and relationships with people and their participation in the workplace, and their expectations of their performance and progress.

Illeris (2003) claims that adults learn only what is meaningful to them and take as much responsibility for their learning and development as they want or deem necessary.

Furthermore, adults will not learn something that they are not interested in or consider unimportant (Billett and Somerville, 2004; Illeris, 2003; Siemens, 2006). The choice to seek out and engage with both formal and informal learning opportunities and the proclivity and ability to adopt and assimilate new knowledge are determined by the individual teacher. Therefore, a teacher's personal agency is critical to their engagement with knowledge mobilisation. Billett (2004), following Gibson (1969), proposes that workplace affordances reside within the individual and that an individual's experience of learning opportunities is shaped by their ontogenies or personal histories. This means that the experiences and interactions that have occurred throughout a person's life shape the values, beliefs, concepts and approach that they bring to their future learning (Rogoff, 1990; Scribner, 1985). The role of individual ontogenies in shaping a person's future attitudes and actions is linked to Bourdieu's (1991) concept of habitus. According to Bourdieu, habitus is the subconscious collection of dispositions that orientate and inform a person's actions in a specific situation. A teacher's personal history, values and beliefs shape both the learning process and the knowledge that they construct.

The role of individual characteristics and dispositions is also examined in the literature related specifically to teacher learning. Shulman and Shulman (2004) suggest that to be an accomplished teacher who learns and develops, one must be ready (possessing vision), willing (having motivation), able (both knowing and able 'to do'), reflective (learning from experience), and communal (acting as a member of a professional community). A number of studies have determined that teachers who possess a strong drive to learn will undertake activities to ensure that they develop and progress within their practice (Fullan and Miles, 1992; Spillane, 1999; Van Eekelen et al., 2006). Grundy and Robinson (2004) frame a teacher's receptiveness to and enthusiasm for learning as being driven by their life histories, personal circumstances and professional life trajectories. Day (1993) adds weight to these claims by suggesting that teachers cannot be developed passively. The ability to keep pace with change requires teachers to develop actively and to take charge of their own learning agenda.

While the individual disposition of a teacher shapes the learning process, learning also encompasses social elements. To fully understand learning it is necessary to recognise the role that the learning context plays in shaping the knowledge that an individual constructs. The internal drive to learn is transformed into learning opportunities through

engagement with the socio-cultural context of practice where learning is distributed across the individual, other people and resources (Cobb and Bower, 1999; Greeno et al., 1996; Pea, 1997; Putnam and Borko). New knowledge is generated in part through an individual's participation within their context of practice as well as through interaction and engagement with the resources (material and human) available in that context (Lave and Wenger, 1991). The learning process and resultant knowledge is shaped by the context(s) in which knowledge is acquired and used. Clarke and Hollingsworth (2002) describe the impact of a teacher's socio-cultural context on their practice:

The school context can impinge on a teacher's professional growth at every stage of the professional development process: access to opportunities for professional development; restriction or support for particular types of participation; encouragement or discouragement to experiment with new teaching techniques; and, administrative restrictions or support in the long-term application of new ideas. (962)

In an unpublished study, Little (2005) determined that the density of learning resources (both physical and social) that a teacher or group of teachers has access to has an impact on both the quality of learning and the level of innovation in their classroom practice.

Studies have identified several levels of external factors that have an impact on teachers' learning. The first level is the culture of a school. Day (1999) argues that the culture of a school may provide both positive and negative support for teacher learning. School culture, according to Day (1999), encompasses the conditions (including time and resources) and opportunities for teacher to engage in ongoing reflection, collaboration and inquiry. Other scholars have divided school culture into departmental culture and school leadership and management culture. Hodkinson and Hodkinson (2005) claim that departmental cultures, in particular the nature and degree of collaboration that occurs between teachers in a department, have a significant impact on learning. Hodkinson and Hodkinson (2005) further identify the importance of school management for teacher learning, as the value that school leaders place on teacher learning has a great impact on how teachers approach their development. A number of studies support the importance of school leadership in shaping teacher learning (Barker 2001; Fernandez, 2000; Leithwood et al., 1999).

2.9 Forms of learning

This study is focused on the continued professional learning of teachers, once they have undertaken their initial teacher training and entered the classroom as fully-fledged teachers. Teachers engage with a variety of activities – deliberate and unintentional,

formal and informal – to facilitate the creation of new knowledge of and for their practice. The purpose of this section of the literature review is to examine the various ways in which teachers can learn in and through their practice. Rather than to suggest that one form of learning is better or more prevalent than the others, the perspective adopted in this study is that teachers learn in a variety of ways, depending on their particular needs and the opportunities they have available to them. Detailing the various ways that teachers have been found to learn provides a foundational understanding that this study can draw upon when assessing and determining the nature of the learning process as it occurs in and through Internet-mediated teacher-to-teacher knowledge mobilisation.

Tynjala (2008), in her review of the literature on workplace learning identified three basic modes of workplace learning:

- (1) incidental and informal learning, which takes place as a side effect of work, (2) intentional, but non-formal learning activities related to work (mentoring, intentional practising of certain skills or tool use, for example), and (3) formal on-the-job and off-the-job training.

Wilson and Berne (1999), drawing on the work of Ball and Cohen (1999), describe teacher learning as ‘a patchwork of opportunities – formal and informal, mandatory and voluntary, serendipitous and planned – stitched together into a fragmented and incoherent “curriculum”’ (174). This description captures the inconsistent and segmented nature of learning opportunities of teachers and the often unconscious and ad hoc way that teachers navigate and engage with professional learning. Eraut (2004) suggests that professional knowledge, while dependent in part on public codified knowledge, is constructed through experience and is acquired over time through the demands and challenges that arise in the workplace. Much workplace learning, therefore, is unintended and informal in nature, occurring as a result of an individual’s participation in a changing work context.

Attempts have been made to identify and categorise the various learning opportunities teachers engage with and the actions they undertake when creating knowledge in and for their practice. Meirink and colleagues (2007), in a review of research on teacher learning, identified five broad categories of learning opportunities or actions that teachers undertake: (1) doing; (2) experimentation; (3) reflection on experiences; (4) learning from others without interaction; and (5) learning from others with interaction. These five categories are similar to those discussed by Hargreaves (1996) in his analysis of the

literature on how teachers create knowledge within their practice. Hargreaves identifies four knowledge-creation processes teachers employ: tinkering and experimenting in their practice (Elbaz, 1983, Huberman, 1992); adopting the stance of the reflective practitioner (Schon, 1983); becoming researchers of and within their own practice (Lytle and Cochran-Smith, 1992; Cochran-Smith and Lytle, 1999); and through formal and informal, planned and unplanned collaboration and conversations with other teachers. Hargreaves (1999) further distills these ideas into the ‘three seeds’ of teacher knowledge creation, tinkering, research and interaction.

Elbaz (1983) suggests that it is through tinkering and experimenting in practice that teachers are able to combine the theoretical knowledge that they hold of subject matter, child development and learning theory with their experiential and practically oriented knowledge, which is developed through experience. Fox and colleagues (2011) build on Elbaz’s conception of learning to suggest that much of teachers’ knowledge creation occurs through the constant adjustments and modifications that teachers make to their practice. The process of trial and error that teachers go through when integrating new knowledge or tools into their teaching practice is described by Huberman (1992: 136):

They gradually develop a repertoire of instructional skills and strategies, corresponding to a progressively denser, more differentiated and well integrated set of mental schemata ... They develop this repertoire through a somewhat haphazard process of trial and error, usually when one or other segment of the repertoire does not work repeatedly ... Teachers spontaneously go about tinkering with their classrooms.

Huberman’s description of teachers’ gradual accrual of knowledge aligns with Ibarra’s (1999) suggestion that individuals learn through an iterative process, moving from observation, to imitation, adaption and eventually the development of their own practice, what he calls ‘experimenting with provisional self’. Huberman, Elbaz and Fox and colleagues all suggest that teacher learning occurs automatically through engagement in practice. Hammerness and colleagues (2005) dispute this, instead suggesting that teachers must take an active role in developing their professional practice. For them, experimentation and tinkering in practice requires teachers to rethink their ideas, practices and often their values in order to develop new patterns of thought and behaviour. This study considers that learning involves change in an individual’s capacity, including shifts in cognition and mental modes. However, as the act of learning may occur unintentionally through participation in everyday events, it is possible that an

individual may remain unaware of the changes in their thinking and practice (that is learning) that have taken place.

Schon's (1983) concept of the reflective practitioner provides a means to connect the at times unconscious tinkering teachers undertake within their practice more concretely with the construction of new knowledge. Schon invests teachers with an active role in the procurement and development of the specialised knowledge that they require to become expert teachers. Schon believes that teachers' personal, practical knowledge is developed only when teachers reflect on their actions:

He [the teacher] reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation. (Schon, 1983: 68).

For Schon, the teacher is an active agent in the progression of his learning and his acquisition of knowledge.

Lytle and Cochran-Smith (1992) build upon and extend Schon's theory of the reflective practitioner to suggest that teachers also learn and create new knowledge by assuming an inquiry stance within their practice. They claim that 'what is worth knowing about teaching includes teachers' 'ways of knowing', or what teachers, who are researchers in their own classrooms, can know through their own systematic subjectivity' (43). Hargreaves (1999) describes teacher-led research as a more systematic form of tinkering. It is tinkering with an explicit purpose, the overt intention of building new knowledge. Barth (2001) claims that inquiry into practice is essential for allowing teachers to 'distill, clarify and articulate [their] craft knowledge' (65). It enables teachers to extend their knowledge beyond the immediate contexts of its creation and employment, essentially making it more codified and explicit.

Learning also arises from teachers' interactions with other teachers. Studies demonstrate that the one-off chance encounters and brief conversations that teachers have with other teachers within the context of their school day are among the most beneficial activities for their professional development (Hodkinson and Hodkinson, 2004, 2005; Lieberman and Pointer Mace, 2010; Little, 2002, 2003; Shedd and Bacharach, 1991). Participation in formal and informal conversations and discussions about classroom practice, observing colleagues who are engaged in innovative practices and the sharing of resources and examples of good practice are essential for enabling and supporting ongoing knowledge

creation (Ertmer, 2005; Hodkinson and Hodkinson, 2005; Van Braak, 2001; Wozney et al., 2006). In these circumstances, while the learning process is distributed across multiple teachers, the knowledge that arises from these interactions is individually constructed and known.

Little (1988) positions the creation of shared understanding and collective participation as pivotal aspects of teachers' professional development. Other studies support Little's findings, determining that professional communities of teachers who share ideas and resources, and support each other in their learning and development, are a primary enabler of and means for teacher learning and knowledge construction (Becker, 2001; Hodkinson and Hodkinson, 2004 and 2005; Meirink et al, 2009; Webster-Wright, 2009). This form of learning aligns with the theory of communities of practice (discussed in chapter one), which was developed by Lave and Wenger (1991) to describe the process in which learning occurs through social practice and membership of a professional community. Communities of practice develop around collective learning and focus on accumulating knowledge and experience within shared areas of interest through the experiences of participants (Wenger, 2001). Learning is developed through the processes of reflecting on practice and interpreting and negotiating shared meaning between participants. While it is possible that true communities of practice do develop between teachers, much of the learning that arises through interaction between teachers does not conform to the 'assumption of collectivity' (Grossman et al., 2000) that is central to communities of practice. While teachers undoubtedly rely on their colleagues for advice, support and new ideas, their interactions are not always grounded in collaborative learning enterprises or shared meaning making and collective beliefs and behaviours. However, regardless of whether interactions between teachers constitute the formation of true communities of practice, research consistently demonstrates the value of teachers sharing their personal, practical knowledge with other teachers. This growing recognition of the value of teacher-created knowledge and the role that teacher-to-teacher knowledge mobilisation can play in shaping innovation and supporting teacher learning has led to the development of new channels for knowledge mobilisation.

2.10 New channels for knowledge mobilisation (and learning)

Over the past fifteen years, teacher networks – sometimes referred to as professional learning communities – have emerged in education, as well as other sectors, to facilitate

practitioner-to-practitioner knowledge mobilisation. Teacher networks were designed to address the perceived failings of particular forms of traditional professional development, which were criticised for being fragmented, unproductive and ineffective, unrelated to teacher needs and irrelevant to classroom practice (Boyle et al., 2005; Darling-Hammond et al., 2009; Elmore, 2004; Rait, 1995; Riding, 2001; Shedd and Bacharach, 1991). They were conceptualised as providing opportunities for professional groupings of teachers or schools to work together to share and build knowledge, resources and learning opportunities, thereby creating learning opportunities that are teacher-driven, collaborative, and specific to the challenges and issues arising from teachers' work (Darling-Hammond et al., 2009; Katz and Earl, 2010).

Research has determined that for professional development and knowledge dissemination to be successful it needs to be sustained and ongoing, to include opportunities for individual reflection as well as group inquiry, to be embedded in the work and contexts of teachers, to be collaborative and interactive, to be rooted in the knowledge base of teaching, and to be targeted and tailored to the needs of teachers and the issues that they are facing in their practice (Corcoran, 1995; Darling-Hammond et al., 2009; Darling-Hammond and McLaughlin, 1995). Networks place teachers at the centre of their own learning, encouraging them to take an active role in facilitating the creation, dissemination and reconstruction of knowledge. As Hargreaves (2003: 9) explains:

A network increases the pool of ideas on which any member can draw and as one idea of practice is transferred, the inevitable process of adaptation and adjustment to different conditions is rich in potential for the practice to be incrementally improved by the recipient and then fed back to the donor in a virtuous circle of innovation and improvement. In other words, the networks extend and enlarge the communities of practice with enormous potential benefits.

Whereas the traditional work and learning contexts of teachers are based upon individually held knowledge, networks promote the pursuit of collective learning and knowledge building. They facilitate a move towards Scardamalia and Bereiter's (2002) concept of knowledge building, which results in 'the creation or modification of public knowledge – knowledge that lives "in the world" and is available to be worked on and used by other people' (para. 8). Teacher networks, like knowledge building, 'make [ideas] available to the whole community in a form that allows them to be discussed, interconnected, revised and superseded' (Scardamalia and Bereiter, 2002: para. 11), resulting in a stronger collective knowledge base.

The majority of studies cast networks in a positive and at times uncritical light, emphasising their supposed ability to support teacher learning and development. Studies have identified the potential of networks to expose teachers to new ideas (Huberman, 2001; Katz and Earl, 2007, 2010), to facilitate learning that supports major changes in school structures and teaching practices that can increase student outcomes (Katz and Earl, 2010), and to influence and impact on the potential for school change (Penuel and Riel, 2007). By ‘enabling collaboration between practitioners, schools and colleges ... [networks] provide opportunities for practitioners to meet, to share their findings and experiences’ (Barker, 2005: 19) and promote the development of social capital among teachers (Katz and Earl, 2010). The flexibility in network structures enables members to take on different roles and varying levels of commitment. As networks are embedded in the individual experiences and school contexts of their members, they support the development of context-specific knowledge (Lieberman, 1996) and provide personalised learning that is centred on issues and needs arising from members’ practice. While the theoretical potential of networks is well documented, there have been relatively few empirical studies that have really tried to capture exactly what goes on in teacher networks or to identify the nature or influence of the learning they promote. The benefits of collaboration and flexibility are often assumed rather than empirically supported.

Despite the supposed benefits that arise from participation in networks, Katz and Earl (2010: 27-8) offer a reminder that:

There is little systematic research about the way that networks work in educational contexts or about what to emphasise to foster successful and productive networked learning in education.

This warning is reiterated by Little (2005), who claims that little is known about what transpires during network interactions or how these interactions shape professional learning or school improvement. Katz and Earl’s (2010) research further highlights the inconsistency of learning outcomes between different networks as well as between teachers participating in the same network. This suggests that not all networks and not all participation are equal. Further empirical studies are required to determine how to structure networks and their activities to facilitate learning and knowledge creation best. More data are required on how teachers conceptualise and utilise the information and resources they gain from their participation in networks to construct new knowledge and to develop their teaching practice.

2.11 Conceptualising online platforms

The rise of digital technologies has prompted the creation of online platforms that support similar notions of teacher networks and knowledge sharing in online settings. These tend to be conceptualised in much the same ways as offline teacher networks, with social technologies considered to enable the replication of the structures and features of in-person networks in the virtual sphere. Online platforms are credited with fostering social interactions, learning and the sharing of knowledge. People are able to create, contribute to, collaborate on and engage with material and resources virtually, as well as develop personal relationships and professional connections. The proliferation of online platforms has been particularly apparent in the area of teacher professional learning. In their review of issues facing technology and teacher learning Borko and colleagues (2009) suggest three primary ways in which digital technologies are employed to support teachers: (1) the digitisation of artefacts and the sharing of classroom experience between teachers (the focus of the online platforms in this study); (2) online social networks for educators; and (3) online professional development programmes.

Online platforms designed to support teachers' professional learning now include subject websites, social networking forums, virtual professional development courses, and websites where teachers can share teaching resource, lesson plans, action research projects and examples of good practice. Governments and school districts, private companies, not-for-profit education organisations, university education departments and teacher collectives have all been involved in establishing online platforms. The increasing number of networks has fostered a culture of innovation among the providers, leading to increasing variety in the types of knowledge being shared and the modes of transmission. Written reports, discussion forums, email listservs, uploaded files and media documents, videos of teachers engaged in their classroom practice, sound and video clips of experts sharing specific knowledge and online mentoring have been used to support teacher learning.

Discussions of online networks suggest that, like their offline equivalents, they foster social capital building (Dede, 2000; Hew and Hara, 2007, Schlager and Fusco, 2003; Schlager et al., 2009) offering teachers the opportunity to collaborate with other teachers and experts outside their schools (Hunter, 2002) and to discuss their teaching practice and any changes, issues or innovations with which they are engaged (Duncan-Howell,

2010; Lock, 2006). Participation has been found to enable the sharing of experience and good practice among teachers (Riding, 2001; Stoll, 2004), which in turn has contributed to improved practice (Schlager and Fusco, 2003) and school reform (Penuel and Riel, 2007). Schlager and colleagues (2009), in their study of a long-running virtual professional development community for teachers, found that in certain circumstances teachers can interact more frequently, develop more diverse networks and engage in discussions that are better than face-to-face conversations. The 'just-in-time' learning provided by online platforms has been positioned as more valuable than the 'just-in-case' learning offered by many traditional professional development programmes (Granger et al., 2002).

The digital technologies employed in online teacher networks not only open up new resources and the ability to connect with a wider range of people but they also have the potential to offer personalised and targeted learning opportunities for teachers. New digital tools further allow individuals to collaborate in the analysis and creation of new resources and to participate in educational events that otherwise would have been inaccessible (Borko et al., 2009). The literature on online teacher platforms focuses on and emphasises the role that online platforms play in enabling teachers to learn from, contribute to, and collectively build upon the knowledge that is being shared by teachers from across the network. While documenting the potential benefits that arise from teachers' engagement with online platforms, the majority of studies fail to provide insight into the specific nature of learning that the platforms facilitate and the roles they play in shaping teachers' practice remain largely circumstantial. Fisher and colleagues (2006) identify this issue in their review of the literature on teachers learning with technology. They suggest that,

There is very little fundamental research that investigates how teachers might learn with digital technologies. Rather, there seems to be a pervasive assumption that teachers will learn with digital technologies (Fisher et al., 2006: 2).

They argue that while the affordances of digital technologies can contribute to enhanced learning opportunities for teachers, to truly understand the roles that technology might play in teacher learning it is necessary to also examine the social and structural contexts in which teachers and technologies are situated.

The failure to engage deeply with the question of how teachers learn with technology reflects, at least in part, the continued adoption of technologically determinist approaches,

which focus on the affordances of technology. Much of the discussion around the potential roles of the Internet and in particular social technologies centres on their ability to foster connections between people and organisations and to support the creation, enhancement and dissemination of knowledge (Chui et al., 2012; Dede, 2000). This has resulted in a dominant focus in the literature on the ability of technology to facilitate knowledge sharing opportunities and to enhance communication channels, with limited research examining how the individuals or groups who choose to engage with these opportunities conceptualise them and the opportunities they provide in relation to their broader lives and offline contexts. This approach tends to disregard, or at least minimise the role that social and contextual factors play in people's use of technology and the outcomes associated with this use.

In contrast, this study takes the view that to understand people's engagement with technology and the outcomes of this engagement it is not enough to just study the affordances of the technology. Instead it is necessary to examine how people choose to engage with and take advantage of technology, situating the technology and people's agendas and actions in the broader context in which they operate. The adoption of the interpretative approach (Bakardjieva, 2011), as it was outlined in the previous chapter, provides a means for breaking away from the technological determinist approach. The interpretative approach directs attention away from a sole focus on the technology and instead focuses on attempting to understand why teachers are engaging with the platforms and how they interpret and construct their engagement in relation to their broader teaching experience, workplace culture and professional learning.

The view that the Internet (or any technology) has the power to shape individual's behaviour and actions produces an incredibly seductive, but often unsubstantiated and uncritical rhetoric. A report by the McKinsey Global Institute (Chui et al., 2012) claims that two-thirds of value creation potentially afforded by social technologies lies in improving communication and collaboration within and across enterprises by providing platforms for content creation, knowledge distribution and consumption. Chui and colleagues (2012) suggest that the power of social technologies lies in the distributed rights they endow their users to create, add, modify and disseminate content as well as the distributed access individuals and organisations have to these networks and communities. In this way social technologies may be leveraged to create networks of

individuals (and in some cases organisations) with shared interests and agendas that foster communication, collaboration, shared problem solving and content and knowledge transmission between members.

Similar claims about the power of technology to revolutionise and democratise opportunities are present in the education literature. In a teacher learning context, Internet-mediated knowledge sharing and online professional development opportunities place greater control in the hands of the teachers to determine when and how they engage with knowledge and learning opportunities (Dede, 2000; Granger et al., 2002; Lock, 2006). The Internet has the potential to break down geographical and temporal barriers. It enables teachers to access learning opportunities and knowledge sources that are not available in their local contexts and to connect with a broader cross-section of teachers and education professionals (Dede et al., 2009; Duncan-Howell, 2010). Teachers may engage with learning opportunities beyond their individual classrooms and beyond their school contexts, increasing their frames of reference and strengthening their learning potential (Burn et al., 2010; Little, 2005). Furthermore, the Internet further allows teachers to access anytime, anywhere learning (Borko et al., 2009; Duncan-Howell, 2010; EdSurge, 2014; Fletcher et al., 2007), providing on-demand targeted learning opportunities. The potential offered by Internet-mediated teacher learning is summarised by Dede colleagues (2009: 9):

The need for professional development that can fit with teachers' busy schedules, that draws on powerful resources often not available locally, and that can create an evolutionary path toward providing real-time, ongoing, work-embedded support has stimulated the creation of online teacher professional development (oTPD) programs.

This focus on the affordances of technologies reduces the role of individual autonomy and teacher agency, which were identified in sections 2.7 and 2.8 as critical factors in the learning process. Oliver (2011), in his discussion of alternative ways of thinking about the relationship between learning and technology argues that the idea of affordance gives 'insufficient recognition to the importance of social practice, meaning, and knowledge' (375). Oliver, together with Selwyn (2010) and Conole and Dyke (2004), instead argues that affordances should be perceived as possibilities for action, which are realised through the actions of individual users. Internet-mediated knowledge mobilisation is user-driven. Therefore, the knowledge teachers construct and the learning outcomes they derive are determined not by the technologies but rather by how they use them within the contexts of their practice. As indicated by Barkardjieve (2011) in her discussion of

the interpretative approach to the study of technology, context emerges as a critical element of Internet-mediated knowledge.

2.12 Theorising learning on online platforms

Discussions of online learning platforms and Internet-mediated knowledge mobilisation are dominated by two main theoretical approaches: network theory and communities of practice. The dependence on these two theories is problematic. Firstly, both theories frame discussions of online platforms as social structures in which learning takes place (Wenger et al., 2011). This serves to emphasise and elevate the role of socialisation and social structures for understanding engagement, knowledge mobilisation and learning. Selwyn (2010) suggests the corollary of this assumption of social learning is that:

While going some way to explaining how technology-based learning *can* take place, such approaches go little way to explaining why technology-based learning actually takes place (or not) in ‘real-life’ contexts. (67)

Secondly, communities of practice and network theory rely on a narrow range of methodological approaches and methods, which do not facilitate a holistic understanding of online platforms. They focus primarily on the actions and activities that occur online and as a result do not seek to situate either the online platforms or their users within their wider social contexts.

2.12.1 Communities of practice

Engagement with online platforms and Internet-mediated knowledge mobilisation is frequently associated with or, in many cases, is synonymous with community membership and formation. Increasingly, the word ‘community’ is used in the literature as a short form of ‘community of practice’ (Wenger et al., 2011). This serves to amplify the ambiguities that already surround the meanings of both ‘community’ and ‘practice’ (Cox, 2005). The communities of practice approach considers online platforms to centre upon not just the development of relationships and interactions between users but also upon the construction of a shared identity and collective intentions between members (Wenger et al., 2011). Stoll (2004) suggests that members of online communities hold shared values, a common vision and collective responsibility, and undertake reflective professional inquiry and professional collaboration, as well as collective learning. The implicit connection developed in many studies between online platforms and community formation has shaped conceptualisations of teacher learning in the education literature. Studies suggest that online platforms facilitate the creation of flexible teacher

communities, which enable collective and reflective learning (Dede, 2006; Granger et al., 2002; Lock, 2006). Online networks often aim to transform teachers into ‘active knowledge builders’ (Granger et al., 2002) through the cultivation of a culture of shared practice and sustainable, ongoing support (Barab et al., 2001; Dede, 2000; Lock, 2006).

The apparent ubiquity of the term ‘community’ and the automatic assumption of collectivity between members it promotes are problematic. Grossman and colleagues (2000) criticise the indiscriminate use of community in education:

Community has become an obligatory appendage to every educational innovation. Yet aside from linguistic kinship, it is not clear what features, if any, are shared across terms. This confusion is most pronounced in the ubiquitous “virtual community”, where, by paying a fee or typing a password, anyone who visits a website automatically becomes a “member” of the community ... Groups of people become community, or so it would seem, by the flourish of a researcher’s pen. [3]

Labelling a group a community of practice, particularly before any empirical investigation has been undertaken requires a judgement to be made regarding the primary role and purpose of the group. It imposes a cohesion and consensus in purpose and actions where it may not in fact exist. Wasko and Faraj (2000), in their study of the factors facilitating knowledge sharing behaviour determined that though people who participate in professional online networks have a strong desire to engage in knowledge exchange and learning opportunities for their work they do not use the spaces to socialise. This is supported by Hsu and colleagues’ (2007) finding that while personal outcome expectations and self-efficacy influence knowledge sharing behaviour, community-related outcome expectations play no significant role in determining behaviour. This suggests that the role of community cannot be assumed in Internet-mediated knowledge mobilisation but rather must be determined on a case-by-case basis.

Much of the research on online communities is centred on identifying and measuring the relative importance of the various factors that motivate or impede participation. This focus is based on the notion that the biggest challenge facing virtual communities is ensuring a continuous supply of knowledge from their members (Chen and Hung, 2010; Chiu et al., 2006; Hsu et al., 2007). Barriers and motivations are generally understood as being both personal, involving the disposition, beliefs and values of individual members, and collective or socially influenced. The level of interpersonal trust established between members (Chen and Hung, 2010; Wasko and Faraj, 2000), personal expectations (Hsu et al., 2007), the desire to establish oneself as an expert (Ardichvilli et al., 2003) and the self-efficacy of the member (Chen and Hung, 2010; Hsu et al., 2007) all have been found to

influence participation in online networks. A moral obligation to contribute and the expectations of the community also have been found to be significant in determining individual's behaviour (Ardichvilli et al., 2003; Chiu et al., 2006; Hsu, et al., 2007; Wasko and Faraj, 2000). While these studies have identified community-level factors as being important to learning, they tend to focus on the 'immediate social processes surrounding an individual learner's use of technology' (Selwyn, 2010: 67) and fail to consider how the technology and individual users are situated within their wider settings of operation and action. To understand the applications and wider implications of the learning that is occurring as a result of teachers' engagement with online platforms, it is necessary to examine how learning occurs not only in relation to the platforms but also how it influences and is employed in the contexts of teachers' professional practice.

2.12.2 Networks

In knowledge or social networks people act as the nexus of engagement, with ties between individual users facilitating the flow of information. Wenger and colleagues (2011: 9) define a network as a 'set of nodes and links with affordances for learning, such as information flows, helpful linkages, joint problem solving and knowledge creation', which does not hinge on the development of a collective identity or purpose between members. As people join a network they can contribute content, in the form of information, resources or examples of practice, which then becomes part of the network's collective knowledge. Dede (2006) explains that the power of a network lies in its expansion and deepening of the knowledge base and the development of shared memory and wisdom, which collectively surpasses the contributions of each participant.

Networks retain a focus on the individual whilst allowing for the accumulation of diverse resources and skills through interactions with others in the network. Information and expertise are embedded within the network and it is through an individual's social capital that they are able to access resources. The connections established between users and between users and knowledge artefacts are pivotal for each individual's learning as well as for the success of the network as a whole. The concept of the networked individualism (Castells, 2004 and 2005; Wellman, 2002) describes the ways that new communication techniques allow individuals to engage with a range of self-selected communication networks. In this conception, society is comprised of networked individuals with 'each person separately operate[ing] his networks to obtain information, collaboration, orders,

support, sociability, and a sense of belonging (Wellman, 2002: 13). Wellman and Castell's concept of the networked individual, which imbues individuals with the power and flexibility to navigate learning opportunities and resources independently, depending on their specific needs at a particular moment in time aligns with the approach to teachers' engagement with online platforms being adopted in this study. However, the accompanying notion of networked learning (see for example Haythornthwaite, 2000, 2008 and Goodyear, 2005), which emphasise the role of socialisation and interaction in the learning process are more problematic for this study, which questions the absolute need for social interaction to facilitate learning through online platforms that dominates network theory.

Networked learning considers learning to be reliant on direct connections between individual users or groups of users. Haythornthwaite (2008) explains,

Learning is a social network relation: it is a transaction, an exchange between people as one teaches and another learns ... learning depends on interaction between individuals. Examining what interactions occur provides the basis for understanding how a network of learners engage with each other and create a communal whole. (140-141)

According to Haythornthwaite, learning in a network arises through direct connections between users. Similarly to the positioning of the community as the gatekeeper of knowledge and learning in communities of practice, the individual user is the gatekeeper of specific information or artefacts in networks. Goodyear (2005: np) similarly contends that 'human-human interaction, through computer mediated communication or CMC, is an essential part of networked learning' and that engagement with online resources is 'not a *sufficient* characteristic to define networked learning'. Connectivism (Siemens, 2006) offers another conceptualisation of networked learning that also references the role of the connected individual who learns through their engagement with and navigation through various networks and knowledge nodes. While impressive in its scope, as others have suggested (Bell, 2011; Kop and Hill, 2008), in its current formation connectivism lacks the nuance or depth of insight for conceptualising the nature of learning occurring in this study.

It is not only the insistence on social connections for learning that makes network theory problematic for this study but also the methodological approaches that are more commonly adopted in network studies. Network studies focus primarily on identifying and delineating the scope of a network, analysing the activity of members, and identifying the roles they play within the network and the connections that exist between

members in order to establish ‘the size, strength, density, and structure of social networks [which] may serve as indicators of community health and growth’ (Schlager and Fusco, 2003: 214). While network analysis enables insight into the structure and size of a network and how it changes over time, it does not provide an understanding of what these connections mean, the nature of learning they support or how the network structure and patterns of engagement are contributing to learning, questions that lie at the heart of this study. Network analysis provides valuable data on what is occurring in a network but provides limited scope for understanding the broader implications of this data or what it means for the individuals involved in the network, which are central concerns in this study. Despite the critiques of network theory and communities of practice presented here, this study is not seeking to dismiss these frameworks outright, indeed they have made a valuable contribution to research in this field. Rather, this study is seeking to widen the theoretical scope that guides its design and analysis, order to present fresh insight into the nature and influence of Internet-mediated teacher-to-teacher knowledge mobilisation.

2.13 Internet-mediated knowledge mobilisation in this study

In their editorial introducing a special issue of the *Journal of Teacher Education* focusing on online teacher learning, Borko and colleagues (2009: 3) wrote:

Their potential to transform K-12 education motivated our decision to devote a theme issue of *Journal of Teacher Education* to the innovative uses of technology for teacher learning. Although optimistic about the possibilities new technologies offer to support K-12 learners’ achievement, teachers’ productivity, effectiveness in classrooms, and teacher learning, we also recognize that teaching and learning with new technologies represents a “wicked problem”.

Borko and colleagues, drawing on the work of Rittel and Webber (1973) define ‘wicked problems’ as those that ‘include a large number of complex variables—all of which are dynamic, contextually bound, and interdependent’ (Borko et al., 2009: 3). The preceding sections of this chapter have explored the complexities surrounding technology-supported teacher learning and the issues surrounding the incorporation of rapidly changing digital technologies into the dynamic cultures and contexts of teachers’ professional lives and have also outlined the current limitations affecting the research and literature in this area. These include both limitations in the theories most commonly applied to the study of technology-facilitated teacher learning and online teacher platforms and to the continued dependence on technologically deterministic approaches, which focus primarily on delineating the affordances of technology without developing a

robust understanding how technology is conceptualised and used in the contexts of teachers' professional practice.

While there are increasing numbers of online learning opportunities for teachers (EdSurge, 2014), there still remains a lack of empirical studies focusing on how teachers conceptualise and utilise the information and resources they gain online in their teaching practice and the influence they have on their professional learning. Whitehouse and colleagues (2006) in their overview of findings from empirical research on online teacher professional development noted that there were very few studies that attempted to measure observable changes in teachers' knowledge or skill level as a result of professional development initiatives. Instead, studies tend to focus on issues of design, delivery and teachers' use of the platforms (Whitehouse et al., 2006). Dede et al. (2009) in their review of the literature on online teacher professional development found that few studies sought to measure how teachers make sense of their new knowledge and skills or how they apply these in practice. By utilising the knowledge mobilisation framework and focusing specifically on delineating and examining the knowledge reconstruction process it is possible to examine how teachers assess, utilise and implement the information and resources they gain online in their practice, as well as how they perceive the role the resources play in developing their professional learning.

The inductive nature of this study means that rather than applying a particular approach or theoretical framework, it is hoped that new conceptualisations of Internet-mediated knowledge mobilisation will emerge out of the research process. However, the critical approach to educational technology, as it is developed by Selwyn (2010) and Oliver (2011), provides a useful initial lens for structuring the study's design. Oliver suggests that:

By adopting a critical position, it has been argued that technology should not be understood to operate on a causal model; it does not have straightforward 'impact' in some simple, mechanical way on the practices that it encounters. (381)

Instead Oliver (2011) argues that it is necessary to draw attention to different ways of conceptualising technologies. Selwyn (2010) supports this view by suggesting that adopting the critical approach 'does not entail a dogmatic adherence to any particular theoretical stance, school of thought or '-ism' (68). Instead he suggests that studies of digital technologies should concentrate on developing "thick' descriptions of the present uses of technologies *in situ*' (69), focusing on the 'state-of-the-actual'. The most

important aspect of Selwyn's views on the critical approach for this study is the need to develop research designs and analyses that are 'context-rich' rather than 'context-free'. The knowledge mobilisation framework provides a valuable means for achieving this. By extending the focus of this study beyond knowledge dissemination channels to examine also the knowledge reconstruction process, it becomes necessary to interpret and understand teachers' knowledge and learning within the broader contexts in which they are situated. Interpreting knowledge reconstruction as a learning process means that the ideas surrounding the intertwining and interdependence of individual and contextual factors in the construction of new knowledge and learning that were discussed in sections 2.9 are also applicable to Internet-mediated knowledge mobilisation.

2.14 Research questions

The research questions are designed to provide a platform for analysing and interpreting teachers' actions and thought processes during the knowledge mobilisation process and to assess how these processes contribute to developments in teachers' professional learning and practice. The questions provide the scope for reimagining and reinterpreting the broad concepts and theoretical models that are frequently applied to online platforms and knowledge mobilisation, and enable the study to build towards the construction of a new theoretical framework for interpreting teachers' engagement with and construction of knowledge and learning in Internet-mediated knowledge mobilisation. Dede and colleagues (2009) suggest that,

All studies should commit to reflecting on and revising theory as an overarching goal. If we are to address the issue of effectiveness and impact, we need to contribute continuously to an evidence-based conceptual framework that provides robust explanatory power for theory and model building to support designers, implementers, and participants. (15)

In light of this, it is hoped that constructing a new theoretical framework, which enables a deeper understanding of the entire knowledge mobilisation process will also facilitate the fine-tuning and potential reconfiguration of online platforms so that they can best serve the learning and knowledge needs of teachers.

This study's dual focus, encompassing the knowledge that is shared on the platforms and reconstructed by teachers in their practice as well as the learning that arises from teachers' engagement with the platforms and the knowledge reconstruction process, resulted in the construction of two overarching research questions.

1. What is the nature of the knowledge being shared and reconstructed by teachers in teacher-to-teacher Internet-mediated knowledge mobilisation?
2. What is the nature of the learning arising from teacher-to-teacher Internet-mediated knowledge mobilisation?

These overarching questions are addressed through the exploration of four second-level questions, each representing a separate area of focus. They are designed to build upon each other to enable the deep exploration of both the knowledge being shared and created, and the learning that occurs during Internet-mediated knowledge mobilisation.

- What is the nature of the online platforms that facilitate teacher-to-teacher knowledge mobilisation?

While the study is working towards the creation of a new theoretical framework that facilitates fresh ways for interpreting and understanding Internet-mediated knowledge mobilisation, it is necessary to ground the findings in the specific contexts of the two case studies. Developing a sound understanding of the design and structure of the two platforms in this study, including the knowledge and resources they contain serves as the foundation upon which the data and their analysis can be understood and contextualised. Furthermore, defining and understanding the nature of the specific platforms in this study is important for linking the platforms' design, both structural and content or knowledge specific, to teachers' engagement and learning outcomes.

- How are teachers engaging with the online platforms and what factors influence their engagement?

To understand fully the nature of the knowledge being shared and reconstructed on the platforms and the types of learning the platforms support requires the examination of teachers' engagement with the platforms and the actions and processes involved in utilising the resources they support. Exploring the engagement of individual users and identifying and delineating the factors that influence their engagement will establish a more comprehensive understanding of how Internet-mediated knowledge mobilisation operates. It further enables the examination and evaluation of the outcomes and impacts of the knowledge reconstruction process in relation to teachers' engagement with the online platforms more generally.

- What is the nature of the knowledge reconstruction process in Internet-mediated knowledge mobilisation?

Knowledge and knowledge mobilisation lie at the heart of this study. While the literature emphasises the importance of knowledge mobilisation to teacher learning and educational improvement, there remains limited understanding of how teachers participate in this process and more particularly how they utilise the knowledge they gain from various sources in their own practice. Consequently, this study will explore and delineate the processes teachers employ and the stages they progress through when reconstructing knowledge found on online platforms in their own practice. It is necessary to understand fully the nature of the knowledge reconstruction process before attempting to assess how it contributes to teachers' professional learning and practice.

- How do teachers perceive the influence of engagement with Internet-mediated knowledge mobilisation on their professional learning and practice?

This study examines the actions and thought processes of teachers throughout their engagement with the platforms and the knowledge reconstruction process in order to understand the nature of the learning that occurs. The inductive approach adopted in this study requires that conceptualisations of learning arise from the data rather than through the application of a pre-existing theory at the study's outset. There have been few studies to date that have attempted to trace the impact that engagement with online platforms has on teachers' learning and practice. This perhaps in part reflects the difficulties associated with trying to delineate and observe the impact of teachers' engagement, which is ongoing and self-directed and manifests itself in a variety of ways. As a result, this study focuses on perceived change. There is no direct attempt to distinguish between 'actual' experience and perceived experience (Van Eekelen et al., 2006). Teachers, however, will be asked to provide examples of specific resources they have taken from the platforms and to reflect on how they have integrated these into their teaching practice.

Chapter Three: Methodology

3.1 Qualitative paradigm

To really understand the value of knowledge, you cannot merely count “things”. Static measures, such as participation rates, documents produced, or cycle times – only become useful in the context of stories that explain the causal links between them ... Stories are the best way to traverse the knowledge system in a way that explain the linkages between community activities, knowledge resources, and performance outcomes ... Only a story can describe these complex causal relations while incorporating implicit contextual factors that may be crucial to appreciate but hard to codify or generalise ... Such stories depend on practitioners’ involvement, because only practitioners can tell how the knowledge was put into action. (Wenger et al., 2002: 168)

Wenger and colleagues’ (2002) discussion of the importance of engaging directly with practitioners and collecting their personal stories when investigating how knowledge mobilisation operates played an important role in shaping the initial design of this study and in particular in my adoption of the qualitative paradigm. In order to understand the nature of the knowledge being shared on the platforms and the knowledge reconstruction and learning processes that arise from teachers’ involvement in Internet-mediated knowledge mobilisation, it was necessary to move beyond interpreting quantitative data on how often and with what knowledge teachers are engaging, to connect directly and deeply with the personal narratives of individual teachers. Accessing teachers’ own accounts and personal perceptions of their engagement with the online platforms enabled the construction of rich and nuanced data on how Internet-mediated knowledge mobilisation operates and on its impact on and relationship to teachers’ professional learning and practice.

Creswell (2007: 37) contends that,

Qualitative research begins with assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem.

Knowledge mobilisation theory provides a preliminary framework for structuring this study and an initial lens for examining Internet-mediated teacher-to-teacher knowledge mobilisation. While knowledge mobilisation frames the study’s overall conception, an inductive rather than a deductive approach was taken. Previous studies have shown that teachers benefit from interacting with other teachers and exchanging their personal-professional knowledge. The literature also suggests that growing numbers of teachers are turning to online sources to share their knowledge and to gain new information and ideas. However, there have been few studies, empirical or theoretical, that have

investigated in detail how teachers mobilise knowledge among themselves, and even fewer that have attempted to understand how the Internet can support this process. Consequently, this study takes its starting point in the knowledge mobilisation literature and builds towards the construction of a new or revised theoretical framework of Internet-mediated teacher-to-teacher knowledge mobilisation, which incorporates the factors that motivate and limit teachers' engagement, the processes teachers undertake when accessing knowledge online and reconstructing it in their practice and teachers' perceptions of how their actions and behaviours contribute to their professional learning and to developments in their instructional practice.

Denzin (1994: 2) contends that qualitative researchers 'study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them'. Embedding the study in the natural settings of teachers is critical to the collection and analysis of data. In this study, the natural settings of teachers encompass both the 'real' world contexts of teachers' schools and classrooms and the online context of the platforms. It further includes the ways in which teachers move and transfer knowledge between these two settings. The importance of studying and understanding both online and offline contexts is gaining increased attention (Hine, 2000; Orgad, 2009; Sade-Beck, 2004; Slater, 2002). Sade-Beck (2004) suggests that the virtual world and the 'real world' are merging and that it is necessary to adopt approaches in Internet research that focus on the 'imagination, associations and reciprocity between the two worlds' (9). Slater (2002) argues for the need to analyse and interpret the online context both in its own right and in relation to other contexts. As Hine (2011: 568) further articulates,

Methodological choices can ... be highly consequential for theoretical development, and the issue of choosing contexts relevant to understanding interpretive practices is particularly highly charged ... the challenge of choosing appropriate contexts to study, and reflecting on the consequences of those choices for our ability to theorise adequately, seems greater than ever.

Collecting teachers' personal stories enables this study to examine teachers' actions and behaviour in both online and offline settings thereby facilitating the analysis of the interactions and intersections that emerge between the offline and online settings of teachers' work.

3.2 Research design: multiple case studies

This study employs a multiple case study design. Yin (2009) claims that case study design arises from a desire to understand complex social phenomena while retaining a focus on the holistic and real-life context in which they occur. He identifies three situations in which case studies are particularly appropriate – when: (1) asking how or why questions; (2) when you have no control over participants' behaviour and there are more variables than you can control for experimentally; and (3) the focus is on contemporary events. All three conditions are met by this study. This study asks how the knowledge mobilisation process is mediated by online platforms and how engagement with these platforms has an impact on the practice and learning of teachers. Because teachers' engagement with the platforms is primarily voluntary, with individual teachers determining the frequency and nature of their engagement independently, it was not possible to control teachers' behaviour or actions. Though the study principally focuses on teachers' current engagement with online platforms, fulfilling Yin's third criterion, in order to provide a richer and more holistic understanding of the knowledge mobilisation process, teachers will be asked how their engagement has changed over time.

Verma and Mallick (1999) contend that a major strength of case study design is that it 'allows the researcher to focus on a specific instance or situation and to explore the various processes at work within that situation' (115). This fits well with the research questions aimed at understanding the constituent parts of the knowledge mobilisation process and the factors shaping teachers' engagement with the online platforms and knowledge reconstruction. The decision to employ knowledge mobilisation theory as the foundation for structuring this study in part reflects Yin's (2003) suggestion that case study research can benefit from 'the prior development of theoretical propositions to guide data collection and analysis' (Yin, 2003: 14). The methodological openness of case study design and its ability to accommodate unanticipated events and actions enables the study to capture the subtlety and complexity present in knowledge mobilisation.

Two online knowledge-sharing platforms, each representing a separate case, were selected for this study. While Merriam (1998) asserts that the more cases included in a study and the greater the variation across the cases, the more compelling the interpretation is likely to be, Yin (2009) cautions that multiple case studies are resource and time intensive, particularly for a lone researcher. The decision to restrict the study to

two cases reflected the need to contain the size and scope of the study in order to ensure that an in-depth examination of the two platforms and the collection of a rich and detailed dataset could be achieved. Including two platforms also potentially enhanced the validity, strength and generalisability of the findings by enabling comparisons to be made between the two cases (Herriot and Firestone, 1983; Merriam, 1998; Miles and Huberman, 1994). These ideas will be discussed in greater detail in sections 3.8 and 3.9.

The two platforms were chosen following Yin's (2009) suggestion to select each case so that it predicts either similar or contrasting results for anticipatable reasons. The two cases were chosen because of the similarities in the design and structure of the online platforms as well as the commonalities between the populations of users engaging with each platform. However, while the online platforms are similar in design, each case has distinct features. It was hoped that any differences in the data that emerged between each case could be traced back to differences between the two platforms, their users or their affiliated organisations. The inclusion of two cases facilitated the drawing of deeper insights to be drawn about how the structure of a platform and the nature of its users influences the knowledge mobilisation process as well as about teachers' perceptions of the impact their engagement has on their professional practice and learning.

3.3 Context

Both online platforms included in this study are based in the USA. The choice to focus exclusively on the USA context was connected primarily to the long-tradition of online professional development opportunities for teachers (see e.g. Barab et al., 1999; Borko et al., 2009; Riding, 2001) and the wide range of online knowledge sharing opportunities that exist for teachers in the USA. A wide range of organisations have established online platforms for teachers, including not-for-profits, teacher co-operatives, school districts, state departments of education and for-profit companies. These platforms represent an important source of professional learning and professional development opportunities for teachers (Dede et al., 2009; EdSurge, 2014).

However, the ways in which teachers are engaging with the platforms and utilising their resources, and the impact that teachers' engagement has on their teaching practice remains under studied. Dede and colleagues (2009) advocate the need for a new research agenda for online teacher professional development that combines multiple areas of

focus. They suggest that more research is needed which examines how the design of a platform has an impact on engagement and learning outcomes as well as new ways for examining and measuring the outcomes and impact of online initiatives and Internet-mediated programmes. Building on these suggestions, this study has a tripartite focus. It examines teachers' engagement with the online platforms, the nature of the knowledge reconstruction process, and teachers' perceptions of the impact their behaviour and actions have on their professional learning and practice.

3.4 Two cases

The two platforms were selected because of the similarities between their design and objectives as well as the congruence between the educational aims and philosophies of the organisations that established them. Both online platforms were set up by not-for-profit education organisations with similar missions and educational agendas, to reduce inequality in educational attainment in the USA. Both organisations believe that teachers are central to achieving their missions and subscribe to the same 'no excuses' (Goldstein, 2014; Mehta and Teles, 2014) teaching philosophy. They further provide their teachers with a wide range of professional development opportunities, including access to online knowledge sharing platforms.

There, however, is an important difference between the two organisations. One organisation is responsible for the initial recruitment and training of teachers, as well as their ongoing professional development but has no official connection to the schools in which they teach. The other organisation is a charter management organisation (CMO) and therefore is not only responsible for providing professional development but also runs the schools in which their teachers work. This means that the teachers from each case work and engage with the online platforms in different school and organisational contexts. In one case, the teachers are part of a school-wide community of users and their engagement is closely connected and at times regulated by their schools. In the other case, teachers' engagement is separate from their school context. Although not one of its explicit aims, this study will examine whether this difference in organisational structure influences how teachers engage with the platforms. As will be discussed in section 3.7, the data analysis process was designed to allow for comparisons between the two cases to be drawn and similarities and differences identified.

The design of each platform is similar. Both platforms are closed, and can be accessed only by teachers affiliated with the organisation. They offer a comparable range of services, including a resource exchange where teachers can search for relevant teaching and planning resources as well as upload their own resources for others to view, and content communities, which allow teachers from the same subject areas to interact and share their ideas and resources with each other. Small differences do exist in the design and function of the platforms. These differences, together with the impact they have on teachers' engagement, will be explored in detail in the following chapter.

3.4.1 Case One: Teach for America¹

Teach for America (TFA) is a not-for-profit education organisation committed to providing quality education to all students in the USA. It recruits top college graduates to teach in low-income communities for at least two years. During their two-year commitment to TFA, teachers are known as corps members. Upon fulfilling their commitment nearly two-thirds of corps members choose to stay in teaching, and remain part of the TFA community as alumni (Donaldson, 2014). TFA is now active in forty-six regions around the USA, with 11,000 corps members and over 32,000 alumni.

TFA provides their corps members with a range of professional learning opportunities. All corps members participate in an intensive, five-week teacher-training programme known as 'Institute'. During their first two years, each corps member is assigned a manager of teacher leadership and development (MTLD) who acts as their mentor and instructional coach. Corps members also attend regular training sessions provided by their regions. These in-person learning opportunities are supplemented by their online knowledge-sharing platform, TFANet.

TFA established TFANet as an online community for all corps members and alumni. It provides a collection of lesson plans, unit plans, data tracking tools, and classroom management strategies created by and for teachers working in low-income communities. It offers content-focused communities where teachers can post questions to a discussion forum and share ideas with other members and alumni teaching relevant grades and subjects. Members can watch video clips of excellent teachers to see successful grade- and subject- specific strategies in action. Videos range from short clips of different

¹ Teach for America gave permission to be identified and named in this study.

classroom systems, techniques and lessons to longer, more in-depth videos of a featured teacher's instructional approach throughout a school day.

TFANet is well suited for inclusion in this study. The platform is oriented around user-generated content, with TFA teachers creating the majority of the material available on the site. This aligns with the study's focus on teacher-created knowledge and the processes involved with the mobilisation and utilisation of this knowledge. The platform has a large number of users, who between them teach all subjects and grade-levels and have varying levels of experience in the classroom. All of the users have received the same initial training and professional development opportunities during their first two years (although many teachers also receive additional professional learning in their individual schools and districts), which creates similarities in their teaching philosophies and pedagogy as well as a high degree of continuity and consistency in the types and structure of the resources uploaded to the platform.

3.4.2 Case Two: AKO

AKO² is a charter management organisation (CMO), which currently runs over 140 schools, enrolling 50,000 students in twenty states and the District of Columbia. AKO employs over 3000 teachers. Its mission is that 'all students, regardless of their zip code or demographics, will learn and achieve'. The majority of AKO schools belong to a region, with each region supported by a central office and governed by a common local board. While each AKO school is largely autonomous, common frameworks structure the teaching and learning philosophy across all AKO schools.

The CMO is committed to the professional development of its teachers and has developed a range of learning and sharing opportunities to support its teachers and school leaders. These learning opportunities operate at school, regional and national levels. Individual schools and regions offer regular professional development sessions and training days to their teachers. At the national level, each year teachers have the opportunity to participate in subject training camps and the annual AKO conference, where teachers and school leaders from all AKO schools across the country meet for several days to share ideas, participate in training sessions and form new connections

² AKO is a pseudonym. The CMO asked to be anonymised.

with other teachers in the CMO. As part of its commitment to teacher learning and sharing, AKO has established an online learning platform for its teachers, AKO Net.

AKO Net is a customised version of BetterLesson³, which is accessible only to AKO teachers. Teachers are able to search the platform for relevant teaching resources and planning materials, which have been created by AKO teachers. Teachers may upload resources and materials they have created to their own user profile page; these are then available to all AKO Net members to view. Content communities enable teachers from the same subject area or grade level to connect with each other and find relevant materials. AKO Net has a small number of videos available for teachers to watch. Teachers are able to send colleague requests to other AKO Net members (similar to the friend function on Facebook) but there is no private messaging service available on the platform.

The reasons for including AKO Net in the study are similar to those discussed in relation to TFA Net. AKO Net is a closed platform, accessible only to AKO teachers and staff members. Like TFA Net, AKO Net relies predominantly on teacher-created knowledge and resources to provide the content for the platform, which fits with this study's focus on teacher-to-teacher knowledge mobilisation. AKO's promotion of a particular teaching philosophy and specific teaching practices among their teachers creates a degree of continuity and congruence between the various resources available on the platform. This enabled the study to examine the importance of there being alignment between the teaching philosophy and pedagogy of users and the knowledge available on the platform. With over 3000 teachers across the charter network's schools, there were a large number of potential participants, who teach at all grade levels and most subjects.

3.5 Sampling

Both Bryman (2008) and Kvale (1996) warn that it is often difficult in qualitative research to assess the number of people who need to be included in the sample. As Kvale (1996) explains, if the sample is too small it is impossible to generalise or assess variance among groups. Conversely, if too many people are sampled the amount of data yielded makes it

³ BetterLesson is responsible for the technology and design of AKO Net but has no control over the content available or how AKO and its teachers utilise the platform. AKO Net utilises the 'old' version of BetterLesson and does not use BetterLesson's new site, designed specifically to support teachers teaching the Common Core.

difficult to explicate incisive interpretations. In order to mitigate these concerns a purposive sample of teachers was used, employing Miles and Huberman's (1994) concept of maximum variation sampling. Maximum variation sampling was used in this study to ensure that the teachers who were selected to participate were engaging with the online platforms in a variety of ways. They included teachers who used the platforms to find resources and information, teachers who shared resources on the platforms and teachers who both shared and used resources. The sampling process also attempted to ensure that participants taught a variety of subjects and grade levels and had a range of years of teaching experience. Teachers from different geographical regions across the country were also selected in order to determine whether a teacher's regional context influenced her engagement with Internet-mediated knowledge mobilisation.

The same criteria informed the selection of teachers from both platforms; however, the specific sampling techniques employed were different due to the different policies of each organisation. TFA supplied a list of all of the teachers who logged onto the platform during one calendar month and the number of times each teacher accessed the site. From this list 128 teachers were identified as meeting the initial criteria for the study, and were sent an email about participating in the study. The criteria were being located in one of seven geographical locations, which were specifically chosen to ensure variety of context, and having accessed the site at least twice during the one-month period, to ensure the study only included teachers who were actively using the platform. Teachers who expressed an interest in the study were asked to complete an online survey [Appendix A], which collected basic biographical information including their age, years of experience, subject and grade level taught, as well as data on how frequently and in what ways they engaged with TFANet. Based on the results of the survey, ten teachers were asked to participate in the study. One teacher pulled out of the study at a later date, and so there were nine participants from TFA.

AKO did not provide access to the web data it collected from AKO Net or the email addresses of their teachers. Consequently, the administrators of the platform were asked to identify potential participants. Lincoln and Guba (1985) suggest that asking people in the study's context for participants who exemplify both ends of the spectrum being studied can prove a valuable sampling strategy. In the context of this study, the spectrum refers to both the frequency and the nature of teachers' engagement with AKO Net. The

Name	Experience	Age	Subject/Grade	Region	Extra responsibilities
AKO					
Alison	6	28	First Grade	Houston	Literacy Coach
Rosa	13	35	ELA Middle School	Houston	Subject leader
Amelia	6	27	First Grade	Houston	Instructional Coach
Jasper	6	27	Biology and Environmental Science High School	Houston	Subject leader
Scott	7	27	History High School	New York	Instructional Coach Community leader
Caroline	5	31	Spanish High School	New York	Subject leader
Deanna	5	27	Social Studies Middle School	New York	
Natalie	6	27	Environmental Science High School	New York	
Chris	2	24	Mathematics Middle School	Bay Area	
Michelle	1	39	Biology High School	Bay Area	
Ariana	3	24	English High School	Bay Area	
TFA					
Georgina	5	26	First Grade	New York	
Brittany	5	26	Social Studies Middle School	New York	
Zoe	7	27	First Grade	Washington DC	Instructional Coach
Claire	3	25	Kindergarten	Washington DC	Literacy Specialist
Alicia	3	23	ELA Middle School	Delta	Community Leader
James	3	24	Mathematics High School	Delta	
Tom	1	30	Mathematics Middle School	Delta	
Anna	5	27	First Grade Bilingual Specialist	Chicago	Grade leader Community leader
Laura	5	27	Mathematics Elementary School	Chicago	Head Teacher

Table 3.1 **Participants selected to participate in the study**

administrators were informed of the various teacher attributes that were being looked for in the sample. These were, teachers from a variety of subject areas, grade levels and schools, a range of years of experience and a range of frequency and types of engagement with the platform. A letter [Appendix B] describing the study and the requirements of participation was provided to the administrator to give to the teachers they contacted. I was given the email addresses of the teachers who expressed an interest in participating in the study. These teachers were emailed and asked to complete the same initial survey as teachers from TFA. Based on the result of this survey twelve teachers were asked to participate in the study. One teacher withdrew from the study at a later date and so eleven teachers ultimately participated. Table 3.1 presents the study's participants⁴ from both organisations.

An attempt was made to achieve variety in the participants selected with regard to demographic factors and teaching backgrounds. Participants include both male (n=5) and female teachers (n=15) and a range of ethnic groups. They taught a variety of subjects and grade levels, had varying years of teaching experience (ranging from one year to thirteen years) and several participants also held additional leadership roles in their schools. Teachers from four TFA regions and three AKO regions (and nine AKO schools) were selected in order to allow for comparisons in use and outcomes between regions.

It is important to note that while the sampling techniques aimed to identify a wide cross-section of teachers, the participants were not necessarily representative of teachers in the USA. Being members of AKO or TFA immediately sets these teachers apart. Both organisations recruit very particular types of people, specifically those who are highly motivated and driven to support students from low-income communities to achieve academically. TFA and AKO teachers subscribe to the missions of their organisations, both of which seek to address the issue of inequality in America's education system, and this agenda shapes and informs their teaching practice. TFA teachers do not attend traditional teacher-training programmes, and instead receive a short, intensive initial training, followed by ongoing support during their first two years in the classroom. TFAers also attend graduate school during their corps years where they work towards a Master's in Education. While some AKO teachers have received traditional teaching

⁴ Participants are anonymised. All names are pseudonyms.

qualifications, as a CMO, AKO is able to hire teachers who have not received any formal teacher training. AKO recruits with no formal teaching qualifications participate in teacher training programmes (similar to those attended by TFA corps members) during their first two years in the classroom. The average age and the average years of teaching experience of AKO and TFA teachers are below the national average (Donaldson & Johnson, 2011; Feistritz, 2011).

The sampling process considered only teachers who were currently engaging with the platform. Past users and those teachers who choose not to engage with the platform were excluded from participation. This decision reflects the study's focus on the nature of active engagement with the platforms and its impact on teachers' practice.

3.6 Multiple methods

The study took place between August 2013 and January 2014. It employed two sets of semi-structured interviews with teachers as well as short semi-structured interviews with the platform designers, weekly journal logs, observations of the platforms and an initial survey [Appendices A, C, D, E]. The employment of multiple qualitative methods aligns with the study's case study design. Merriam (1998) suggests that data collection in case study research should employ multiple methods and in particular advocates interviews, observations, and the analysis of documents. Patton (1990: 244) supports the use of multiple sources of information claiming that 'no single source of information can be trusted to provide a comprehensive perspective'. Multiple methods were used to engage both independently and collectively with each of the three focus areas of this study: teachers' engagement with the online platforms and their resources; the processes through which teachers reconstruct knowledge in their practice; and teachers' perception of the influence that their actions and behaviour have on their professional learning and practice. Figure 3.1 illustrates the combination of methods used to investigate each of these three areas.

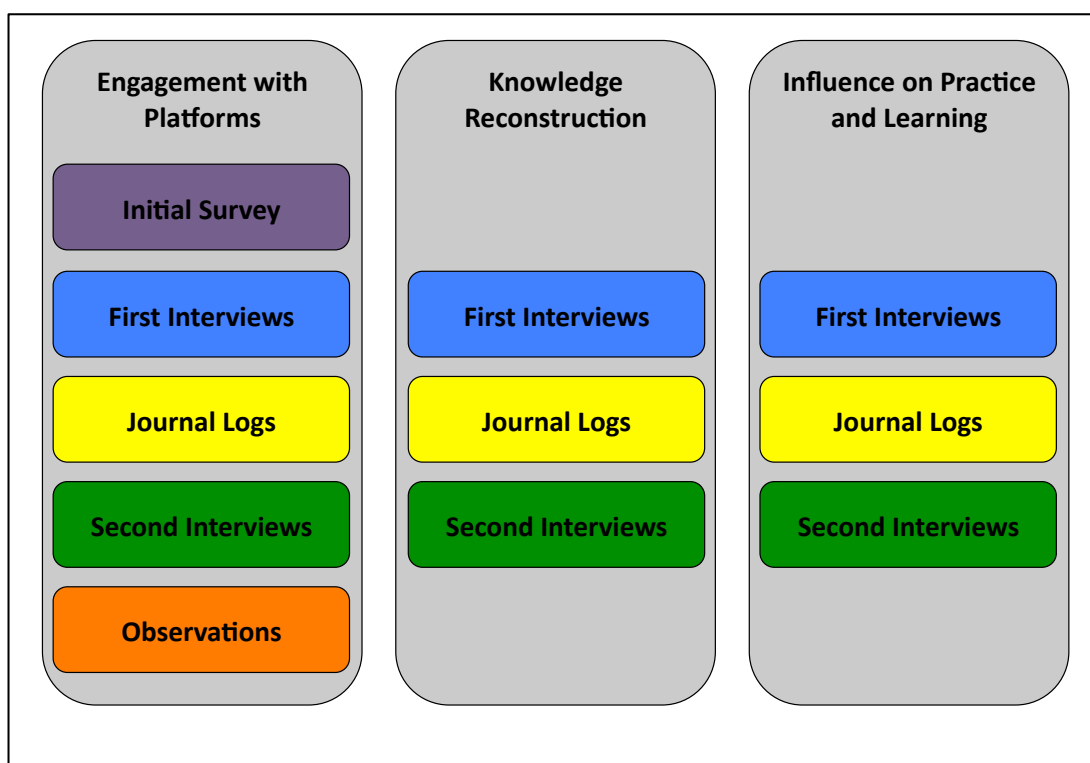


Figure 3.1 Overview of methods used to investigate each focus area

The first interviews provided an initial, rich set of data, covering all three areas of the study. The journal logs, which also collected data on all three areas, were designed to complement and enrich the data collected in the first interviews. By asking teachers to record on a weekly basis how they had engaged with the platforms and the actions and thought processes involved in reconstructing a resource taken from the platforms in and for their own practice, the journal logs ensured a temporal closeness between teachers' actions and their reflections and recording of them. The recording of teachers' more immediate reflections on their actions and behaviour in the journal logs as well as the longer-term reflections captured in both sets of interviews was an important aspect of the data collection process.

Research into the transformation and recall of episodic memory indicates that how people remember particular events and actions changes over time (Furman et al., 2012). As Middleton and Brown (2005) further explain 'what is actualised in recollection is not exactly what was experienced at the time' (139). When participating in the interviews, teachers are constructing and recalling their memories in a very particular context and for a particular purpose. As will be discussed in greater detail in section 3.6.7 the context and purpose of the interview informs the nature of the data collected. The combination of

journal logs and two interviews was employed to help to mitigate some of the issues surrounding teachers' recall of their engagement with the platforms and the knowledge reconstruction process. The journal logs enabled teachers to record their actions soon after they occurred, while the interviews facilitated delayed reflection, enabling teachers to consider their actions and the outcomes of these actions more holistically within their teaching practice. Asking teachers to select examples of resources they used from the platform also played an important role in stimulating teachers' memories. Middleton and Brown (2005) suggest that objects act to mediate recollection and enable people to more easily reconstruct and recall past events and actions in the present. The resources provided a physical artefact to stimulate teachers' memories about the knowledge reconstruction process.

The eight-week gap between the first and the second interviews was also critical for understanding how teachers' engagement with the platforms fluctuated over time and the factors that influenced the changes. Dede and colleagues (2009) suggest that collecting data on teacher learning over an extended period of time is critical when studying online teacher professional development because teachers apply what they learn on the platforms to their practice over time. Consequently, to understand more fully how teachers reconstruct and apply new knowledge in their practice and the ongoing role that this knowledge plays in their work, it was important to track the teachers over a period of several months. The data collection period was selected in order to capture teachers' engagement with the platform at different times of the school year, ranging from the summer holidays through to the end of the first semester of the new school year.

The combination of data from the first interview and the journal logs, together with my observations of the platforms, allowed for what Tracy (2010) has termed 'crystallisation'. Tracy suggests that crystallisation can occur when the use of multiple methods is not concerned solely with identifying a single, more valid truth but enables a study to gain a more complex and multi-perspective understanding of the issue or phenomenon being studied. Asking teachers to reflect on the knowledge reconstruction process and the impact that engagement has on their practice and learning at various temporal intervals and in both written and oral form allowed for numerous perspectives and interpretations to develop. How these were balanced and understood is further explored in the discussion of the data analysis in section 3.7.

The second set of interviews and the platform observations played a critical role, not only in the collection of additional data but in enabling the triangulation and the checking or verification of the data. While Tracey (2010) suggests that triangulation and crystallisation come from two different paradigms, comparing the data from the different methods provided a valuable verification tool in this study. Yin (2003) and Merriam (1998) suggest that utilising multiple methods allows for the triangulation of data, which increases confidence in the findings. This is because congruence between the data collected from different sources helps to ensure their credibility. In this study, the second interviews were designed to build upon the data collected in the journal logs, asking teachers to describe in greater detail the events that they recorded in their weekly logs. This provided me with the opportunity to discuss any discrepancies that I had observed between the data collected during first interviews and the weekly journal logs, which in turn facilitated a deeper understanding of teachers' actions and perceptions. My observations of the platforms, which occurred throughout the whole research period, also provided me with the opportunity to confirm some of the statements participants made during their first interviews about the nature and design of the platforms and their resources.

3.6.1 Initial survey

As discussed in section 3.5, an initial survey was completed by all of the prospective participants as part of the sampling process. Following Punch's (2003) advice, when designing the survey I situated it within the wider research context and carefully considered how the purpose and function of the survey related to its format. The survey was primarily designed and used to help in selecting a purposive sample. However, it also provided biographical information on each of the participants, including their age, years of teaching experience, subjects and grade levels taught, and leadership positions held as well as preliminary data on how each teacher was engaging with the platform. As such, it served as what Bryman (2008: 442) terms the 'face-sheet', providing the necessary background information on the participants. Gathering this background data in the initial survey meant that it did not have to be collected during the first interview, allowing more time to be spent in discussing the teachers' use of the platforms and their resources. The information also provided useful contextual information, which was used to clarify and check the data, both during the interviews and when analysing the data from the interviews and journal logs (Bryman, 2008).

3.6.2 Piloting

Prior to undertaking the first interview, the interview schedule was piloted. Robson (2011) strongly advocates the piloting of data collection processes because that highlights any potential issues and enables the researcher to refine their schedules. Pilot interviews were conducted with teachers who were identified during the initial sampling process as potential participants but who, once completing the initial survey, did not meet the requirements for participation. Two TFA teachers and one AKO teacher were selected to participate in the piloting. Following the pilot interviews the schedule for the first interview was modified. The question order was altered and the schedule was divided into five sections, each focusing on a particular theme: use of the platform; design of the platform; professional learning; knowledge reconstruction; and a concluding section. The wording of some questions was changed in order to make them more accessible and to tighten their focus. Several questions were added to the schedule following piloting. The new questions asked teachers about how their engagement had changed over time and how their offline actions and interactions with teachers affected their online behaviour engagement with the platforms.

The three teachers also completed one entry of the teacher journal log, detailing their use of the platform over the course of one week. Based on the piloting of the log, the decision was made to modify the journal log so that it not only focused on one learning episode, as suggested by Wenger and colleagues (2011) but also asked teachers about their use of the platform generally over the course of the week.

3.6.3 First interview

Semi-structured interviews were conducted with all of the teacher participants from both organisations (Kvale, 1996) [Appendix C]. All interviews were audio recorded. An interview lasted for approximately one hour; however, its semi-structured nature meant that some extended beyond this as I followed up interesting points raised by the interviewees (Rapley, 2004; Robson, 2011). The first interview was designed to collect data on all three areas of the study: engagement with the platform; knowledge reconstruction; and influence on practice and learning.

Following Bryman's (2008) advice that successful interviews have carefully structured schedules, the interview protocol was divided into five sections, each with a particular

topic focus. The first section addressed teachers' engagement with the platform, and tried to gain an understanding of how teachers used the platform both currently and in the past. Teachers were asked about the parts of the platform they engaged with, the frequency of their engagement, the types of knowledge and resources they were seeking and their perception of these resources. They were asked about whether they contributed knowledge to the platform, by uploading resources, contributing to discussion forums or interacting directly with other users. The first section also probed the factors influencing teachers' engagement. This section of the interview was focused primarily on what Robson (2011) has called questions concerning behaviour, asking teachers to reflect on their own engagement behaviour and to consider the factors shaping that behaviour.

The second section was short, asking teachers to discuss the design of the platform, how the design contributed to their use of the platform and any design limitations they had encountered. The third section addressed teachers' professional learning, firstly asking them to describe their professional learning generally and then to relate their general experiences to their use of the platform. It also asked teachers to reflect on how their engagement with the platform had influenced their classroom practice and to what extent the resources and knowledge they had gained from the platform became embedded in their practice. The third section reflects Robson's (2011) category of beliefs and attitudes, focusing primarily on teachers' perceptions of the impact that engagement had on their practice. Robson (2011) suggests that belief and attitude questions are the hardest to formulate and following the pilot interviews, several questions in this section were altered. The fourth section of the interview focused on the knowledge reconstruction process, examining the processes and stages teachers moved through when using the information and resources found on the platforms in their teaching practice. The final section asked teachers if there were any changes they wished to see made to the platform. I then explained to the teachers how the rest of the study would unfold, including how the weekly journal logs would work and the purpose and timing of the second, follow-up interview.

3.6.4 Teacher journal log

The choice to use participant journal logs [Appendix D] in this study was based on my inability to track how individual resources were interpreted, modified and utilised by teachers. Robson (2011) claims that participant journals can serve as a proxy for

observation, and in this study they were used to provide a more detailed understanding of how teachers engaged with the platforms and how they utilised the knowledge in their teaching practice (Robson, 2011; Wenger et al., 2011). The journals were designed to complement and build upon the data collected during the interviews.

Over an eight-week period teachers completed one journal log entry each week. A major issue faced by this study was encouraging teachers to complete all eight of their journal entries. To strengthen participation, Robson (2011) suggests providing very clear instructions for the participants and to check participants' progress with their journals. At the end of the first interview I discussed the journal log format and the expectations with each participant and throughout the eight-week period I sent weekly emails asking participants to complete their journal entries.

While the most useful form of journal log would have asked teachers to record the actions and activities that they undertook every time they logged on to the platform, and whether and how they utilised the resources they accessed, the time consuming nature of this task made it impractical. The journal log instead was a modified version of a log designed by Wenger and colleagues (2011), which focused on one learning episode each week [Appendix D]. The log enabled me to trace teacher engagement more closely than the interviews permitted, as there was a smaller time gap between the teachers' actions and their reflections on them. The logs also allowed me to see how teachers' engagement unfolded over a two-month period, providing a more robust and detailed understanding of engagement with the platforms over time (Giraud, 1999). Because teachers were asked to record how they utilised information and resources from the platforms in their planning and classroom practice, the logs also allowed me to track the knowledge reconstruction process.

Each log entry first asked teachers whether they had used the platform that week. Those teachers who had not used the platform did not have to complete the rest of the journal entry. Those who had were then asked how long they had spent on the platform that week, the actions they had taken (accessing knowledge, sharing resources, contributing to discussion forums), and whether their use was primarily structured, unstructured or a combination of both. The second part of the log asked teachers to identify how a specific activity or action they had undertaken on the platform that week had affected

their professional learning and/or teaching practice. By asking participants to select the learning activity that they considered to have been most significant, participants were given ownership of the logs and were able to describe their own experiences without the influence of an interviewer (Giraud, 1999).

3.6.5 Second interview

The second interview [Appendix C] took place two months after the first interview, once the teachers had completed all eight of their journal log entries. These interviews were considerably shorter than the first interview, lasting approximately twenty minutes. Due to practical constraints, the interviews were conducted via Skype (Hanna, 2012; Irvine, 2011). All the participants consented to performing the second interview via Skype and this was reconfirmed during their first interview. There is increasing evidence that utilising Skype (or other online video conferencing software) may be a viable alternative to face-to-face interviews (Glassmeir and Dibbs, 2012; Sedgewick and Spiers, 2009).

The purpose of the second interview was to examine in greater detail two occasions when teachers had used resources from the platforms in their teaching practice and the processes they went through to reconstruct the knowledge for their own practice (Kvale, 1996). Before the interview teachers were asked to select at least two resources that they had taken from the platform during the past two months to talk about. They were asked to email through copies of these resources before the interview so that I had a better understanding of what they would be discussing. Seventeen follow up interviews were conducted. Two teachers did not use the platforms during the eight-week period during which they were completing their learning logs and so were not asked to participate in a follow-up interview. A third teacher could not identify a convenient time for the interview to take place but still wished to be included in the study.

The second interview comprised three parts. The first section involved the teachers discussing the resources they had selected. Teachers were asked to explain their reasons for selecting the resource, describe any modifications they had made to the resource before employing it in their practice, and to evaluate how successful their use of the resource had been. The second part of the interview focused on the teacher's journal log. Before each interview I read through the teacher's log and selected any entry that I wanted to discuss in greater detail in order to probe the teacher's motivations and actions

(Kvale, 1996; Lincoln and Guba, 1985). In the final part of the interview I asked teachers whether they had had any thoughts or observations about the platforms since our previous interview and if there was anything further that they wanted to share with me. In several interviews the final question produced some very interesting observations and reflections from the teachers.

While Skype interviews are used widely in qualitative research, there are some particular issues that are connected to their employment. Those most commonly cited issues are the potential lack of visual cues when not conducting an in-person interview (Opdenakker, 2006); issues with developing rapport between the interviewer and interviewee (Irvine, 2011, Gillham, 2005); issues with technology access and participants' ability to utilise technology; and the removal of the interview from the natural setting (Hanna, 2012).

I made a number of attempts to mitigate these concerns. Firstly, by utilising the video option on Skype, I was able to see my participants and consequently read their visual cues. Secondly, as the first interview was in person, it provided the opportunity for me to establish rapport with the participants and I believe that this rapport extended to the second interview. Thirdly, because my study is focused on participants' online behaviour and one of the conditions of participation was that they were active online, I was confident that the participants had adequate technology access. During the first interview I confirmed that all of the teachers were comfortable conducting the second interview via Skype. The final concern was not one that I could easily mitigate. However, as the first interview was conducted in the natural setting, I felt that I did have the opportunity to engage with the participants in their natural settings. Conducting the interview online had the benefit of allowing interviewees more flexibility about when and where the interview was conducted.

One thing that I could not change is the difference between the first interview being in-person and the second interview being online. I did, however, attempt to minimise the differences in the data produced by only audio-recording the second interview, rather than video-recording it, as it is possible to do on Skype. This meant that the data from both sets of interviews were in the same format. I did not feel that there were any

significant differences in nature or quality of discussion between the two sets of interviews.

3.6.6 Platform observations and administrator interviews

Throughout the data collection process I observed both online platforms. Wilson and Peterson (2002) suggest that online observations can provide a productive vantage point from which to view the context of the study. The purpose of the observation was to gain a greater understanding of the design and function of each platform, including the types of resources and information available, the operation of the search function, the organisation of the content communities and the nature and frequency of participation on the discussion forums. There is a well-established tradition of online observations (see e.g. Dicks et al, 2005; Garcia et al., 2009; Hine, 2000; Markham, 2004; Sade-Beck, 2004; Wilson and Peterson, 2002). Most online observations often fall into one of two categories. Firstly, the analysis of text and forum posts (Herring, 1996; Mitra & Cohen, 1999; Norskov and Rask, 2011) and secondly, online ethnography (Androutsopoulos, 2008; Sade-Beck, 2004; Wilson and Peterson, 2002). My observations, however, did not fall into either category. I did not perform discourse analysis on the forum posts, nor did I attempt to participate on the platforms in any way. The observations I conducted were very similar to De Walt and De Walt's (2011) pure observation, which 'seeks, to the maximum extent possible, to remove the researcher from the actions and behaviours so that they are unable to influence him or her' (18).

During my observations I was seeking to gain a more holistic understanding of both platforms. As a result, I was not concerned with keeping track of the specific behaviour and actions of my participants. For the most part this would not have been possible. My initial observations were unstructured and I had no preconceived notions about what I wanted to observe. However, when I was verifying particular ideas that had emerged during the interviews or journal logs, I was more targeted in my observations. During my observations I kept short notes, which I included with my initial memos during the analysis process (see section 3.7).

In conjunction with the platform observations, in order to deepen my understanding of the operation of the platforms I also conducted a short, semi-structured interview with an administrator from each platform [Appendix E]. These interviews lasted for

approximately 30 minutes and were informal in nature. They were intended to provide greater detail on the purpose and function of the platforms and to gain insight into the decision-making surrounding the platforms' design, which would enable me to contextualise more effectively the data I was gathering from the teacher interviews and journal logs. The notes I recorded both during and after the interviews I included with my initial memos during the analysis process (see section 3.7).

3.6.7 Role of participants in data collection

The participants played a central role in determining what information was produced and collected during the interviews and in the journal logs. Participants construct their knowledge for the particular context and occasion of an interview (Walford, 2001). As Rapley (2004) further elaborates, a participant constructs a specific version of reality that exists only within the context of the interview. They may carefully frame their answers on the basis of their perception of what the research is about or their relationship with the organisation being studied, and thereby affect the reliability of the data collected. There were several participants who were reticent at first to speak openly about the organisations: however, when I assured them of their anonymity, most were willing to share their opinions. Many participants valued the opportunity to share their true feelings and opinions about the online platforms with someone unconnected to the organisations, as they had not previously had the opportunity to do this.

During their first interview several participants mentioned that since agreeing to participate in the study they had made more of an effort to use the platform. However, it became evident during the course of the interview and through analysing their journal log entries that while they had increased their use over a short period of time immediately prior to the first interview, this increase in use was not sustained. Nor had it changed the ways in which the teachers perceived the platform or the extent to which they were utilising the resources. Most of the users who mentioned engaging more frequently with the platform immediately prior to the interview were minimal engagers with the platform. Their learning logs demonstrated that in the eight weeks following the interview their usage matched their description in the interview and had not increased. This held true for the participant who mentioned during the first interview that participating in the study made him think that he should recommence engaging with his

content community and begin to share resources on the platform. The entries from his learning log and the second interview showed that this had not happened.

3.7 Analysis

All of the interviews were audio-recorded and transcribed verbatim. The interview transcripts were combined with the text of the learning logs [Appendix F] and the data from the initial survey during the analysis process. Analysis focused primarily on the transcripts from the two interviews, with data from the journal logs and initial surveys being used largely to cross-reference data and to clarify any issues or questions that emerged in relation to specific participants during the analysis process. The primary reason that the journal logs were treated as a secondary data source is because the second interview focused on unpacking the content of the logs, allowing participants to describe in greater detail the events they had recorded. The opportunity to probe participants about their actions more fully meant that the second interview transcripts provided a much richer data set on which to focus my analysis. The initial survey and the learning logs provided valuable additional data on the frequency and nature of participants' engagement with the platforms.

During the data collection and transcription process I kept a journal where I recorded any initial thoughts that I had about the data. Merriam (2009) suggests that beginning the data analysis process during data collection will produce richer and more valuable findings. The notes I wrote after each interview were generally short reflections, typically no longer than five or six sentences. They allowed me to establish what Richards (2009) has called a timeline of interpretations and ideas, as they emerged from the data. These reflections were important for developing my thinking about the data, and enabled me to identify key ideas and initial connections that emerged between the stories of the participants. These journal entries not only helped me to reflect on the data I was collecting but also allowed me to develop my understanding of the contexts of my study and the data. Dey (1993) emphasises the importance of establishing the context of the data and the need to incorporate that into the analysis process. To help in the development of my understanding of context and to visualise better what the participants were discussing, I observed the platforms throughout the data collection and the data analysis process. By concurrently collecting interview and journal log data and observing the platforms I was able to begin to establish connections between my data and to

determine the degree of congruence between participants' perceptions of the platforms and the platforms themselves. This process became important later in the data analysis process for establishing corroborating evidence (Dey, 1993), which helped to strengthen my findings.

Following the collection of data, the first step in the analysis process was to read and re-read the transcripts and learning logs, recording memos of any new ideas into my timeline. Richards (2009) claims that writing memos helps to guide and provide structure to the data analysis process and ultimately promotes greater legitimacy in the explanations and conclusions drawn from the data. Having established my initial thoughts and reactions to the data I made the decision to structure my analysis according to the three distinct areas of focus that had shaped the research design and data collection – engagement with platform, knowledge reconstruction process, and the perceived influence that engagement had on teachers' practice and learning. By maintaining this tripartite division throughout my study I hoped that I could establish what Tracy (2010) terms 'meaningful coherence', the interconnection between the literature, theoretical frameworks and research questions guiding my study.

I organised the interview and journal log data into my study's three focus areas (Miles and Huberman, 1994). My aim at this stage was not to limit or preference the data and no judgments were made about the relevance or significance of the data beyond my initial memos (Dey, 1993). In keeping with this approach, the three areas were not mutually exclusive, with some data being assigned to multiple sections. The data from each platform were kept separate, so that I could later assess any similarities or differences that emerged between the two cases. Having organised the data into the three areas, I analysed each area independently [Appendix F].

3.7.1 Engagement with platform

Data from each platform were analysed independently, in order to enable comparisons to be drawn between the two cases. Ayres and colleagues (2003) suggest that,

Interpretive techniques designed to be used within individual accounts or cases provide a wealth of contextual richness and person-specific information without which that case cannot be understood. (873)

Analysing teachers' engagement with each of the platforms separately enabled me to develop a rich understanding of the nature of engagement and the factors influencing

teachers' behaviour. In order to identify similarities and differences between the two cases, I completed each stage of the coding process for both cases before moving on to the next stage. This process of alternating between the platforms ensured that data from both cases was shaping the analysis process. It further provided the opportunity to see where connections and differences between the cases appeared. As Stake (1995) suggests cases are interesting for both their uniqueness and their commonality. In order to build towards the creation of a new theoretical framework for interpreting Internet-mediated knowledge mobilisation, it was important for this study to draw out the similarities and differences between TFANet and AKO Net and teachers' engagement with them.

The first stage of analysis involved coding the data into initial content areas, what Miles and Huberman (1994) have termed the descriptive, interpretive stage. Following Fontana and Frey's (1994) advice that a priori categories could limit the scope of the inquiry, I began this stage with no predetermined coding categories, and instead let the data guide the initial codes. The content codes that developed were broad categories: use of the resource exchange, use of the content communities, use of videos, sharing behaviour, interaction behaviour, change in behaviour over time, use – offline sharing and interaction, use – connection to people or resources, first order motivations to access resources, first order motivations to share resources, second order motivations for engagement. First order motivations were conceived as more personal motivations or factors relating to the individual user and their needs. Second order factors denoted factors, which were considered at the time to be external from the individual, such as trust in organisation, trust in resources, community and network development.⁵

The second stage of coding involved reading and rereading the coded data to identify themes and connections between ideas. Miles and Huberman (1994) have described this process as 'identifying patterns', while Richards (2009) terms it the 'analytical coding' phase. Richards' (2009: 95) comment that 'coding should always be for a purpose. It is never an end in itself' inspired me to go back to my research questions and to use them to help me to focus my classification of the data. Ayres and colleagues (2003) suggest that asking yourself during the analysis process what questions you want the data to answer is a valuable means for structuring analysis. During this second stage of coding I classified my data into profiles of engagement for each part of the platform – resource

⁵ Over time I came to interpret these factors as being personal to the individual also.

exchange, content communities, sharing behaviour, interaction with other users, and the primary motivating factors influencing engagement.

These classifications became the conceptual foundation for my analysis (Dey, 1993). The next stage of analysis focused on creating connections between the concepts, and identifying the factors and motivations that influenced each of the profiles of engagement. At this stage I employed the theory of learning ecologies, as it is developed by Barron (2006), to shape my analysis and understanding of the data. I attempted to analyse the platforms as part of a wider system which incorporated the learning agendas and motivations of individual teachers, their school and professional contexts, and the organisational context. However, when I came to test this conceptualisation of the data (Dey, 1993) I realised that the approach did not hold.

I returned to my original classifications and categories and attempted to discern links between the data (Dey, 1993). When embarking on this stage of analysis, unconnected to my study I was reading Rasiel's (1999) book on how consultants at McKinsey approach the problems their clients are facing. Rasiel's description of the issue tree and how it functions inspired my next stage of analysis. Rasiel suggests trying to narrow the number of branches on an issue tree by tracing ideas back to their elemental forms. Through this process I identified the primary factors influencing each engagement profile and was able to test them by comparing the stories of each individual participant to the issue trees that I had created. Rasiel's issue trees are very similar to Dey's (1993) category diagrams. By analysing the data in this way I was able to represent the connections, both one-way and reciprocal, that developed between each engagement profile and the motivating factors. I was also able to identify common motivating factors across the different profiles of engagement and between the platforms.

This final stage of analysis, creating links and connections (Dey, 1993) between my data categories, had two primary outcomes. Firstly, it enabled me to understand teachers' engagement through the lens of influencing factors and secondly, I was able to examine how these factors shaped the nature of engagement with the platforms generally as well as the engagement profiles of individual teachers.

3.7.2 *Knowledge use*

Similarly to the process I adopted when analysing the engagement data, I began my analysis of knowledge use by coding the data into content areas (Miles and Huberman, 1994). I used the three processes involved in knowledge reconstruction as it is conceived in knowledge mobilisation theory (selection, modification and evaluation) to structure my initial content codes. The close alignment between the data and these pre-established categories (Punch, 2009) encouraged me to retain this tripartite division throughout the analysis process. Throughout the analysis, however, I made sure that I remained open to other potential options for structuring my analysis (Dey, 1993; Perakyla and Ruusuvuori, 2011). Having organised the data into the three categories I moved to the second analysis stage, which involved determining the themes or patterns that emerged in each of the three areas (Miles and Huberman, 1994; Richards, 2009). During this process I realised that the themes emerging from the data from both platforms were nearly identical; teachers from both TFA and AKO were undertaking the same processes when reconstructing knowledge from the platform in their practice. I made the decision to combine the data from both platforms.

Dey's (1993) recommendation to organise the data into primary categories and subcategories provided a useful means for thinking about my data. I identified a wide range of categories under each of the three processes. At first I did not limit myself to a specific number of codes. This enabled me to focus on drawing out as many elements from the data as I could and to retain flexibility (Dey, 1993). When rereading through the coded data I realised that it was possible to develop a more refined category list (Dey, 1993; Miles and Huberman, 1994) by establishing new categories and reorganizing the data. I established three categories for knowledge selection: alignment with needs; application potential; and structure of resources. From the data I created four modification profiles – the idea gainer, the cosmetic modifier, the substantive modifier and the amalgamator – to describe the four different ways in which participants used resources in their own practice. Two categories of knowledge evaluation were determined: personal and objective.

3.7.3 *Influence*

Following the same analytical processes as the other two areas, I began my analysis of the influence of engagement by organising the data into overarching content codes (Miles

and Huberman, 1994; Richards, 2009). These were influence of platform use, embedding and integration of resources, importance of teacher collaboration and teacher-to-teacher learning, differences between online and offline learning; nature of online experience, impact of videos, use of other websites, design of platform and design of content.

The second stage of analysis involved developing my thematic or analytical codes (Miles and Huberman, 1994; Richards, 2009). When comparing the codes between the two platforms, I again realised that they were nearly identical and that teachers from both organisations perceived the influence of engagement in very similar ways. At this stage I decided that it would be useful to combine the data from both platforms together for the final stage of analysis.

The memos I had written at the very beginning of the analysis process were important in shaping the analytical codes I developed. I had noted in a memo that many teachers did not consider using the platforms to be part of their professional practice. They primarily understood the platforms as a way to help them to perform their job more efficiently and effectively and mentioned comparatively few long-term learning impacts. Keeping this in mind, when I returned to my data, I realised that teachers discussions of the influences of engagement could be divided into short-term and long-term ones. This observation provided my two initial categories. Through careful reading of the data I was able to establish the sub-categories of learning and impact that came under each of these primary categories. Having established my categories, subcategories and subclassifications of the subcategories (Dey, 1993), I then established links between the types of knowledge that were connected with the different levels of influence, and to then created connections between teachers' actions and the perception of influence.

3.8 Limitations

With any study there are a number of issues facing the collection and analysis of data, which in turn may place limitations on the results and conclusions that are drawn from the research. While qualitative methods provide rich, discursive data sets that may be used to induce theory, they also have limitations. The potential issues and their resulting limitations are discussed in this section. A discussion of the trustworthiness of the findings and the ethical considerations underpinning this study will be discussed in sections 3.9 and 3.10, respectively.

3.8.1 Researcher as research instrument

The role of the researcher is intensified in qualitative studies because they function as the primary research instrument (Kvale, 1996; Marshall and Rossman, 2006). Rossman and Rallis (2003) explain that qualitative researchers must be sensitive to their personal biography and how it affects the study, and throughout the research process must reflect systematically on who they are within the inquiry. This study is connected to and informed by my past role as a secondary school teacher as well as by my personal views about the importance of teacher knowledge and the need to establish more effective knowledge dissemination channels in education. My personal history as a teacher was both a strength and weakness in my study. It enabled me to more easily establish rapport with the participants, more easily allowing me to empathise and relate to their experiences. However, I also had to ensure that I did not overidentify with the participants and therefore lose my critical perspective (Kvale, 1996). Setting my study in a country where I had no teaching experience and engaging with online platforms that I myself had never used professionally helped me to maintain some distance and objectivity. Throughout the research process I actively reflected on my beliefs and opinions. I questioned how my personal values and views were shaping the interviews and my interpretations of the data as well as how my own beliefs and personal experiences differed from those of the participants (Straus and Corbin, 1998)

With the exception of the weekly journal logs, which were highly structured and based on a pre-existing instrument (Wenger et al., 2011), I decided to utilise unstructured observations of the platforms and semi-structured interviews. This allowed me to ground my data collection in the pre-existing theory of knowledge mobilisation while also providing me with the flexibility to change and adapt this theory and to follow any new leads or ideas that arose during the course of each interview and the observations (Rapley, 2004; Robson, 2011). The interviews provided a space in which each participant and I could co-construct meaning and knowledge (Rossman and Rallis, 2003). Whenever possible I sought to check my understanding and interpretation of data through follow-up and clarifying questions as well as questions that probed the specific meaning and understanding of the participants throughout the interviews (Kvale, 1996). The two-month time period between the first and second interviews provided me with the opportunity to transcribe and read the transcripts of the first interviews, as well as the weekly journal log entries, prior to the follow-up interview. I was able to clarify any

questions I had regarding participants' meaning or perceptions during the second interview, which served to strengthen the reliability of the data and the analysis process (Kvale, 1996; Lincoln and Guba, 1985).

3.8.2 Reliance on teacher perception

This study relied on participants' self-identification of their engagement with the platform and their personal perceptions of the impact that engagement had on their practice and learning. Dede and colleagues (2009) warn against the reliance on self-reports in studies of online professional development. They suggest that:

Although self-reports offer one kind of insight—namely a teacher's perspectives on his or her own practice—they do not provide data that can be used to assess teachers' knowledge or compare teachers' practices to a standard or to goals for improvement or to other characteristics that a researcher might wish to observe. (Dede et al., 2009: 15)

There have been calls to increase the use of cyber research tools to measure online learning (Dede et al., 2009; Schlager et al., 2009). In this study I had hoped to include web-data collected by the organisations on platform use to gain a better understanding of the composition and operation of the platforms as a whole as well as to track each participant's activity on the platforms. Unfortunately this was not possible for either platform. Firstly, neither organisation would grant me permission to use their web data in this way. Secondly, the web data that the organisations did collect were limited and would not have facilitated comprehensive network analysis.

In the absence of substantial web data, I took several steps to minimise the potential issues arising from relying on teachers' self-identification of their actions and beliefs. Data on engagement were collected in three ways and from four sources: the initial survey; the first and second interviews; and the journal logs. This meant that any discrepancies I noticed in teachers' accounts could be clarified during the second interview. Furthermore, teachers completed the journal logs on a weekly basis, enabling the more immediate recording of their actions and thought processes. Any events or actions recorded in the journal logs could be verified and further explained or clarified in the second interviews. In certain circumstances I was also able to observe specific recorded events or locate particular resources teachers had mentioned on the platforms. Determining how engagement with the platforms had an impact on a teacher's practice was more complicated. There have been very few empirical studies that have attempted to measure observable changes in teachers' knowledge or skills as a result of participation in professional development programmes or professional learning activities (Garet et al.,

2001; Whitehouse et al, 2006). As Dede (2006) observes, measuring the effectiveness or impact of a professional development opportunity is a major challenge. This reflects both the lack of reliable measures for assessing impact on teachers as well as the difficulties in determining the impact that a specific learning opportunity or professional development programme has on a teacher's practice.

Lam and Bengo (2003) suggest that measuring change in teachers' practice is usually done through either a pre-test and post-test method or using a post and retrospective pre-test method. Both of these methods are predicated on a specific intervention or clearly bounded programme having taken place. However, this did not fit with the self-directed and voluntary nature of teachers' engagement with the online platforms in this study. As a result, this study focused on perceived change. Following Van Eekelen and colleagues' (2006) approach, there was no direct attempt to distinguish between 'actual' experience and perceived experience. However, in the journal logs and the second interview teachers were asked to discuss their actions and thought processes concerning the selection and implementation of a specific resource in their practice. This enabled teachers' perceptions to be connected to concrete actions and resources.

3.9 Trustworthiness

Lincoln and Guba (1985) suggest that rather than attempting to establish reliability and validity in qualitative research, the researcher should seek trustworthiness, which involves establishing the credibility, transferability, dependability and confirmability of findings. Several steps, following measures advocated by Lincoln and Guba have been built into the research design. Prolonged engagement in the field is encouraged in order to promote trustworthiness. Tracy (2010) also discusses the importance of adequate engagement in the field, claiming that it helps to establish rigour in qualitative studies. Participants participated in the study over a six-month period (from the initial survey to the second interview) and observation of the platforms occurred through this whole period. The first and second interviews were separated by two months and the participant journal logs were completed every week for eight weeks. This extended period of engagement was designed to ensure that teachers were accurately identifying their engagement profiles, and it allowed participants time to reflect on their engagement and the impact it had on their practice. Lincoln and Guba (1985) suggest that crosschecking data with the participants may further enhance trustworthiness further.

The second interview was designed to enable participants to engage further with and elaborate on the information that they had recorded in their journal logs. It provided an opportunity for any discrepancies between the first interview and the data in the journal logs to be clarified.

Throughout the data collection and data analysis processes I attempted to achieve what Tracy (2010) has termed 'sincerity' in my actions and behaviours. I kept a journal throughout my fieldwork and analysis, which allowed me to reflect on and acknowledge my own biases and preconceptions and how these were influencing my actions. It also enabled me to keep track of how I was progressing in relation to my research goals and to identify some of the challenges I was facing in my work. This was particularly important during the data analysis stage, when I was combining data not only from multiple sources but also across two case studies.

The combining of data from two cases to find commonalities across the cases (Lincoln and Guba, 1985; Miles and Huberman, 1994) was an important component in realising this study's aim to build towards the development of a new theoretical framework for understanding the nature of knowledge being created and learning occurring in Internet-mediated knowledge mobilisation. The concept of analytical generalisations (Becker, 1990; Yin, 2003) was employed in this study to enable the generalisation of the findings from the two case studies to a potentially wider sample of online teacher platforms. Yin (2003) suggests that analytical generalisations is not generalising to the particular population that has been sampled but rather to a theory of the phenomena being studied. In this study, generalisations were developed in relation to the factors shaping teachers' engagement with the platforms and conceptualisations of the learning and the knowledge creation processes involved in Internet-mediated knowledge mobilisation. In keeping with this focus on analytical generalisations, it is hoped that the theoretical framework proposed in Chapter 6 has the potential to act as a vehicle for examining other cases and examples of Internet-mediated knowledge mobilisation (Yin, 2003). It is anticipated that the ways in which engagement, learning and knowledge reconstruction processes are conceptualised in the model should remain relatively stable, however, it is recognised that variations in different cases will inevitably create variations in results (Becker, 1990). Indeed subtle variations were evident between the operation and structure of the two cases in this study.

3.10 Ethics

A consideration of the ethical implications of undertaking research in the natural setting is necessary. This process is complicated by the lack of a definitive view on what constitutes an ethical study. As Soobrayan (2003: 108) states ‘there is no single set of rules or practices that govern the ethics, truth and politics of a research project’. This study followed the general ethical agreement and guidelines formulated by the British Educational Research Association (BERA). Before beginning data collection I received ethical approval from the Central University Research Ethics Committee (CUREC) [Appendix G].

I ensured that my engagement with the two organisations involved in my study and with the participating teachers followed ethical guidelines. Both organisations consented to participation. Similarly, the teachers were advised before the data collection commenced about the nature and objectives of the study and exactly what their participation would involve. Informed consent was obtained from all participants (BERA, 2011; Hammersley and Traianou, 2012). This was originally gained when the teachers completed the initial survey. To mitigate any ethical issues surrounding collecting informed consent via the Internet, and to provide participants with the opportunity to ask further questions they might have had about the study and their participation in it, the participants were asked to sign hard copies of the consent forms at the start of the first interview [Appendix H]. Participants could withdraw from the study at any stage and two participants (one from each organisation) did so. Anonymity was guaranteed to all of the participants and they are identified by pseudonyms in this thesis. AKO requested anonymity and so their name has been changed. TFA was happy to be identified by name.

Miles and Huberman (1994) suggest that to mitigate ethical issues it is not only necessary to follow the ethical guidelines of your particular institution but also to consider why the study is worth doing and how it will contribute in some significant way to the broader domain. This relates closely to Tracy’s (2010) insistence on ensuring the worthiness of the topic of study and considering the significance of the contribution it will make to the research field or to practice. The potential value of this study is threefold. Firstly, this study’s questioning of the reliance on communities of practice theory and network theory for interpreting Internet-mediated knowledge mobilisation enables the study to build towards the construction of a new theoretical framework for interpreting teachers’

engagement with and construction of knowledge and learning in Internet-mediated knowledge mobilisation. Secondly, by focusing on teacher-to-teacher knowledge mobilisation this study addresses an area of education research and practice that is not only considered critical to the development of teaching and learning but remains understudied (Hargreaves, 2000; Fullan et al., 2006; Little and Bird, 1986; OECD, 2000). And thirdly, it is hoped that developing a deeper understanding of the entire knowledge mobilisation process will facilitate the fine-tuning and potential reconfiguration of online platforms so that they can best serve the learning and knowledge needs of teachers.

I endeavoured to ensure that my research was founded on integrity of purpose and objectives and that its design enabled transparency in its purpose and methods. Both of the participating organisations were aware of the purpose and nature of the study and what involvement would require of them and their teachers. Throughout the research process I maintained close connections between the literature, my research questions, methods and analysis (Tracy, 2010). This became particularly important when writing my findings and discussion chapters as I moved between my data, the literature I reviewed when initially defining my study and constructing my research design, and the new literature I engaged with during and after the analysis process.

Chapter Four: Findings; Engagement with the platforms

This chapter presents analysis of data from both sets of teacher interviews and the teacher journal logs examining how teachers engaged with TFANet and AKO Net and the factors influencing their engagement. The findings relayed in this chapter relate to the first two sub-questions: (1) What is the nature of the online platforms that facilitate teacher-to-teacher knowledge mobilisation? (2) How are teachers engaging with the online platforms and what factors influence their engagement? The data from each platform will be discussed separately, enabling a more detailed understanding of how the platforms operate individually. This will also allow for the similarities and differences between the design and function of the two platforms and teachers' engagement with them to emerge from the data.

4.1 TFANet

Two parts of TFANet – the resource exchange and content communities – were the focus of this study. The decision to concentrate on these two parts reflects the centrality of teacher-to-teacher knowledge mobilisation to their role and function on the platform.

4.1.1 *Resource exchange*

The resource exchange is a digital collection of teaching resources created by TFA teachers, including unit plans, lesson plans, classroom resources, which encompassed worksheets, class activities and PowerPoint presentations, homework activities, assessments, behavioural management strategies and data-tracking tools [see Appendix J for examples]. Teachers find resources by using keyword searches, and may further filter their results by grade level, subject, resource type and state of origin [Image 4.1]. Corps members and alumni may upload their own teaching materials to the resource exchange, making them available to the TFA community. Users tag the resources they upload in order to facilitate the search function.

TFANet > Teaching > Resource Exchange Home > Search Results

www.tfanet.org/net/myportal/tfanet/teaching/resourceexchange/searchresult

YouTube Yahoo! News Popular Import to Mendeley

CONTRIBUTE TO THE EXCHANGE

Prevent others from reinventing the wheel by uploading plans, strategies, links, and other helpful resources.

[Upload a Resource](#)

Adjust Search Criteria

[Tips](#)

Keyword(s):

[Update Search](#)

Refine Your Search

- [Grade\(s\)](#)
- [Subject\(s\)](#)
- [Resource Type\(s\)](#)
- [TAL Action\(s\)](#)
- [Time\(s\) of School Year](#)
- [File Type](#)
- [State\(s\)](#)
- [Uploader and Author](#)

[Back to Resource Exchange home](#)

SEARCH RESULTS

Resource Exchange Results [1-10 of 500] Results per page: 10

« Prev 1 | 2 | 3 | 4 | 5 Next »

Results too broad? Modify your search with the tags to the left.

Resource	Recommended	Average Rating	Relevance
 Pop Art Portraits: Information & Activities for Secondary Art Teachers Author(s): National Portrait Gallery Uploaded by: ('00) This 38-page packet was designed by the National Portrait Gallery and may be used by teachers to educate students about pop art portraiture. This document accompanied an exhibit put on by the museum ... Download - Bookmark		 2 rating(s)	98%
 Europe after WWI Author(s): - Uploaded by: (New Mexico '09) 1-2 day lesson on Europe after WWI. This lesson includes an adapted inflation simulation, notes, graphic organizer and poetry Preview - Download - Bookmark		NOT RATED 0 rating(s)	98%
 AZ Reading Summ Gr 9 (from SAT) Author(s): - Uploaded by: TFANet Team AZ Reading Summative Assessment Preview - Download - Bookmark		NOT RATED 0 rating(s)	98%
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Image 1

Screenshot of the resource exchange, TFANet

TFA shared web data on biweekly usage of the resource exchange for the first six months of 2012.⁶ During this period there were on average 49,788 whole site visits per fortnight and 370,417 individual page views, with an average of 7.4 individual page views per visit. On average, there are 12,732 unique visitors to the platform each fortnight, which is an average of 3.9 visits per visitor. On average 12.9% of corps members and 2.8% of alumni logged on to the platform each fortnight. Data from the 2010/11 school year indicated that 100% of corps members logged on to TFA Net at least once over the course of the school year, with 75% logging on every quarter.

Over this same period 70% of corps members downloaded at least one resource each quarter and 20% uploaded a resource. During the first six months of 2012 an average of 36,525 searches of the resource exchange were conducted every two weeks. This was an average of 2.9 searches per visitor. Of these searches, 20.3% resulted in at least one resource being looked at.

4.1.2 Content communities

The content communities are online groups comprised of teachers who teach the same subject and grade level. They are designed as spaces where teachers can come together to share ideas, problem solve and receive advice and support from community members. Each community is led by a TFA alumnus who is responsible for finding or creating interesting and relevant resources for members and sending out a fortnightly email highlighting useful resources and links to recent discussions. Leaders also moderate the discussion forums on which members can ask and answer questions and provide guidance for other teachers in the community [Image 4.2].

⁶ There are a number of issues with the data presented here. I was reliant entirely on TFA for the provision of data, and had no control over the form in which the data was provided. It is important to note that the data for usage of the resource exchange are provided in fortnightly intervals, while the data for usage of the content communities is presented in monthly intervals. This makes comparisons between the two difficult. Comparison is complicated further because the data for the resource exchange and content communities are taken from different time periods. The data presented here are designed to provide a general overview of platform usage and are not a core aspect of the findings. Under the details of my confidentiality agreement, I am not allowed to include any raw data I was provided with.

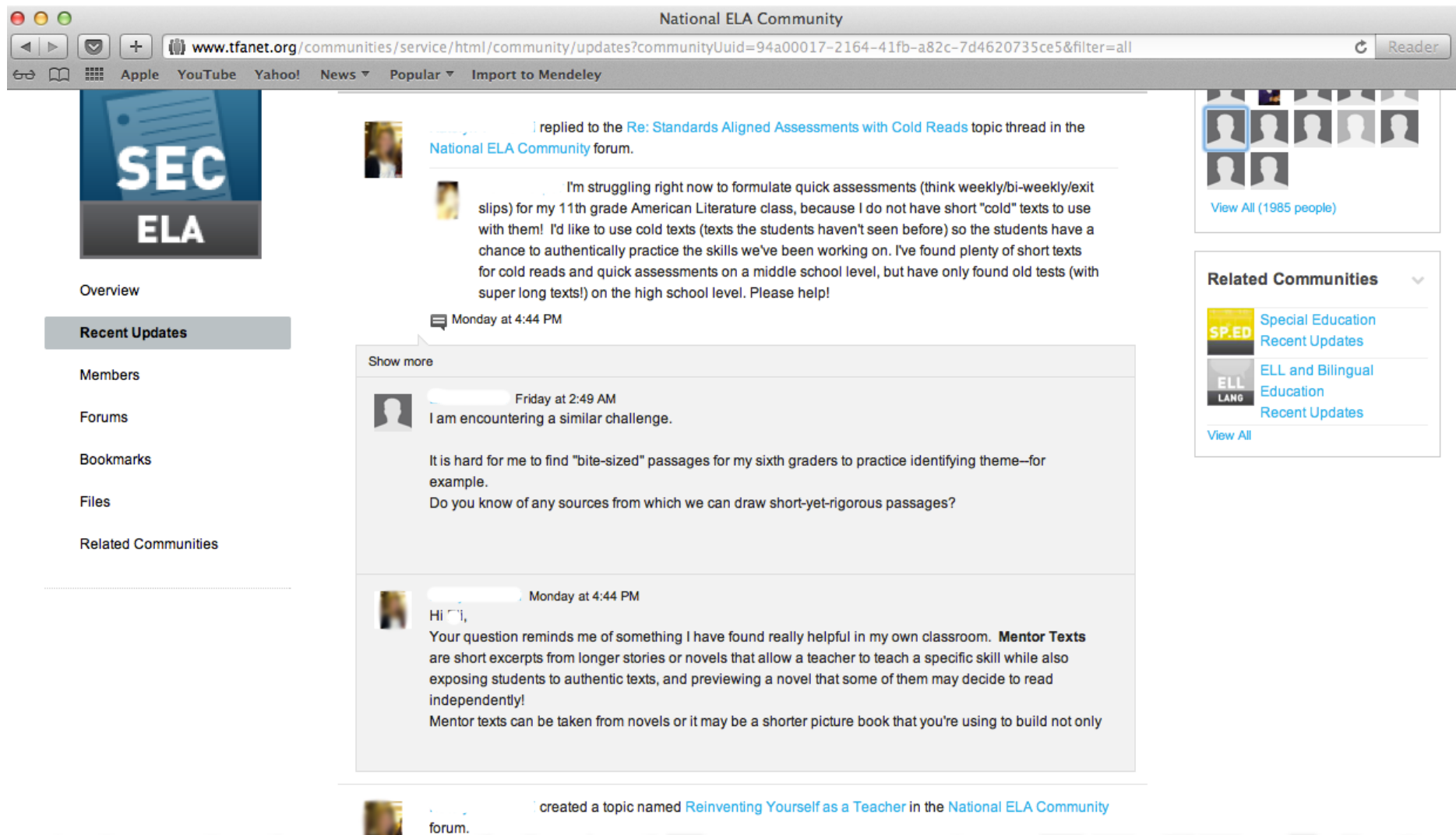


Image 4.2 Screenshot of the discussion forum on the English, language, arts (ELA) content community, TFANet

Over the past year TFA have modified the structure and function of the content communities in an effort to increase user participation and active engagement. TFA recognised that the communities did not facilitate high levels of collaboration or interaction between teachers. They wanted to redirect the focus away from just the supply of resources, towards guiding teachers through a collaborative learning process. To promote social knowledge creation and co-operative learning, community leaders are now supposed to act as online instructional coaches. Alicia, the community leader for the national middle school ELA community, explained how she understood this change in focus:

So, it's a more legitimate emphasis and focus on the coaching aspect even though it's online. In the past it's been sort of like here's a resource. Like a lot of people ask a question, like I need a resource for this unit or does anyone have any good resources for this test? Or how do I make this test? So very resource based. But we want to take a step back from only providing people with resources to saying, ok, let's not just think about the resource right now and think about, what do you want kids to get out of this unit? Like, what's your vision for this unit? And then let's work backwards from that.

TFA provided web data on corps members' (alumni data were not made available) monthly engagement with the content communities during the 2012/13 school year. There were 10,517 corps members in 2012/13 and on average 6510 corps members (62%) logged on to TFANet each month. Of those who visited the platform, 87% were subscribed to at least one content community; however, only 54% of all corps members were subscribed to a community. On average 2008 (19% of all corps members and 31% of members who visited the platform) visited a content community each month. Of corps members who visited a content community 38% (approximately 10% of all corps members) made at least one repeat visit.

Active contributions to the communities were low. TFA divide data on active contributions into initial posts (starting a new discussion forum thread) and comments (responses to the initial post). On average, 73 initial posts and 73 comments were made across all content communities each month. This amounts to just 1.4% of all corps members and 2.2% of corps members who visited TFANet contributing actively to the content communities each month. It is important to note that the number of posts and comments does not include those made by alumni. Data from the interviews and learning logs, which will be discussed in greater detail later in this chapter, indicate that corps members are more likely to make initial posts, generally to ask a question or seek

specific advice, while alumni are more likely to post comments or responses to these posts.

4.2 Participant engagement

Data from both sets of interviews as well as the journal logs were used to develop an understanding of how each participant currently engaged with TFANet as well as how their engagement had changed over time. The following vignettes detail each participant's engagement as well as providing initial insight into their perceptions of the platform.

Anna

Anna is an elementary school teacher and instructional coach with five years' teaching experience. As a corps member she engaged regularly with all parts of TFANet in order to develop her teaching practice and extend her pedagogical knowledge. Anna contributed actively to the content communities as a corps member, asking questions about teaching bilingual students and English language learners (ELL), information that was not available to her through other sources. During her second year in the corps Anna began to share her resources on the platform and following the positive reinforcement she received from the high star ratings for her resources, she continued to upload materials routinely. Since leaving the corps Anna's engagement with the resource exchange has decreased, as she no longer finds the resources to be at the level that she requires to extend her practice. She remains actively involved with the platform as the leader of the bilingual and ELL content community. Anna is enthusiastic about the potential of the communities to support the learning and development of corps members; however, at times becomes frustrated by the limitations of TFANet's design and in particular by the challenges the design poses to facilitating meaningful interaction between teachers.

Brittany

Brittany is a fifth-year middle school social studies teacher. As a corps member, Brittany received no curricular materials from her school and consequently engaged almost daily with the resource exchange in order to find teaching resources that would help her to structure and develop her practice. Brittany engaged passively with her content community as a corps member, behaviour that she considers to align with her Internet

usage generally. She has never shared resources on the platform, citing a lack of time and motivation. Since leaving the corps, Brittany's engagement with TFANet has decreased substantially. She attributes this to her increased knowledge and greater confidence in her teaching practice, as well as to now being in a school where teachers plan collectively and share all their teaching resources. Brittany typically only logs on to TFANet only at the start of the school year to search for supplementary materials, which potentially will provide a new perspective on how to teach particular topics.

Claire

In the corps, Claire was a first grade teacher. She used the resource exchange frequently during her first year, relying on it to learn how to teach particular skills and concepts to her students. Claire often felt overwhelmed as a first year teacher and reading the posts in the content community written by other corps members who were also struggling, helped her to feel better about her own situation. Claire never contributed actively to the communities. During her second year, Claire's engagement shifted. While she continued to use the resource exchange to find resources, her frequency decreased. With the encouragement of her MTLT she also began sharing her resources on the platform, which boosted her confidence about her teaching. Claire is currently a literacy specialist at a not-for-profit organisation that works with teachers and students across multiple schools to improve literacy instruction and student learning. She continues to engage with the resource exchange occasionally in order to find resources to use with the teachers she is working with.

Tom

Tom is a first year middle school mathematics teacher. He engages frequently with the resource exchange, using it to find lesson ideas and activities for his students. Tom had only been teaching for a couple of months when he started participating in the study. He had limited experience in the classroom and during the interviews struggled to find the vocabulary to discuss his teaching practice in depth and to articulate with any detail the impact that engagement with the resources on the platform had on his practice. Tom does not engage with his content community because he does not believe it contains resources or knowledge that are relevant to his needs. He has not uploaded any resources to the platform, primarily because he does not yet feel confident in the materials that he

is producing. Tom was positive about the role that TFANet plays in supporting the development of corps members and values having access to the resource exchange.

Georgina

Georgina is a first grade teacher with five years' teaching experience. She engaged regularly with the resource exchange as a corps member and actively contributed to the content communities. She found TFANet to be a particularly important part of her professional development while in the corps because she was in a rural school and had a limited in-person support network and professional community. Over time, she has found the resources available on the platform to be less relevant to her professional needs and now engages with the resource exchange infrequently. She only searches the resource exchange when she knows from previous experience that it has the types of resource she is specifically looking for. She does, however, continue to contribute actively to the content communities when someone asks a question about something that she has experience of. She believes strongly in contributing to the communities and helping to support corps members. Georgina has shared resources on the platform in the past, however, she no longer continues to do so.

James

James is a third year, high school mathematics teacher. As a corps member James engaged frequently with all parts of TFANet. Using the resource exchange to find lesson ideas and classroom resources enabled James to be more efficient in his practice and he appreciated the opportunity to engage with ideas from teachers outside his school. He engaged actively with the content communities in order to receive support in areas of his practice that he was struggling with and valued the support he received. Now in his third year of teaching, he no longer engages with the content communities and uses the resource exchange less frequently. James has never shared any resources on the platform, although he mentioned during the interview that he was not opposed to the idea.

Louise

Louise is an elementary school teacher with five years' experience. She has recently become a lead teacher and is responsible for supporting the teaching and learning of all the teachers at her school. As a corps member Louise engaged frequently with the resource exchange, relying on it to help the development of her teaching practice. She

has never used the content communities or shared resources on the platform. She continues to have high levels of engagement with the resource exchange. However, this is not for her own practice but rather to find resources to help support other teachers in her school. Louise finds the high quality, practically oriented resources that are available on the platform well suited to supporting the professional learning of the teachers at her school and values her continued access to TFANet.

Alicia

Alicia is in her third year as a middle school English, Language, Arts (ELA) teacher. As a corps member she engaged frequently with the resource exchange and found it pivotal to supporting and expanding her teaching practice. She engaged actively with the content communities and valued the opportunity to be part of a group of teachers on whom she could rely on for support and advice. She now is the leader of the middle school ELA community. Prior to becoming a community leader she had not shared any resources on the platform. However, her role now requires her to do so, and she does so frequently and willingly. Alicia believes strongly in the importance of her role as community leader and works hard to provide her community with high quality resources and support. While Alicia acknowledges the limitations of online dialogue and interaction, she actively engages with the questions posted on the community discussion forums.

Zoe

Zoe is a lead teacher at her elementary school. She has been teaching for seven years. Zoe is enthusiastic about TFANet and continues to engage with the platform. Her use of the resource exchange has fluctuated over the years. As a corps member, she used it frequently to find new materials and to help her to develop her teaching practice and extend her pedagogical knowledge. As she has gained experience and knowledge her use has decreased. However, she continues to engage at certain times during the school year, when she is reflecting on her practice and thinking about new ways of doing things. Since her second year in the corps Zoe has been an active contributor to TFANet, uploading materials to the resource exchange (although she does this infrequently now) and posting on the content community. She believes that it is important to give back to a community that had provided her with so much in the past. Though she used to contribute more regularly to her community, she will now only post on a forum if she believes that she has knowledge and experience that relates directly to the topic being discussed.

4.3 Understanding engagement

Engagement with TFANet is voluntary, relying on teachers' self-motivated and self-regulated actions. A number of factors appear to influence engagement. Some of these factors were anticipated in the literature review, establishing continuities between this study and previous research into online learning platforms. There were, however, factors that emerged that had no precedents in the literature reviewed at the start of this study, leading to the exploration of new areas of theory and research to help to explain how and why teachers were using TFANet. The next section has the dual purpose of exploring the primary factors influencing teachers' engagement with TFANet, while also attempting to link these factors to corresponding theory and literature, which will be discussed in detail in chapter six.

4.4 Trust

Trust underlies all engagement with TFANet. This aligns with the findings of previous research on knowledge sharing, which indicates that trust is pivotal to people's willingness both to share and to receive knowledge. When discussing trust during their first interviews most participants focused on trust of the organisation, TFA. All participants described a strong identification with TFA and a belief in its mission. The trust teachers felt for TFA is transferred to the resources and services that TFA provides, including TFANet. As Alicia noted in her first interview:

I think for better or for worse I think that I already have a high level of trust in it because it's coming from Teach for America and I know, I trust the organisation and I trust the people in it and I trust that the resources posted, even if they're not the most useful to me or to my content or context, that they're legitimate resources.

For Alicia her affective commitment to TFA and TFA members superseded her own personal perception of the quality of some resources. The trust that exists between TFA teachers is grounded in their shared experience of initial teacher training, the similarities in their educational philosophies and pedagogies and their subscription to a common educational mission. Trust in the resources and knowledge on TFANet was strengthened further because other teachers, rather than educational experts who had limited contact with the classroom, had created them. Teachers considered teacher-created resources to have greater authority and authenticity and felt more comfortable about utilising them in their own practice, knowing that they had been employed previously.

Ongoing use of TFANet by TFA alumni, after they have left the corps and have less direct contact with TFA, helps to preserve their sense of trust in, and commitment and

connection to the organisation. Teachers' use of TFANet becomes a cycle of trust and reliance. Teachers trust in and engage with TFANet because it is part of TFA. Their ongoing engagement with TFANet over time, however, also serves to increase their trust in and connection to the organisation. Louise spoke of the importance of maintaining an ongoing sense of connection with TFA during her first interview:

I guess I still feel like I'm connected to something larger cause I see it [TFANet] as a collection that everyone is connecting to ... So, if I didn't have it I'd feel much more like TFA was something I had done in the past and was now living post TFA. Because I use it all the time I feel like that I am in TFA all the time.

4.5 Need, use and gratification

If trust and affective commitment to TFA provide an initial foundation for teachers' engagement with TFANet, the specific nature of engagement is shaped by users' professional needs. As engagement is voluntary, teachers play an active role in determining levels of use. Data analysis of the interview transcripts and journal logs determined that individual participants' ongoing use of TFANet was predicated on how well their needs were met by the platform and the knowledge it contains. Uses and gratification theory, and its reconceptualisation as social cognitive theory in relation to technology use (see particularly LaRose et al., 2001; LaRose and Eastin, 2004) provide a theoretical structure for analysing teachers' engagement with TFANet. The theory suggests that individuals actively seek out opportunities that they believe will gratify the particular needs they have. The more gratification they receive, or expect to receive, from their actions, the more they will continue to engage in the behaviour. Conversely, negative outcome expectations lead to decreased engagement. This section will explore the behavioural incentives or professional needs teachers have that prompt their use of TFANet and how expected outcomes shape the ways in which users monitor and regulate their engagement.

The resources on TFANet primarily support teachers in their planning and lesson preparation. While discussions of teaching practice tend to focus on the acts of teaching and learning that occur in the classroom, before entering the classroom teachers undertake a key part of their practice as they develop their annual schemes and sequences of work, develop unit and behavioural management plans and create individual lesson plans and the accompanying teaching resources and classroom materials. The knowledge available on TFANet is designed to support teachers in the planning and preparation process, enabling them to undertake their classroom-based teaching practice more

effectively and efficiently. Teachers engaged with TFANet in order to satisfy their cognitive needs for information to support and develop their practice. The ease of accessibility and types of resources and knowledge available on the platform provide the primary behavioural incentives for engagement.

4.5.1 Corps members

All nine participants engaged frequently with the resource exchange as first year corps members. High engagement levels among beginner teachers reflect the specific professional needs that these teachers have. First year corps members enter the classroom with minimal training and teaching experience. They have limited knowledge of what to teach or how to teach it, and have not had the opportunity to build up their personal collection of teaching resources and materials. Consequently, corps members have a great need for resources that can help to direct, support and develop their planning and teaching practice. In her first interview, Claire described how her professional situation and needs influenced her engagement with the resource exchange as a first year teacher:

When I got into the classroom I had not studied education undergrad and so it was all very new and scary. And so I was using the online tools very regularly after my first week of teaching, realising that I have no experience in teaching second graders how to read, so I need a lot of help. And so I would literally put in what was happening with the child and whatever came out I would just read. You know for hours. And so, I used it a lot for guided lesson, lesson plans. That was my first year.

Beginner teachers are often concerned with filling short-term or immediate gaps in their practice. TFANet provides a quick fix, enabling teachers to search for resources that are directly relevant to what they have to create in and for their practice. Brittany, in her first interview, described how during her corps years she would log on to TFANet most evenings hoping to find resources to use in her lessons the following day:

I was starting out as a corps member it would be some days when it would be like, ok I know this topic I have to teach but I don't have a lesson for it. I don't know how you would teach it. Like please, I hope someone has uploaded something that I can use.

The resource exchange provided just-in-time learning and support, which Brittany and other corps members could access at any time. Providing continual access to the teacher-created resources can help to remove some of the uncertainty beginner teachers face in their practice as well as the sense of isolation that many teachers feel in the classroom.

The need for easy access to ideas and resources continues, although perhaps less consistently, beyond the first year of teaching. While the basic need for resources remains,

the nature of teachers' engagement and their manner of searching shifts. As teachers gain experience in the classroom and accumulate professional knowledge, their searches become more targeted and specific. Teachers in their second year of the corps tend to have a better understanding of the types of resources they want from the resource exchange and are more discerning in their selection of resources. Alicia described how her engagement evolved during her second year:

And so my second year I was able to look for specific things that I needed help with rather than just everything ... I had a better idea of what was going on and how to teach. It was more of, um, looking to see what other people had done in the past and see if it fitted. It's interesting to see what resources are out there but I didn't rely heavily on it in terms of like creating my own lesson plans.

Using the resource exchange becomes an efficient learning and support exercise for corps members, providing a quick and generally reliable fix for an immediate issue that they are facing. The ready-made, teacher-created resources provide knowledge that not only is relevant directly to their immediate planning and teaching needs but also presents knowledge in a form that they can employ easily in their practice. For James, as a corps member, and still today, it was the ease of using TFANet and the applicability of the resources that encouraged his use:

And so, for me it was easier to get a premade PowerPoint than having to go back and make one myself. Just for the sheer fact that as a first year corps member in TFA, time is very precious and so, like that's something that I tried to find a lot.

Use of the content communities is similarly influenced by the professional needs of teachers. While engagement with the resource exchange was relatively consistent between all participants when they were corps members, engagement with the content communities appeared to be more influenced by the context and characteristics of individual teachers. Four participants engaged actively with their communities as corps members by posting questions on the discussion forums. Their activity was sparked by the need for more specific knowledge than was available on the resource exchange. The interactive component of the content communities made them well placed to provide more personalised, subject-specific support. Anna initially engaged with her content community because she required additional help teaching the bilingual students and English language learners in her class. She explained during her first interview that she did not feel that the resource exchange or other teachers at her school could provide the specialised information that she required:

... more specific questions for my content area that I really couldn't find any where else. Like, specific questions on how to adapt lessons for English language learners. Or best

methods for teaching vocabulary. Things that were much more specific that I just couldn't find resources for.

For three participants, passive engagement with the content communities provided the level of additional support they required. For Claire, reading the discussion posts and seeing that other teachers in her community were struggling with aspects of their practice made her feel better about the difficulties that she was having. The sense of shared struggle that Claire gained from reading the posts helped her to feel more confident in her own practice:

Well most important, when I would read other people's questions, it would make me feel ok. Other people are where I'm at. It's not the end of the world. I'm not failing ... So it was actually really nice to see that other people were struggling and had questions. Sometimes they asked questions that I didn't even know to ask yet. And so that was really helpful for me as well.

The opportunity to share experiences and to receive validation, even if only indirectly through reading a post, is important to teachers. For first year teachers, who often have had limited opportunity to develop their own in-person support networks or professional communities, the content communities on TFANet can provide an effective means for receiving support and a sense of belonging. The importance of community will be discussed in greater detail in section 4.6.

4.5.2 Changing needs of alumni

As teachers gain experience in the classroom, their professional needs shift and this in turn prompts a change in their engagement with TFANet. Alumni, overall, engage less frequently with TFANet. The development of teachers' pedagogical and content knowledge during their two years as corps members and their increased familiarity with the planning and preparation process mean that their need for the types of resources available on TFANet decreases. Data from the interviews and journal logs indicated three occasions when more experienced teachers engaged with the platform: (1) for a quick fix or immediate solution; (2) when teaching a new topic or subject; and (3) to access new ideas or perspectives.

Participants continued to expand and extend their teaching practice as alumni, searching for new ideas or different perspectives on how to teach a particular topic or skill. This encouraged their continuing engagement with TFANet. Their needs often arose at specific times; typically either at the start of the school year when teachers were planning their teaching curriculum or at the conclusion of the year when they reflected back over

the year. Brittany explained during her first interview how this process had worked for her:

I think that at this point in my career it's something over the summer when I was reviewing curriculum and thinking about new things that I wanted to add, it was one of the places that I would go to get ideas or to get specific resources for the new things that I wanted to add. But it wouldn't be something that I was looking at daily.

Alumni tend to have well-developed personal collections of resources and therefore have less need to engage frequently with the resource exchange. It does, however, still act as a good source of new ideas for teachers who are looking to broaden their practice. Alumni often engaged with TFA Net prior to teaching a new topic or subject. The absence of existing resources meant that teachers had a greater need to find new planning and teaching resources that they could draw upon to support them in their practice. For example, Zoe engaged with the resource exchange infrequently during her third and fourth years of teaching; however, when she changed from teaching kindergarten to first grade at the start of her fifth year, she started to re-engage with the resource exchange. Zoe required new resources and ideas to support her in developing her instructional practice for a new grade level.

The easy accessibility of TFA Net and the ready-made resources it provides are important drivers for alumni engagement. Georgina, who since leaving the corps has had limited engagement with the resource exchange, discussed an episode recorded in her journal log of using the resource exchange to find phonics cards. Her decision to use TFA Net on this occasion reflected her need for specific, ready-made resources:

I did go to TFA Net on that day because I knew there were some good resources already and I just wanted to find something that was ready made. Usually I've been able to find like picture cards really easily on TFA Net.

Despite her overall limited engagement with TFA Net, Georgina knew that the resource exchange would provide easy access to the specific type and format of resource that she required. Her high outcome expectancy motivated her engagement in this instance. Users exercise their capacity for forethought and their ability to anticipate the potential outcomes that will arise from particular behaviour when planning their actions.

4.5.3 Absence of Need or Gratification

Teachers, as corps members or alumni, stop using TFA Net or reduce the frequency of their engagement when they no longer have a need that the platform can fulfill or if the platform no longer gratifies their needs. The data indicated a decrease in alumni's needs to find planning and teaching resources. As previously explained, as teachers gain

experience in the classroom, they feel more confident and comfortable in their practice and develop their own collection of teaching materials. Consequently, their reliance on the resource exchange decreases. Also, five participants commented that they had experienced a shift in their professional learning. As corps members they concentrated on knowing what to teach and how to teach a particular lesson, while as alumni their focus shifted to more holistic, pedagogical and philosophical concerns. As teachers become more confident in their daily practice, and in the planning and preparation of their lessons, they spend less time finding resources and more time developing and extending other parts of their teaching practice.

Four alumni attributed their reduced engagement with TFANet to a decrease in the perceived usefulness of the knowledge it contains. Engagement no longer led to the same levels of gratification that it did when they were corps members. Anna discussed this issue in some detail during both of her interviews, observing that the resources were no longer able to extend her practice or promote the types of learning and development she required:

I feel like a lot of what is on TFA Net at the present moment is geared towards first and second year teachers. And so, as I've developed as a teacher, you know ... a lot of the resources just weren't at the calibre of where my teaching is right now. I can see why a lot of teachers [stopped using TFANet], like right after their third year, cause that's when I stopped using it too. Kind of like move away from it just because of what you're given, is not bad but like by your third, fourth, fifth year of teaching it's not pushing you enough any more.

As alumni experienced a decrease in outcome expectations and gratification, they were motivated to find other knowledge sources to fulfill their needs. During both interviews Georgina discussed how Pinterest, another online sharing site, better suited her professional needs:

In the sense that I think Pinterest is a little more reliable ... I think maybe 'cause Pinterest teachers tend to be a little more experienced or they're really eager to um, share cute ideas. Maybe that has something to do with it. So it's the quality of what you're getting, it's a lot more reliable on Pinterest.

An absence of need also influenced engagement levels with the content communities. Two teachers had very limited or no engagement with the communities. Louise's decision not to engage related to her role as lead teacher at her school where she is responsible for providing support and resources to the teachers in her school. Her involvement with all subject areas and grade levels means that she finds it impossible to select just one content community to engage with. She explained her non-involvement during her first interview:

I guess for me it's so hard to pinpoint myself into the one thing that I do. That I would end up subscribing to most of them and then at some point it becomes just the same thing as performing the search in the first place.

Tom's lack of engagement stems from his perception that 'it's not relevant to what I'm doing'. His low outcome expectations meant that he did not consider it worthwhile to engage.

4.6 Context and community

Involvement in an in-person professional community of teachers and access to in-person resource sharing opportunities influence teachers' needs and their engagement with TFANet. There was overwhelming agreement among participants that in-person support and cooperation provided greater gratification than the support and knowledge offered online via TFANet. The experiences of Georgina and Brittany provide insight into the different values teachers placed on offline and online cooperation. As corps members both teachers were in schools with no access to shared resources and limited professional community between teachers and both engaged frequently with TFANet. In contrast, now they are teaching in schools with strong collaborative cultures, where teachers are members of professional communities who share all of their curricula and teaching resources. Both teachers suggested that their decreased engagement with TFANet since their corps years in part reflected how their new school contexts could better support the needs that previously had been met by the platform.

Both passive and active engagement with the content communities was related closely to whether teachers were part of an in-person professional community. As a corps member Georgina engaged regularly with her content community while she was in the corps because she lacked an in-person support network. She commented:

There was only one other TFA teacher and one other fifth grade teacher [at my school]. So you know, it was a little bit, it was still hard to find someone on the same page or same level as you.

This contrasts to Claire, who engaged passively and less regularly with her community. Despite having a limited community in her school, Claire developed a strong in-person community through her MTL and friends who were teaching. She explained:

For me it was more engaging and useful for me to meet with my programme manager in person rather than to do that online thing. And I met with my friends. I'd rather meet them than have a conversation on the phone.

While online communities can provide a substitute in the absence of an offline community, teachers appeared to receive greater gratification and benefit from being involved in in-person communities.

The region in which a teacher is located also appeared to influence their participation in the content communities. As a corps member Georgina was in a rural community, physically isolated from other sources of support:

I really loved TFA Net as a corps member. It was really helpful. I was in the Delta so we were very spread out from each other. So, you know it was my go to resource, instead of a colleague, a principal or a coach. Not being there, I went right to TFA Net. And I really relied on it a lot.

This finding was reinforced by what Anna had observed as leader of her content community. Fewer teachers from the larger TFA regions, where corps members receive in-person bilingual and ELL support, engaged with the content community. Teachers from smaller regions lacked this in-person support and training, and therefore had greater need to participate in the online community. Brittany, who was a corps member in New York City, one of TFA's largest regions, adds weight to the regional variation in engagement levels. During her first interview Brittany explained why she felt less need to connect with teachers via TFA Net:

You know, New York City, such a big corps, um, and I'm working in a school where almost everyone was part of the corps at one time. So I think the desire to connect is a little less pressing because I already feel connected with alumni.

These findings suggest that teachers need and value interaction and support from other teachers. In-person connections were valued more highly by participants than online connections; however, when in-person connections are limited or non-existent, the online support offered by the content communities becomes increasingly important. This in part reflects the differences between the types of interaction occurring online and offline. As will be discussed in greater detail in the following chapter, all participants acknowledged in-person dialogue to be more fulfilling and useful than online communication. This may be connected to the asynchronous nature of communication on TFA Net, where responses on discussion forum tend to be delayed. This delay in receiving information is at odds with teachers' primary reason for engaging with TFA Net, to gain a quick answer or immediate solution to an issue.

While six participants made reference to the important role that being a member of the content communities played both in developing their practice and in facilitating a sense

of community, there was little evidence that participants were concerned with collaboratively building shared knowledge within the community. Observations of the platform together with the interview data indicate that discussion forum posts rarely developed into a more detailed or prolonged dialogue. Re-posting to the same thread was uncommon and most posts made little attempt to engage with or respond to the ideas offered in earlier posts. As a result, there were few opportunities for teachers to build towards shared meaning or a common understanding. Alicia explained the limitations of online communication:

I think that they're delayed. And so someone posts something and I'm responding within a day but still that's a long time. I think that's where relationships are also really important and I think they're a little bit harder to cultivate on a place like the community. Even though, yes, we're all in a community, we're all ELA teachers, it's harder in my opinion to build them with the screen between you. Um, and so, I found them to be good but I sometimes found them to be like either I'm helping too late, I'm responding too late or by the time they get back to my response, it's like, where were we? What was this even about?

Participants also discussed the absence of personal connections or relationships between members on the platforms. When asked during her first interview whether she had used TFANet to connect with other teachers, Georgina replied:

It depends what you mean by connect. I mean in terms of building any kind of rapport or relationship or any networking, no. Um, I haven't. Just in terms of responding to what someone may have said on a resource exchange, oh, content group. Yes.

Georgina's response reflects the dominant mode of engagement among users. Teachers were happy to reply to a question and to provide support to other teachers but they remained essentially anonymous in these exchanges, making few attempts to develop a deeper, more personal connection with other users.

4.7 Sharing and contributing

The primary factors influencing the behaviour of teachers who did not share resources on the platform were a lack of confidence and a lack of time. Alicia, who only began sharing resources this year since becoming a content community leader, discussed in her first interview her previous reticence to share:

Just a lack of confidence in my own skills and abilities. I was like, I'm still learning and still pretty inexperienced ... And also it is kind of time consuming. So I think I hadn't really thought about it cause I wasn't really thinking about, ok, I used this resource, it went really well, let me upload it onto TFA Net. So, which, can be sort of a flaw in my own mindset or my own mentality about it.

Teachers who had not shared resources all expressed a lack of confidence in their professional knowledge and teaching materials, questioning the benefit that sharing their resources would add to TFANet. Three participants also claimed that the time involved in uploading and tagging resources put them off contributing, suggesting that they lacked

the motivation or necessary incentive (intrinsic or extrinsic) to engage actively. As Alicia accurately surmised, not contributing was connected to her own mindset about sharing. During their first interviews James and Louise reinforced the importance of self-motivation. James repeatedly said that he was not opposed to sharing; however, he made no attempt to turn his words into action. Louise similarly acknowledged the importance of sharing but felt that she needed someone to compel her to share before she would actually undertake any action:

I realise the utter need for it. So at this point it's just like a time thing. I should just do it. There shouldn't be any excuses for it. I just haven't ... I need that impetus. Someone to just tell me to do it, which is probably what it is.

Similar thought processes and behaviour patterns were detected in the participants who had not engaged or had engaged passively with the content communities. Two passive users commented that they lacked the time or motivation to participate actively. They felt that they benefited from their current level of engagement and consequently had limited incentive to engage actively. The non-excludable nature of the discussion forums, where anyone can benefit from reading the thread regardless of whether they post a comment, reduces the incentive to contribute actively. Three of the non-sharers connected their passivity on TFANet to their Internet usage more generally, and their lack of active participation on any websites.

Personal behaviour and motivation also influenced the engagement of active contributors and sharers on TFANet. Five participants had shared resources on the resource exchange. All five possessed an altruistic mindset and were strongly motivated by the belief that their actions were supporting and helping other teachers. During their first interviews the five sharers identified the action or event that triggered their sharing behaviour. For Claire this came during her second year when her MTL D encouraged her to begin sharing the resources she was creating because she believed that other people would benefit from having access to them. Anna was originally motivated to share by an email that TFA sent asking for more resources to be uploaded, and was inspired to continue sharing because of the positive encouragement and validation she received from having her resources highly rated by other teachers. For Georgina and Zoe, the initial impetus to share came from realising that there were limited resources available in their content area and that contributing resources was a way to help other teachers. As Georgina reflected in her first interview:

I guess when I was creating some sort of resource for myself and my own practice and use, I realised that it could help others and that it was filling a gap or I hadn't found an answer to maybe on TFANet. I didn't find anything that I could use or apply for kindergarten homework so I just made it a habit to upload it.

A strong sense of altruism and the desire to help and support other teachers appears to underlie sharing behaviour. Interestingly, there was a connection between the altruism teachers demonstrated online and their offline behaviour. Four out of the five participants who had shared resources on TFANet also held leadership positions in their schools or at TFA, while the fifth teacher, Claire, is now a senior manager at a not-for-profit organisation that supports literacy teaching in schools. There appears to be something in the behaviour, values and attitudes of teacher leaders that promotes their sharing behaviour. As leaders, these teachers are responsible for supporting and developing other teachers. Contributing resources and knowledge to TFANet provides an additional way to do this, extending their behaviour across the different contexts in which they operate.

Similar motivations and characteristics influenced teachers' active participation in the content communities. All of the sharers apart from Claire also answered questions on their community's discussion forum. Past experience appeared to motivate some teachers. Three teachers suggested that their eagerness to contribute related in part to the support and resources they had received in the past and their desire to help others in the way that they had been helped. Reciprocity is frequently identified as influencing knowledge sharing behaviour. The more users received from the platform, the more willing they were to give back. What differentiates reciprocity as it emerges in this study compared with previous studies is that reciprocity is delayed. Teachers tended to start sharing when their use of TFANet to acquire resources and knowledge was decreasing. Teachers were motivated to give back to a community that had supported them in the past.

4.8 Technology and design

The design of the platform appeared to have a limited impact on the nature or level of participants' engagement. Teachers used the platform within the constraints of what its design allowed. During their first interview all of the participants were asked about the design of the platform. Most were satisfied overall with how it operated. Five participants commented on the limitations of the search function on the resource exchange, however; they did not think that this had impacted their use of the platform greatly. Of greater

importance were teachers' perceptions of the ease of using the platform and the resources' alignment to their needs and teaching practice. The nature of the content available was more important to teachers than the design and functionality of the platform itself.

The recent changes to the design of the content communities, which were discussed only by the two teachers who were community leaders, Anna and Alicia, had not yet changed the way that teachers used the platform substantially. While the intention behind the new communities was to foster online instructional coaching, where teachers collaborate with community leaders to develop shared meaning and collective knowledge, most teachers were still using the discussion forums in order to find resources that could help them to solve an immediate issue they were facing. Teachers continued to perceive TFANet as a source for quick learning and immediate knowledge acquisition. Alicia discussed the disjunction between the new aim of the content community and users' engagement:

Because I think it's more time consuming to think that way. And it requires a lot more planning and a lot more. You can't just post something the weekend before you're going to start a unit and be like, I need this resource. It's like, you need a lot more time than that. So I think that's challenging but I think it's a shift in mindset that needs to happen for ELA teachers and maybe other teachers too.

The way in which teachers engaged with the platform was connected closely to their professional needs and their perception of how the platform could help them to address those needs. Need rather than technology design drives use of TFANet.

4.9 AKO Net

AKO Net is comprised of two principal parts: the resource exchange and the content communities. Teacher-to-teacher knowledge mobilisation is central to the operation of both of these parts. The resource exchange is a digital filing cabinet, containing over 100,000 teaching and classroom resources created by AKO teachers. Resources include unit plans, scopes and sequences, lesson plans, PowerPoint presentations, worksheets, homework activities, assessments and associated rubrics [see Appendix J for examples]. Each AKO teacher has their own profile page to which they can upload resources and organise them into folders and subfolders [Image 4.3]. Teachers can search the resource exchange by performing a keyword search of the whole database, or by searching the resources on an individual teacher's profile page. AKO recently launched the feature teacher initiative. Feature teachers have been identified by AKO as being highly effective practitioners. They upload all of their teaching resources on to the platform, creating a course that is followed by AKO teachers teaching the same subject and grade level. Not all subjects and grade levels have feature teacher courses.

The content communities provide teachers with a space to 'meet' and share resources with other teachers who are teaching their subject and grade [Image 4.4]. Most content communities are led by an AKO teacher who is responsible for uploading resources to the community and sending out monthly emails – called the goldmine – which highlight useful resources for members. The content communities have no discussion forums or interactive capabilities and interview data suggested that most engagement with the communities is focused around teachers reading the goldmine emails rather than on accessing the community on the platform itself.

AKO shared web data they have collected on the monthly usage of AKO Net over seven months from August 2013, a time period representing the first seven months of the 2013/14 school year and coinciding with this study's data collection period.⁷ AKO separated the data into all teachers who had an AKO Net account and teachers who had logged onto AKO Net since August 1 2013. By the end of this time period (February 2014) there were 4822 AKO Net accounts. Of these, 3790 users (78.6% of users) had

⁷ Similarly to the TFANet data, I had no control over the data AKO provided me. AKO provided me with no raw data, instead I was reliant entirely on pre-coded data. I present here the data that was provided to me. The data is intended to provide an overall picture of platform usage and activity.

Search over 600k resources

Resources

Q

Questions

My Planner

My Curriculum

Me



High School

Add As Colleague

2,500

Resources

1,879

Downloads

0

Questions

Summary

Curriculum

Favorites

Questions

Most Popular

Colleagues

Curriculum

Planner

Networks



10th Grade AP World History 2012-2013

404 Resource(s)



10th Grade Global History 2012-2013

360 Resource(s)



10th Grade AP World History 2011-2012

980 Resource(s)



KSS 2012 - Engagement & Rigor in MS & HS

4 Resource(s)

Nothing scheduled at this time.









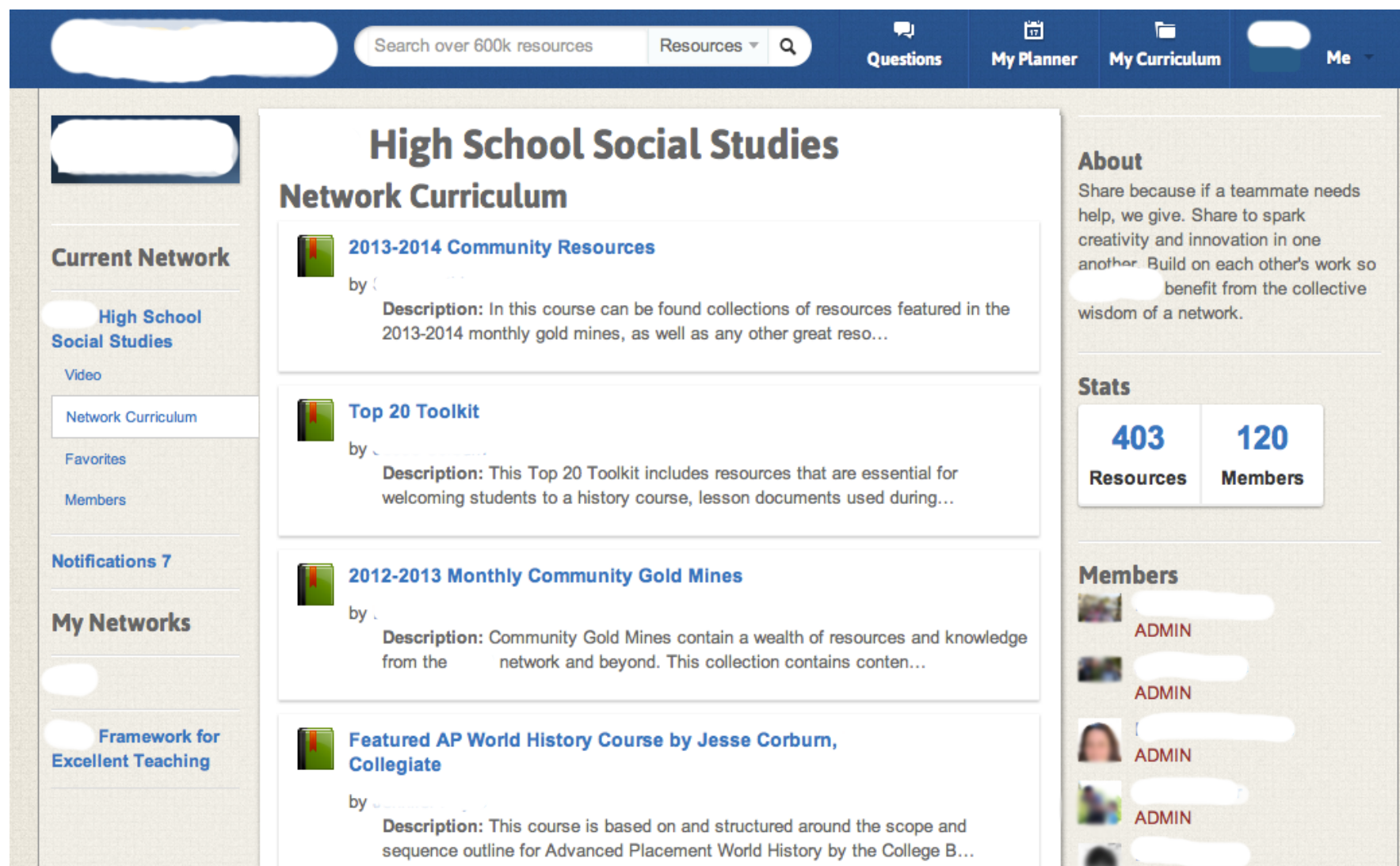


School, New York



Teaching

Image 4.3 Screenshot of a teacher's profile page on AKO Net



accessed AKO Net more than once over their membership period and 47% of account holders had downloaded at least one resource and uploaded at least one resource on AKO Net over their membership period. An average of 46.7% of AKO Net users who have ever accessed the platform are visiting the platform more than twice in any given month, while an average of 62.6% of users who have visited AKO Net since 1 August 2013 are visiting the platform two or more times in a given month. Of the teachers who have logged on to AKO Net since August 2013, on average 54.5% were downloading at least one resource per month while on average 26.7% of these users uploaded at least one resource to the platform each month. The data indicate that a higher proportion of teachers access the platform in order to find resources than to upload resources.

While it is problematic to draw firm conclusions from only seven months of data, the data does suggest that usage of AKO Net changes on a monthly basis. Of the users who had logged on to AKO Net at least once since August 2013, 86.6% accessed the platform at least twice in August while 51.1% had accessed the platform at least twice in February 2014. This suggests that frequency of usage is higher at the start of the school year. A similar trend was detected in the uploading and downloading figures. 1834 teachers downloaded at least one file in August 2013 while 1507 teachers downloaded a file in February 2014, a decrease of 17.8%. In August 2013 940 teachers uploaded at least one file while 713 teachers uploaded at least one file in February 2014, a decrease of 24.1%.

4.10 Participant engagement

Data from both sets of interviews, the journal logs and observations of each participant's profile page were used to develop an understanding of how each participant engaged currently with AKO Net as well as how their engagement had changed over time. The following vignettes detail each participant's engagement as well as providing initial insight into their perceptions towards the platform. All participants' names are pseudonyms.

Scott

Scott is a high school history teacher with seven years of teaching experience. He currently holds a number of leadership positions in his school and at AKO. During his first year at AKO he used the resource exchange frequently. However, over time as his knowledge of the curriculum and pedagogy developed, his engagement has decreased.

He now engages only with the resources of specific teachers, whom he knows and trusts to provide high quality resources. Scott is an active and enthusiastic contributor to AKO Net. He has shared 2800 resources and has had his materials downloaded⁸ 2827 times. He is leader of the high school social studies content community and values the sense of connection and camaraderie his involvement brings. Scott is dedicated to continuing his own professional learning as well as supporting the development of other teachers and believes that active participation on AKO Net is central to achieving both aims.

Caroline

Caroline is head of Spanish at her high school. She has been teaching for five years, all of them at AKO. Caroline has rarely used the resource exchange because she does not believe that it has enough high quality resources in her subject area. She also is a member of a large, collaborative department, which co-plans all of its curricular materials, which means that she has little need to find additional materials. Despite not utilising AKO Net to find resources, she is an active sharer, having uploaded 925 resources. These have been downloaded 4791 times. Her sharing behaviour is motivated by her experience as a first year teacher, when she was the only one teaching Spanish at her school and had no access to shared teaching resources. The Spanish content community has no leader and is inactive, and consequently Caroline does not engage with it. She, however, is committed to trying to connect with other teachers via AKO Net, and sends colleague requests to all of the teachers who have downloaded her resources.

Alison

Alison is an elementary teacher and literacy specialist with six years' experience. Alison's use of AKO Net is limited and she was not very enthusiastic about the role of AKO Net in her practice. When AKO Net was first created Alison struggled to find resources that were relevant to her practice and professional needs. This early disappointment with the platform continues to influence her low levels of engagement with the resource exchange and content communities. Alison's school requires all teachers to upload their lesson plans to the platform and initially offered incentives to encourage teachers to share a wider variety of resources. Alison has shared 669 resources on the platform (she has 648

⁸ Any reference to downloading in this section refers to the number of times a teacher's resources have been downloaded from AKO Net by other teachers. It does not refer to the number of resources that a teacher has downloaded.

downloads); however, if sharing were not mandatory, it is unlikely that she would continue to upload her materials.

Rosa

Rosa is a lead middle school ELA and social studies teacher with thirteen years' experience at AKO. Rosa was selected as a founding AKO Net teacher and was paid to upload four complete units of work to the platform when it was first developed. She has continued to be an active contributor, sharing 1176 resources and has 3984 downloads. Rosa is committed to supporting less experienced teachers and where possible reaches out to teachers who are using her resources and require further support. She has limited engagement with the resource exchange, and engages only when she identifies an area of her practice where she has weaker content or pedagogical knowledge and requires additional resources to support her practice.

Michelle

Michelle is a first year high school biology teacher. She engages frequently with the resource exchange, seeking resources to help her to develop her pedagogical content knowledge and to structure her practice. Michelle tries to engage with resources created by a wide range of teachers so as not to limit the scope of her teaching. She has not engaged with her content community; however, she has joined an alternative online community of AKO biology teachers, which is hosted outside of AKO Net. Michelle values the opportunity to interact and collaborate with other teachers online and given the lack of interactive capabilities on AKO Net, has found it easier to do this outside the platform. She had not yet contributed any resources to the platform, largely because she lacks confidence in her materials and worries about what other teachers will think of them.

Amelia

Amelia is an elementary school teacher and instructional coach with six years' experience. She is enthusiastic about AKO Net and believes her moderate use of the resource exchange has had a positive impact on her professional learning and teaching. It has provided her with access to new ideas and perspectives. Amelia's school requires her to upload her lesson plans. While this initiated her sharing behaviour, over time she has come to recognise the importance of sharing with other teachers and the benefits that

sharing her resources brings to both teachers and students across the network. She has uploaded 671 resources, which have been downloaded 1563 times. Amelia has not engaged with the content communities, primarily because she does not understand how what they offer differs from the resource exchange.

Chris

Chris is a middle school math teacher in his second year at AKO. This year he is part of the feature teacher initiative and he now relies almost exclusively on these resources. Chris believes that using the feature teacher resources has had a significant impact on his teaching and finds it much easier and more reliable to use the resources of just one teacher, rather than having to search the entire resource exchange. He regularly emails the feature teacher and has found the opportunity to ask questions and connect with teachers online (via email not AKO Net) to be beneficial. Chris engages regularly with the goldmine emails and finds that they often contain useful and interesting resources. He does not share his resources on the platform, and questions what value they would add seeing as they are predominantly modified versions of other teachers' lessons.

Ariana

Ariana is a third year high school English teacher. She engages frequently with the resource exchange and finds the opportunity to see how other teachers approach a particular topic and to gain new perspectives valuable in expanding her pedagogical content knowledge. The types of resources Ariana engages with have shifted over time. During her first and second years at AKO she engaged with all types of resources. However, now that she feels more comfortable with planning units and individual lessons, she is more interested in looking for activity ideas and resources to supplement her practice. She does not engage with her content community on the platform; however, when the goldmine emails contain resources that are directly relevant to her immediate teaching needs, she will look at them. Ariana does not upload her own materials to the platform and does not seek to interact or engage with other AKO Net users.

Deanna

Deanna is a middle school social studies teacher with five years' teaching experience. She is very positive about the role that AKO Net plays in her practice and believes that it has had played an important part in increasing her professional confidence. She engages

frequently with the resource exchange and this year is part of the feature teacher initiative. She, however, does not rely on the feature teacher's resources and continues to perform general searches of the resource exchange to support and extend the range of resources she is engaging with. Deanna is an active contributor to the platform and has uploaded 2563 resources and has 1291 downloads. She has limited engagement with her content community but would be more likely to use it if it were more interactive and facilitated communication between teachers.

Jasper

Jasper is head of biology and environmental science at his high school. He has been teaching for six years. When he first came to AKO he engaged regularly with the resource exchange in order to support the development of his practice and to ensure that he was covering the entire curriculum. As he gained experience, his engagement decreased, and now the resource exchange is something he uses when he needs to find quickly an additional resource to use in his practice. Jasper believes strongly that as a subject leader he has a responsibility to help and support other teachers and as a result he shares his materials on the platform. He has uploaded 1373 resources, and has had 2040 downloads. Jasper would welcome the opportunity to be able to interact with teachers directly via AKO Net. He no longer engages with the goldmine emails because he does not find them relevant to his needs. Jasper feels that AKO Net is better aligned to the needs of early career teachers and would like to see more resources by experienced teachers available on the platform.

Natalie

Natalie is head of environmental science at her high school. She has been teaching for six years. She is not very positive about AKO Net. Her negativity largely stems from her dissatisfaction with the range and quality of resources available in her subject area. As a result she has low engagement with the resource exchange and no engagement with her content community. Natalie's school mandates the uploading of all lesson plans and she has uploaded 914 resources. These have been downloaded 3948 times. Natalie expressed frustration in the lack of reciprocity on AKO Net. She felt that she had contributed a large number of resources but received little in return.

4.11 Understanding engagement

This section explores the factors influencing participants' engagement with AKO Net. The same factors discussed in relation to TFANet also shaped use of AKO Net. However, there are subtle differences in the way the factors manifest and influence engagement, reflecting differences in the design of the two platforms, the population of users and the contexts in which AKO Net is used.

4.12 Trust

Trust emerged as a crucial factor underlying engagement with AKO Net. During their first interviews all participants described the strong sense of connection they feel to AKO and its mission to reduce inequality in education. The affective commitment teachers feel to AKO inspires a strong degree of trust both in the organisation and the services it provides, including AKO Net. Trust was enhanced by teachers' belief in the credibility and reliability of the resources housed on the platform. Teachers considered resources created by other AKO teachers to be more authentic and trustworthy than those developed by anonymous experts or teachers outside of the AKO network. Amelia described her trust in the teacher-created resources on the platform:

And I think the authenticity is something that you really get from AKO Net because it's real AKO people. It's real people. Not AKO robots. Like, tried and true things. It's real stuff. It's not things that we're like buying from a textbook company.

Higher levels of trust were associated with using resources created by specific teachers. Scott, who only used resources made by teachers he knows and trusts, described his approach to acquiring knowledge on AKO Net:

There's plenty of stuff that I look at on AKO Net and I'm like, this is crap. ... The best bang for your buck here comes from when you know a teacher and you know what you're looking for and you get what you want.

Teachers gravitated towards resources uploaded by teachers they know. This was true even for Michelle, a teacher who generally avoided relying on specific teachers because she does not want to limit the variety of resources with which she engages. Michelle will rely on a specific teacher if she has met them in person and knows that they can support a particular aspect of her practice:

She presented at [an AKO conference] and she did like, the interactive science notebook. So like when I'm thinking about doing activities that are similar to that I will go back and look for her specifically. So if I find somebody that I know is a good resource for that, I'll go back to them but I still want to see if there's something else out there.

In-person connections between teachers not only increased trust but were also an important factor in the establishment of communities on AKO Net. For Scott, the only

participant who engaged actively with his content community, meeting members of his community in person was pivotal for developing trust in the online setting. He explained during his first interview:

I think it starts in person. So, it starts at National Summit when I get to go to a session ... and I go and I meet like six people who teach the same stuff as I do. And they want a thought partner about stuff. And then, the, online stuff perpetuates our relationship officially through the school year.

Relying on specific teachers also provided a more efficient means of engagement, bypassing the need to sort through large quantities of resources. Three teachers mentioned feeling overwhelmed by the volume of resources available on the platform. Chris described the shift in reliability he experienced between his first year when he was searching the entire resource exchange, to his almost exclusive reliance on the feature teacher resources during his second year:

I didn't have one teacher that I was going with and I found that to be a lot more challenging just because the quality is kind of all over the place in terms of materials ... [Last year] I'd think, is it worth my time to go on AKO Net? Like, I might hit the lottery and find exactly what I'm looking for or I might waste a bunch of time and get nothing. So, um, yeah I think the feature teacher stuff is the way to go because it's, you know, it's going to be good.

Engagement with a specific teacher not only enhanced Chris' trust of AKO Net, but also increased his frequency of engagement. Being able to narrow a search to the resources of a specific user enables teachers to access reliable materials quickly, leading to a higher success rate in their searches and increased trust in the services AKO Net provides.

4.13 Need, use and gratification

Engagement is influenced by how well the platform caters to and fulfils teachers' needs. Use and gratification theory together with social cognitive theory, as discussed earlier in the chapter in relation to engagement with TFANet, provide a useful framework for examining and understanding how and why teachers engage with AKO Net. As with TFANet, teachers' outcome expectations influenced their level of engagement. The higher a teacher's outcome expectation the more frequently they engaged; while conversely the lower their expectations and the fewer gratifications they received, the lower their engagement. AKO Net is a knowledge community and as such outcome expectations were primarily based on performance expectancy, the degree to which engaging with the platform could help teachers to improve their job performance.

AKO Net provides specific types of knowledge that are valuable to teachers in their planning and preparation. The knowledge is well aligned with teachers' needs for easily accessible, ready-made and reliable teaching materials that they can integrate quickly into their practice. As teachers gain experience and develop pedagogical and content knowledge their behavioural incentives for engagement evolve, which leads to a corresponding shift in their outcome expectations.

4.13.1 Beginner teachers

Five participants had access to AKO Net as first year teachers at AKO, and all five engaged frequently with the resource exchange. Beginner teachers tend to have weaker content and pedagogical knowledge and fewer resources to draw upon when creating curricula, planning units and lessons, and making teaching materials. Having access to exemplar materials and classroom resources, such as those available on AKO Net, is particularly valuable to them.

Beginner teachers' primary needs revolve around knowing what to teach and how to teach it. They typically have fewer resources, material or cognitive, to draw upon when planning and preparing for their lessons and consequently have a greater need for materials to support them in these areas of their practice. The resource exchange with its ready-made teaching resources is particularly valuable. During his first interview, Chris, a second year teacher, described what he had struggled with in his first year of teaching and how AKO Net had supported the development of his practice:

Especially for someone who's new to the profession, I think having access to curriculum was something that I was really frustrated with last year, because I was kind of just thrown out. Like, hey, listen, teach pre-algebra and like, I know how to do it, but you know, I didn't have any text books or anything, so, ah, and there was like no curriculum, like nothing was given to me. So, I was kind of like all on my own and AKO Net was all I had a lot of times.

Beginner teachers engage with AKO Net because they need to know how to teach particular topics and skills and require support when creating teaching materials. By providing information and knowledge in a form that is aligned to what teachers have to produce in their own practice, AKO Net is able to gratify some of the primary needs of beginner teachers.

The nature of teachers' work encourages frequent and sustained use of the resource exchange by beginner teachers. The practice of early career teachers is evolving constantly and they require new materials and resources on a daily basis as they progress

through the curriculum, teaching an ever-changing array of content, concepts and skills. The changing nature of their practice led the five participants to use AKO Net on a nearly daily basis as first year teachers. Their weaker knowledge base meant that they needed help with the entire spectrum of planning, from unit planning and lesson planning, through to designing lesson activities and assessments. AKO Net is well placed to provide the types of resources teachers require. Ariana discussed her consistent need for teaching and planning resources during her first year of teaching and her daily use of AKO Net to address these needs:

When I was a first year teacher I really just needed lesson plans. I didn't really know what I was doing. I wasn't even unit planning. I was really, ok, this is what I want to teach tomorrow. Here you go. This is what I'm teaching again. And I would plan the lessons the night before and then implement it the next day.

Beginner teachers come to rely on AKO Net for daily support in their lesson planning and as long as their need for new resources remains and the platform continues to provide them with relevant and high quality materials, they will engage consistently.

4.13.2 Change with experience

As teachers gained experience in the classroom and became more comfortable with planning and lesson preparation, the frequency of their need for the resources available on the platform decreased as well as the range of resources they engaged with. Jasper, in his first interview, reflected on how his engagement had changed over time. He described his use of the resource exchange during his first year at AKO:

I was looking for the entire plethora of the teaching cycle. Just because I wanted to feel like I had a place to fall back to ... I used those resources in my first year really to kind of guide what an experienced Texas biology teacher has done and kind of figured out what worked best for my kids.

Now in his sixth year of teaching, Jasper had become more skilled at unit and lesson planning and had a well-developed personal collection of teaching materials. Consequently he had less frequent need to search out new resources. He explained how his incentives to engage with AKO Net had shifted:

And so now I use it more as a place where if I need something quick I'll go there first. If I need something just to use. Maybe an extra, additional independent practice for students. Maybe an exit slip where I can gather some questions. I'll use it for a quick pull.

Like most more experienced teachers, Jasper perceived AKO Net as a source of just-in-time learning, something to satisfy a specific need or to provide a quick fix or lesson idea. Participants perceived AKO Net as somewhere they could quickly locate reliable knowledge and ready-made resources, which they could integrate directly into their classroom practice.

While beginner teachers have a consistent need for the resources provided on the platform and as a consequence engage regularly, more experienced teachers tend to engage at specific moments when they face a situation in their practice that requires the types and forms of knowledge available on AKO Net. Data from the journal logs and both sets of interviews indicated three situations when more experienced teachers used AKO Net: (1) for support when teaching a new topic or subject; (2) to gain new ideas or a different perspective; and (3) to receive support for areas of weaker knowledge.

All of the participants spoke of how the resource exchange afforded valuable exposure to new ideas and different perspectives by providing insight into how other teachers approached the teaching of a particular topic or skill. More experienced teachers wanted to continue to extend their practice and to provide their students with interesting and challenging lessons. During his first interview Scott described his ongoing need to find new and interesting ways of presenting content to his students:

Shit, I don't know how to teach about the Ottoman Empire in a way that makes it interesting. How can I find engaging sources? And maybe somebody has had the problem before, and I bet they have, and can guide me through their resources to something useful.

Teachers recognised that other teachers will have taught the same topics and content and that their teaching materials can be a valuable source of new ideas and perspectives.

Ten participants also discussed engaging with AKO Net when they were uncertain about how to teach a particular topic, skill or concept and wanted to see how other teachers had approached similar lessons. For some teachers this need arose when they took on a new role or position within the school or started teaching a new subject or grade level and required additional support and resources to support their practice. When Amelia took on the new position of instructional leader in her school she not only had to learn the components of her role but also had to create the resources to allow her to perform her job. Her limited experience and time constraints meant that the ready-made resources on AKO Net were particularly valuable:

When I first got into the role, I started over summer session in June, I was like I don't even know where to start. What should I use for my observations? ... I didn't have time to create everything in that moment. And so I was able to sort of search for observation templates ... Just like, I need to find some stuff.

Amelia's change in circumstance inspired her need for new resources and knowledge to support her in performing her new role. When teaching a topic or lesson for the first

time other teachers also engaged with AKO Net to gain inspiration. As Natalie explained during her first interview:

If it's a lesson topic that I've not taught before then I sometimes go on and get idea for how other people have taught it, even if I don't end up using the materials it gives me ideas.

Engaging with other teachers' ideas and resources can provide teachers with valuable knowledge and new ideas that they can utilise in their own practice.

Five participants recognised areas of their practice where their pedagogical or content knowledge was relatively weak. The resources available on AKO Net provided them with targeted additional support. When establishing a new course at her school, Rosa, a teacher with thirteen years' experience, recognised that she did not have the necessary content knowledge or computer skills to create effective assessments. During her first interview she recounted how she had used the resource exchange to find assessments that she could adapt for her own classes. Scott, who engaged minimally with the resource exchange recorded in his journal log that he had used the resource exchange to find a multiple-choice test for his history class. When asked about this during his second interview he explained that his reason for using AKO Net in this instance was that he lacked both the skills and the motivation to create a multiple-choice test:

I'm not going to make multiple-choice questions myself. I don't know how to do it. So, if I have another teacher who teaches the same subject matter and has already put together a test, um, I would rather use that.

The content available on AKO Net and the design of the platform neatly align with teachers' need for ready-made teaching resources. Data suggest that teachers continue to have a need of the types of resources available on AKO Net at certain times throughout their careers and as long as the platform continues to gratify their needs, teachers will continue to engage as and when that arises.

By providing immediate and specific support in the form of planning and classroom materials, the resource exchange is ideally suited to enabling the just-in-time learning teachers sometimes require. The content communities in contrast are not. Participants' limited engagement with the content communities may reflect the communities' inability to provide immediate, personalised or targeted support. Four participants engaged with the communities when the goldmine email contained resources that addressed an area of immediate need. Achieving a match between an individual teacher's immediate need and the contents of the goldmine, however, occurred infrequently. As Jasper explained during his first interview:

So I'd look at the email and if there was something interesting I would check it out. I might only have checked out one or maybe two resources in total for that.

In the four months of data collection alignment between a teacher's need and the content of the goldmine occurred only once. Ariana had engaged with the goldmine just prior to her first interview because it contained resources she needed:

Yeah, actually it happened last week ... I had an idea of ok let's do a short story one week unit and I got an email saying, trying to push your students to do close reading? And I was like this is perfect. So I looked at the list of I guess steps that they said students should take in terms of close reading and it was perfect.

Alignment between the resources shared in the goldmine and teachers' immediate needs is rare. Teachers approach AKO Net with the expectation that it will provide them with resources that align directly with their particular and immediate needs. The design of the resource exchange and the content it contains are better suited to meeting this need than the content communities and consequently, teachers were more likely to engage with the resource exchange.

4.13.3 Lack of gratification and limited engagement

Non-engagement or limited engagement occurred in three circumstances: firstly, when the services and knowledge provided on AKO Net no longer gratified teachers' needs; secondly, when teachers' needs changed and as a result they no longer required the knowledge available on AKO Net; and thirdly, if teachers identified another source of knowledge, similar to that provided on AKO Net, which gratified their needs better.

Three teachers, Alison, Caroline and Natalie, discussed their discovery soon after AKO Net was launched that the resources available on the platform were not relevant to their subjects and needs. Their poor initial experiences with the platform established very low outcome expectations, expectations that continue to shape their use of the platform. Caroline explained her issue with the resources on the platform in her first interview:

Honestly, I would look stuff up on AKO Net and there's not as much out there for world languages. Um, so honestly when I would look for materials, I'd, um, say I want a lesson on teaching subject pronouns, usually the best stuff that I would find would be ours.

Low outcome expectations were also connected to a perceived lack of high quality resources on the platform. Four of the more experienced participants expressed a desire to engage with teachers who had more experience than themselves. The AKO network is comprised predominantly of early career teachers, and has a high teacher turnover rate, meaning that there are few experienced teachers contributing resources to it. These four

participants felt that engagement did not provide access to the high quality resources they required and as a result they engaged infrequently.

Low engagement was also connected to limited behavioural incentives. Low incentives primarily were seen among participants who had found other, more rewarding sources for obtaining teaching and planning resources. Natalie and Caroline were both members of departments that had collaborated to create all of their curricula and teaching resources. This meant that they had little need to search for materials to supplement their practice. For Jasper and Alison, their engagement with alternative online teaching platforms, which they considered to serve their needs better, reduced their engagement with AKO Net. Alison explained in her second interview:

I mean I think I touched upon this before but it's really, at the end of the day AKO Net doesn't have as many resources as Teachers Pay Teachers. So I guess, I usually first go to Google and then other times it's definitely a close second for specifically teaching resources, I'll go to Teachers Pay Teachers. AKO Net is not something I go to because every time I do I don't find what I need.

When AKO Net failed to gratify teachers' needs, and they identified an alternative source that met these needs more consistently, their use of AKO Net decreased and their engagement with other sources increased.

4.14 Community

During their first interviews all participants discussed the importance of engaging with and learning from other teachers and the need to be part of a professional community of teachers with whom they could share ideas and from whom they could receive support. For most participants, engagement with a professional community occurred in-person, with only one participant engaging actively with the AKO Net content communities. The low levels of participation in the content communities relate both to the design limitations of the platform, to be discussed in greater detail in section 4.16, and to the prevalence of strong school-based and regional communities throughout the AKO network. Eight participants were part of in-person professional communities that provided them with opportunities for co-operative learning and professional support. A number of these teachers remarked that they felt less need to engage with the communities on AKO Net because of the support they received from their in-person networks.

Scott, the only participant who engaged regularly with his content community, was not part of a strong community at his school. During both of his interviews Scott spoke of the importance of being part of a national, online community on AKO Net, which provided him with ‘this set of colleagues who I wouldn’t know otherwise that I can bounce ideas off of’. Scott reflected on how his engagement with the content community had enriched his professional life:

I would say also my life as a teacher here has been enhanced by being connected to people around the country ... Makes me feel like I’m part of a professional community. Makes me happier with my life, work.

Scott’s comments suggest that online communities or groups of teachers can provide a similar sense of connection and engagement to in-person communities, as well as opportunities for the sharing of knowledge and collaboration between members.

This was supported by Chris and Michelle who are members of online AKO communities (both their online communities are hosted outside of AKO Net). While Chris and Michelle have individual colleagues in their schools with whom they connect, they are not part of strong, school-based professional communities. During their first interviews Chris and Michelle both spoke of the important role that their online communities played in supporting their professional development by providing opportunities for them to ask questions and gain feedback on their teaching. While it appears that teachers were more likely to engage with in-person communities and valued these above their online equivalents, in cases where offline communities were limited, virtual communities of teachers could be powerful and positive alternatives, providing similar support and professional learning opportunities for teachers. Teachers’ social integrative need, the need to be part of a community and to feel a sense of belonging, can be met by online sources.

4.15 Sharing and contributing

All eight participants who have shared their resources on AKO Net began doing so because their schools mandated it. Principals at a number of AKO schools require teachers to post their lesson plans online for monitoring and appraisal purposes. For two participants, Rosa and Alison, initial sharing also was incentivised, which further encouraged their behaviour.

While mandated sharing provided the initial impetus to share for all participants, as sharing became a more familiar and regular part of their practice, teachers increasingly recognised the benefits that arose from it. Three participants now use AKO Net as a departmental share drive, enabling them to exchange resources with their colleagues. This encouraged these participants to share a wider range of resources beyond the lesson plans they were required to post. Natalie and Scott also have realised that the resource exchange can operate as a personal cloud storage system, allowing them to save copies of all their teaching resources, which they can then access from any location. For Alison and Natalie mandatory sharing remained the primary reason that they upload resources to the platform and without this extrinsic motivating force, it is unlikely either would continue to share. While mandated sharing may have provided the initial impetus to share for the remaining six teachers – Scott, Deanna, Caroline, Amelia, Rosa and Jasper – their current behaviour was intrinsically motivated by personal characteristics and beliefs.

Organisational affiliation and commitment to AKO encouraged teachers' sharing. Three participants observed that they were more willing to share resources on AKO Net than other websites because they knew that they would be helping to support AKO teachers. Caroline described the importance of the AKO connection during her first interview:

I guess, because there's this layer within it that I'm supporting other AKO teachers, I'm consistent with it. If it was just, hey there's this programme on the online where you can just go post your stuff, I don't think I'd do it. Does that make sense? ... So I am totally happy to share, you know, the work that we've done, especially with other AKO teachers.

The AKO connection not only increased trust in the platform for teachers accessing knowledge but also motivated teachers to contribute resources. The affective commitment participants feel towards AKO and their sense of identification with AKO's aims and agenda means that they are happy to perform extra work if it will help to support the organisation. The most regular sharers thought about their sharing in relation to the wider AKO mission, to improve the educational experience and outcomes of all students. They recognised that sharing resources on AKO Net contributes to this by supporting the practice of other teachers and as a result also enhances the learning of students across the country. Jasper and Amelia spoke about the responsibility they feel to help all AKO students. Sharing their resources on AKO Net provided one means of achieving this.

All six of these teachers were strongly altruistic. Rosa's story illustrated how an altruistic mindset can develop out of initial sharing behaviour. When AKO Net was launched,

Rosa was selected to be a founding teacher and was paid to share four complete units of work on the platform. When Rosa realised the value sharing her resources brought other teachers she continued to upload to the platform without any monetary incentive:

They paid me to post my first four units of study and like, to do all the process of tagging, and organising things and everything, and lesson plans and homeworks and things like that. So, what I found was my downloads went way up and people were messaging me and asking me questions and so I started to see how what I was doing was really valuable to other people. So after those first four units I thought like, ok let me go ahead and continue posting things and then the last two years I've just continued posting things.

Altruism and a strong sense of duty to support and develop other teachers, including teachers they had never met, inspired the sharing behaviour of all six teachers.

Five out of the six teachers were curriculum leaders at their schools, and as such were responsible for supporting teachers in their departments. It appears that leadership qualities that are developed offline are transferred to the online setting, with teachers continuing to exhibit the same leadership skills and desire to support others on AKO Net. For these teachers part of their identity and professional self-worth was associated with being a leader and helping other teachers. Scott, during his first interview, discussed the importance of being actively involved in the content community:

I love talking about teaching and so like, on a given afternoon at 5pm I don't want to grade papers and if there's an email sitting in my inbox that's interesting, and I, and I guess I enjoy my own exposure in the community but, um I don't think that's primarily it ... I thought I could be helpful to people if I said well here's how homework works in my class and here's where I've had success with it and here's what I've struggled with and here's some resources I use that I find helpful.

By helping others these teachers are also feeding part of themselves.

The apparent importance of altruism for driving sharing behaviour on AKO Net is at odds with the existing literature on knowledge sharing. Reciprocity, the need to receive something (knowledge or resources) in return for sharing one's own knowledge, is frequently cited as a major factor influencing knowledge sharing behaviour. Only one participant, Natalie, expressed a desire for reciprocity. She was dissatisfied by the lack of reciprocity on AKO Net and the resultant discrepancy between her high level of sharing and her minimal acquisition of resources. For all other teachers, the realisation that their sharing was benefiting other teachers over-rode any need for reciprocity.

4.15.1 Non-sharers

A lack of confidence emerged as the primary factor driving non-sharers' behaviour. All three non-sharers were early career teachers, with between one year and three years of

experience. These teachers expressed a lack of confidence in the quality of the knowledge and resources they were producing. Michelle, during her first interview, described her fears about how her resources might be perceived:

I think because I'm so new, I don't want anyone to be like, that's a terrible handout. So I know that's part of my reservation. I sometimes feel like, not that it's bad, but people'd be like, that's so juvenile. She made that. That's ridiculous ... There are so many teachers that have so much more experience than you do and it's like, is everybody going to see this? Really? You're putting it out into this big scary world.

Non-sharers also questioned the value contributing their resources would add to the range of resources already available on AKO Net. They felt that there were already many high quality resources available, many of which they drew upon to create their own lessons, and were uncertain what value they would be able to add.

All three of the non-sharers were willing to share resources in-person with teachers at their schools. As Ariana explained during her first interview:

I mean as a department and as a, like, staff we definitely like collaborate and share with each other but I think I just get nervous with sharing things online. I don't know. With what people think.

In-person sharing is perceived differently from online sharing by these teachers. They appear to be more comfortable with sharing resources and knowledge with teachers whom they know and interact with regularly than with strangers online. Again, the differences between developing trust through in-person interactions versus online connections could play a role in shaping sharing behaviour. Teachers feel safer sharing in an environment that is familiar. The anonymity of the Internet and the uncertainty about what others will think of the resources shared on AKO Net is intimidating for some teachers.

4.16 Platform design

While the nature of the content on the platform influenced use by shaping teachers' outcome expectations, the design of the resource exchange appeared to have limited impact on whether and how teachers chose to engage. Many participants described their dissatisfaction with the search function, and in particular the lack of accurate tagging of the resources. As Natalie explained:

The problem with it is that when you upload something you have to tag it with all the things but nobody has time to tag it with the sixteen different things it could possibly be. If they do then I don't know how they're working at AKO. So, the search function is my biggest struggle.

Teachers' frustrations, however, did not appear to influence their engagement greatly. Teachers continued to engage if they thought that they could find reliable resources,

regardless of whether the search function was efficient or not. Outcome expectations were judged principally on the knowledge available, not on the platform design.

The design of the content communities did appear to affect some participants' engagement. Three teachers did not engage with the communities because they struggled to differentiate the services and resources they offered from those of the resource exchange. Amelia, who as a TFA alumna also had access to TFANet, engaged with the content communities on TFANet because their incorporation of social technologies enabled true interaction between members. She, however, struggled to know how to engage with the AKO Net communities:

For Teacher for America, just because like the discussion forum type thing going on. People can ask questions and yeah, I don't really use it to ask questions. I more just look at what people are asking. And I think that's one thing that's kind of lacking on the content communities for AKO Net. It's just, I kind of never knew. I clicked on it and never really knew what to do there.

The lack of interactive capabilities on AKO Net shaped teachers' engagement, encouraging a focus on knowledge acquisition rather than social connections.

Having examined teachers' engagement with the two platforms in this chapter, the following chapter presents the findings on the outcomes of this engagement, exploring the knowledge reconstruction process and teachers' perceptions of the learning arising from platform use.

Chapter Five: Findings; Knowledge reconstruction and learning

This chapter presents the analysis of data on the outputs of engagement with the platforms. The first part examines the knowledge reconstruction process, focusing on how teachers assess, conceptualise and use knowledge and resources from the platforms in their own practice. The second section reports the findings on how teachers perceive the influence that engagement with the platforms has on their practice and professional learning.

5.1 Knowledge reconstruction

This section examines how teachers reconstruct knowledge found on the platforms in their own practice. The first interviews enabled teachers to reflect generally on how the knowledge reconstruction process operated for them, while the journal logs and follow up interviews focused on specific episodes of knowledge reconstruction. In keeping with the findings of previous knowledge reconstruction studies, three stages were identified: the selection and adoption of knowledge, the modification and implementation of knowledge, and the evaluation and embedding of knowledge.

5.2 Selection and adoption of knowledge

For most participants, the knowledge selection process began with the employment of search filters to focus their keyword searches of the resource exchange. Teachers narrowed down their searches by grade level, subject and region. Many teachers further refined their search by the number of downloads (AKO Net) or the star rating (TFANet) a resource had received.

More experienced teachers tended to have greater understanding of their personal teaching philosophy and pedagogical style and could recognise more easily and accurately the resources that would complement this. Several participants spoke about becoming more intuitive in their selection of resources as they became more confident in their practice. Experienced teachers appeared to know instinctively what would work well in their practice and the types of resource they required to teach particular content and skills. In contrast, beginner teachers found it more challenging to gauge the sorts of

resources they required for a particular situation. Brittany explained how this change in her cognition and behaviour had developed over time:

And now I think, it's, it's easy. I'm better at judging pretty quickly, does this look like something my students can do? Does it look challenging for them? Whereas, at the beginning it was just, ok, I'll just take a little bit of everything and see what works.

As teachers gain greater knowledge and understanding of both the curriculum and their students they are able to select resources that are appropriate and meaningful for their students more effectively and efficiently.

The differences between beginner and more experienced teachers suggest that as teachers gain experience their absorptive capacity – that is their ‘ability to recognise the value of new information, to assimilate it, and to apply it’ (Cohen and Levinthal, 1990: 128) – increases. Increased absorptive capacity is matched by more experienced teachers’ improved understanding of their school context and student needs, as well as greater pedagogical and content knowledge. Together, these skills enable teachers to recognise more quickly and accurately a resource’s potential to serve their needs.

A teacher’s professional context is essential to the knowledge selection process. Any resource taken from the platform must be transposed from the context of the original creator into the context of the new user. This requires teachers to determine how a resource fits with their curriculum focus and lesson objectives and, perhaps most importantly, the needs of their particular students. In subjects and grade levels where students are externally assessed, ensuring that resources aligned with the state curriculum objectives or state examinations that students sit at the end of the year was a key concern for teachers. Teachers further considered resources in relation to their specific lesson objectives and questioned how a resource could contribute to the development of specific content knowledge or skill development. For some teachers, particularly those in science and mathematics, establishing an exact content match was a crucial element in the knowledge selection process. For other teachers it was more important that a resource targeted the skills that they wanted to address, and they adjusted the content to fit their topic. This approach was common among ELA and social studies teachers. Participants described how they would substitute alternative English texts or history topics when using a resource. Alicia explained how she undertook the process of changing a resource’s content:

I might change like some of the content. Like if it's not exactly related to what, if the resource is really great or the way it's set up is really great but it's on a different story or a

different content I might like just sort of take that exemplar and take that model and just put in my content and put in my own stuff like that.

All of the participants were particularly concerned about ensuring that resources met the needs of their students. Teachers were keenly aware that different student populations have different learning needs and that resources must be aligned to the specific students in their class. Scott reflected on the importance of understanding his student population when selecting resources from a specific teacher on AKO Net:

And I think he has a slightly different population of kids to what I do. In terms of race and culture and what they're into. And so I might, um, I might evaluate sort of, what is going to engage my kids and what's not.

Teachers' beliefs about their students were a critical variable in the selection process. Teachers sought resources that were appropriate to the level and needs of their students, assessing whether resources provided appropriate challenge or adequate scaffolding and if particular resources would engage their students.

The closed nature of both platforms, making them accessible only to TFA and AKO teachers respectively, helped with the process of transposing a resource from its original context into the practice of the teacher reconstructing the resource. Both TFA and AKO are focused on serving low-income students and have developed particular teaching practices and pedagogies. Ten participants commented that they valued the resources and knowledge provided on the platforms because they knew that they were designed for students like theirs and that the teachers contributing the resources understood the teaching contexts that they worked in. As Brittany observed during her first interview:

I think there's something to be said for TFA specifically knowing that those teachers are in similar situations. Or have been in an educational ideological background that maybe you wouldn't find in other places.

The organisational connection and contextual similarities between the users of each platform enabled resources to be transposed more easily from the platform into a teacher's practice. The connection and alignment teachers feel towards other users connects back to their underlying sense of trust of the platforms and the resources they contain. During her first interview Ariana spoke about the close connection between the resources' alignment with and promotion of AKO's ideology and teaching pedagogy and her trust in them:

AKO Net has definitely been more reliable in terms of it's more rigorous, it's more in line with what AKO believes in ... I guess I like it because I know where the information is coming from. I can trust that we have the same goal and the same mission. So I like that aspect of it.

5.3 Knowledge modification and implementation

While teachers selected resources based on their alignment with their teaching style, students' needs and local teaching context, they generally took additional steps to modify a resource in order to ensure its successful implementation in their practice. All of the participants modified the resources they selected from the platform before employing them in their practice. Several participants discussed the issues that arose if they did not modify a resource before implementing it. Chris (AKO) and James (TFA), during their first year of teaching, attempted to use resources directly from the platforms without changing them first. Both teachers found this to be largely unsuccessful. James described what happened when he attempted to use lesson plans and classroom activities without modifying them first:

Sometimes it blew up in my face ... just because, because I didn't revise it enough to meet the needs of my students. To meet them where they were.

When he used resources without first adapting them, James found that he was not able to address his lesson objectives or target the specific needs of his students as successfully as when he modified a resource. Consequently, his lessons lacked focus, which in turn reduced the learning of his students.

Modification allows teachers to engage more fully with a resource and to understand its purpose and potential in relation to their own teaching practice. It also appears to be a central component in the transposition process, enabling teachers to make the knowledge applicable and relevant to their specific needs and those of their students. Chris, who relied almost exclusively on the feature teacher resources and had developed his classroom routine and teaching style to match those of the feature teacher, still had to modify the resources to fit his context better. Chris' students were less proficient in maths. As a result, he had to scaffold the provided activities in order to make them more accessible. He explained:

I mean one thing that's tough is her students are much higher than the students here in terms of like where they're coming in. So, my students are coming in only 42% of them were proficient last year in sixth grade math and her students are like 98% proficient. And so, um, I end up having to take out a lot of, just scaffold to make it a lot easier.

He also had to cut some elements from the 90-minute lesson plan provided in order to fit it into his own 60-minute period.

The data suggest that teachers use resources in one of four ways: (1) to gain ideas and background knowledge to help them plan a lesson or unit; (2) to amalgamate multiple

resources to form one new, meta resource; (3) to make minor formatting changes to a single resource; and (4) to make more substantial modifications to a single resource to make it better aligned to their needs and context. Participants tended to move between these four profiles at different times, depending on their specific needs and the nature of the resource they had selected.

5.3.1 *The idea gainer*

Teachers sometimes used the resources to gain background content knowledge or as a stimulus for what to teach or how to approach a particular topic. In these cases, teachers did not employ the actual resource in their teaching or planning but extracted relevant ideas or concepts in order to strengthen their knowledge and to shape their teaching practice and instructional approach. When setting up a new course at her school, Caroline used the resources on AKO Net to gain background content knowledge. The specialised nature of the course, a social studies class taught entirely in Spanish, meant that few resources on the platform were directly appropriate to her needs. Because most resources were in English and not Spanish, Caroline could not use them in her lessons; however, as she explained during her second interview, they provided useful background knowledge:

Whenever I'm teaching something that's essentially culture content related not Spanish grammar or vocabulary related, I have to sort of glean a lot of information before I feel like I can teach it ... it was a helpful step in that process for gaining more information and just becoming more familiar myself with her [Sonya Sotomayor's] life and what it was that brought her to the Supreme Court ... So while the biographical information was helpful just in my process of becoming more familiar, the materials themselves weren't something that I wanted to modify for my students.

The materials and resources on the platform, while not appropriate for employment in her classroom, provided Caroline with useful and relevant contextual information and content knowledge, which supported her in the planning and teaching of the unit.

The benefits of encountering new ideas and knowledge, even if they are not implemented directly into practice, was recognised by several teachers in the study. Both Alicia (TFANet) and Natalie (AKO Net) spoke during their first interview about how they had gained alternative perspectives by looking at resources on the platforms. This approach was more common in teachers who have lower levels of engagement with the resource exchanges and find that the resources are less aligned with their specific teaching needs. During her first interview Natalie spoke about what looking at the lessons of other

environmental science teachers had provided her with, despite never having integrated any of the resources directly into her own practice:

It gives me specific ideas for how people present things to their kids. You know, cause even if you're teaching for the regents exam you know the topic but you know twenty teachers are probably going to present it twenty different ways. And so just getting ideas and thinking about how people group things. I've never met another two environmental science teachers who did the same units and put things in the same order or chunked it in the same way. And so going on AKO Net actually does help me see, ok, what units do they do? What order do they do it in? And I wonder what their rationale is?

Natalie used the resources on AKO Net as a starting point for personal reflection on and inquiry into her teaching. While she had not adopted a resource or course structure directly from another teacher, looking through the resources enabled her to develop and extend her thinking and practice, and motivated her to make modifications to her own course.

5.3.2 *The amalgamator*

A number of participants from both platforms adopted the amalgamator stance when using the resource exchange. Teachers would collect multiple relevant resources and combine elements from each resource to produce their own material. By amalgamating the most relevant elements from each resource teachers theoretically were able to create a resource that directly and effectively addressed their individual needs and those of their students. Ariana likened the amalgamation process to undertaking research where you gather information from a range of sources, each with different ideas and perspectives, and then attempt to knit them together to fit your personal approach. Drawing upon multiple sources enabled teachers to take the best and most applicable elements from each resource to produce something that aligned closely with their objectives, teaching style and the needs of their students. Ariana, during her first interview, described how she employed multiple resources from AKO Net when designing some of her lessons:

So I kind of just pool from the different parts. Ok, I want to phrase this in this way. This is going to go in my like new material part. And then I'll pool. Practice will be from this lesson because I think these questions are more rigorous, so I'm going to pull from this part.

While amalgamating various resources added depth and rigour it also could be problematic. Ariana explained the complications she had experienced when amalgamating resources:

So, the only problem with doing that sometimes is it becomes this Frankenstein of a lesson, of like these different pieces from different people and it just doesn't flow as well, so, it's kind of a mix of different things.

When amalgamating resources teachers need to possess a clear vision of their own objectives and teaching style to ensure that the resulting resource targets their specific requirements. Amalgamation appeared to be more common among early career teachers from both AKO and TFA. Beginner teachers typically were less structured in their searches of the resource exchanges and lacked the expertise and experience to know exactly what they wanted or needed. Consequently, they tended to look through more resources before selecting the resources that they wanted to use. They also possessed a more limited vision of how they wanted a particular lesson or activity to look and found it more difficult to narrow down their search to identify the most applicable resources. When more experienced teachers amalgamated multiple resources they tended to be more targeted in their actions and had a clearer understanding of how they wanted the final product to look and function. These teachers generally continued to use their own lesson plans, which provided a consistent structure to their lessons, enabling them to integrate various resources or parts of resources into a pre-planned framework.

5.3.3 *The cosmetic modifier*

Five teachers described making cosmetic changes to resources, altering their format and appearance. While cosmetic changes may seem minor and unimportant, some teachers considered these modifications to be integral to their practice. They enabled teachers to provide consistency and continuity between different teaching activities and materials, which they believed was important for supporting student learning. Tom explained how he modified the appearance of all the PowerPoint presentations he took from TFANet before utilising them in his classroom:

I always use my own design so the kids know this is Mr White's PowerPoint. I don't just give them PowerPoints with different shades.

Tom believed that ensuring visual continuity in his teaching materials was important for providing a consistent learning environment for his students. However, he struggled to articulate the pedagogical or philosophical reasoning that supported this view. Tom had been teaching for only two months when he participated in the study; consequently his pedagogical knowledge was relatively limited and he frequently found it difficult to explain the reasoning behind the actions he took.

An important factor underlying the actions of cosmetic modifiers was making a resource appear as if it were one of their own. During her first interview, Amelia discussed the

importance of ensuring that the professional development resources she made for teachers at her school looked like all of the other resources she had made:

I use the same font for everything. So like, I always just change the font first of all. And then people won't know. They'd be like, Amelia didn't make this. Like, she always uses that cute font.

Underlying this need to personalise resources was an assumption that students and other teachers would be more sceptical of a resource or would question the work ethic of a teacher if they did not make all of their own materials. This need for resources to appear self-made is at odds with teachers' insistence on the importance of sharing knowledge and ideas with other teachers. Teachers valued being able to utilise other teachers' resources; however, there was still a premium placed on self-creation or at least the appearance of self-creation.

Teachers did not appear concerned about issues of intellectual property or utilising other teachers' materials without referencing where they had come from or who had originally created them. Three participants made reference to ownership of resources, but only one of these teachers really conceptualised this as a problem and questioned the legitimacy and appropriateness of some sharing practices. Scott recounted an incident that he experienced as a content community leader involving the misidentification of the original creator of a resource:

So now that I'm the social studies community director I send out these emails and they have links to resources, and I say that this resource is by Peter Brown from AKO Massachusetts and then somebody will respond to the email and will be like, actually, James Black made that resource like four years ago and Peter just ripped it.

While Scott acknowledges that the practice of teachers passing off other teachers' resources as their own happens, he does not question it. During his first interview, Chris suggested that one of the reasons he did not share on AKO Net was because most of his resources and lessons were modified versions of other teachers' materials. He did not question his right to share these materials but rather questioned whether they would contribute anything to the range of materials already available on the platform. While Chris and Scott both recognised that teachers were sharing other teachers' resources without acknowledging the original creator, neither teacher really questioned the situation.

Brittany was the only participant to refer to copyright and intellectual property issues explicitly. During her first interview, when discussing her sharing behaviour, she commented:

I guess sort of I feel right now I have a question of is it even mine to put up? Because so many teachers from my school have collaborated, I think it would be something I would have to discuss with other people before I really stamped my name on it.

While discussions of open education resources (OER) – referring to the open sharing of digital learning resources by institutions or individuals over the Internet – have proliferated over the past decade, teacher-created resources and teaching materials have been largely exempt from these discussions. The sharing of information and resources among teachers is promoted, largely uncritically, as a positive practice in the education literature. Given that teachers' intellectual property rights have not been part of the education conversation at either the academic or practice level, it is unsurprising that they were generally ignored by the teachers in this study.

5.3.4 *The substantial modifier*

By far the most common way in which teachers used the resources from both platforms was to modify and adjust individual resources. When considering how to modify a resource, teachers appeared to focus on three primary areas: (1) their classroom routines, practices and teaching style; (2) the objectives of the individual lesson and the aims of the wider unit; and (3) the needs of their students. The modification process differed for each participant and often changed depending on the resource being adapted.

During his second interview Scott discussed how he had used a multiple-choice test that he found on AKO Net with his history class. Scott chose to find a test on AKO Net rather than to create his own as a timesaving measure. His discussion of how he modified the test shows the care and time that goes into implementing resources created by other teachers:

I was thinking about what time the test would take for my kids, I was thinking about the material that I thought was appropriate to teach them. So if there was a question on her exam that I didn't think aligned to my content, then I would cut that. Um, I guess I was thinking about the challenge of the exam and whether I thought the questions were tough enough. Um, and, that's about it. Was it aligned to the New York State tests?

Scott's thought process when implementing the resource operated on three levels. Firstly, he ensured that the test aligned with the state assessment that his students would take at the end of the year. Secondly, he added and removed questions to ensure that the test fitted the specific learning objectives for his unit and the content the class had covered. He also ensured that the test matched the rigour that he expected of his teaching materials. Finally, Scott considered the test in relation to the specific lesson in which it would be used, and more particularly whether it was an appropriate length for the time

available. As in the knowledge selection process, when modifying and implementing a resource teachers are keenly aware of the importance of transposition, and the need to fit a resource into their specific school and classroom context. New resources were integrated into teachers' existing knowledge frameworks and adjusted to fit their teaching style, creating a resource that was highly localised and context specific.

During her first interview, Zoe spoke in detail about how she modified a school's procedural manual that she found on TFSANet when creating a similar document for her own school. Zoe's discussion highlights the extensive time and thought processes that went into modifying the resource:

I found this one from Southern Cross Academy that I really wanted. I basically like copied it into my own document and then went through really piece by piece and took the pieces that made sense and were simple and you know the language matched what we would want for our school and I kept them and then the pieces that did not match, I changed those. But kind of kept the same sort of structure. Initially I felt like it was really helpful and so, I think the actual physical document. And I, just reading through another school's procedures and just thinking, like, playing in my head, what does my day look like? And how are these things related to, you know, the things that I do? You know, I found really helpful, just internalising.

Zoe explicitly mentioned the internalisation process that she undertook when transposing knowledge and information from one setting and recreating it in her own school context. Similarly to idea gainers, Zoe found modifying a single resource enabled her to gain insight into the practices and operations of another teacher or school. When reading through the document she related everything back to her own experience and local context. This act of comparison and the process of incorporating knowledge into her own knowledge structures and localised conceptual understanding are critical aspects of the knowledge reconstruction process. The need to make knowledge relevant to its new context meant that teachers often selected resources that were already closely aligned to their own setting. Teachers were more likely to integrate the elements from a resource that fitted neatly with their existing practice while discarding the aspects that were not so closely aligned.

5.4 Evaluation and embedding

Teachers' systems and processes for evaluating the knowledge reconstruction process varied considerably. Some participants consistently and systematically reviewed their practice, while the others were more ad hoc, intuitive and inconsistent in their evaluations. All of the participants relied at least in part on their own observations and personal reflections to evaluate their lessons. When reflecting on their practice teachers

tended to measure success and evaluate effectiveness in relation to their students. The success of individual lessons was often determined by observing student engagement and behaviour throughout the lesson and intuiting from this the success and usefulness of a resource. Teachers considered how engaged students were on a task, their level of comprehension and understanding, and how motivated they were to participate. They also considered whether they had to clarify instructions, how quickly students completed activities and the quality of the work students produced. Many teachers spoke of intuitively knowing whether a resource or lesson worked, with Alison commenting that evaluating the success of a lesson is ‘something you can’t measure on a scale’. Much of teachers’ reflective activity was informal and non-deliberative, and for many participants had become a tacit part of their practice. Teachers’ reflections typically produced no physical artefacts but remained in their personal cognition and consciously or subconsciously influenced future decisions.

While teachers were evaluating and reflecting on their practice regularly, the participants suggested that few of the resources that they gained from the platforms became embedded in their practice long term. During their first interview all participants were asked about the extent to which the ideas, knowledge and resources they had gained on the platform had become embedded in their practice. The overwhelming response was that very few actually became embedded. This in part was influenced by teachers not being particularly good at identifying where their knowledge originated or what had influenced different aspects of their practice. Consequently teachers did not always credit the platforms with supplying aspects of their knowledge. The ideas and knowledge that become embedded in their practice were often amalgamations of knowledge from a range of sources. Ariana explained this combining of knowledge sources during her first interview:

I think it’s [AKO Net] definitely helped me get better at teaching and structuring information so that students understand it in a better way. But I also feel like there’s a lot of other factors that have helped me grow as a teacher. I think AKO Net’s just one of those things that helped me along the way.

Teachers found it difficult to assess exactly what elements of their knowledge and practice were derived from their engagement with the platforms and what had been accumulated from other sources.

The limited embedding also reflected the way in which teachers approached the platforms and the types of the knowledge and resources available. As discussed earlier,

the knowledge on the platform is organised into bite-sized pieces that are practical in nature and designed to be quickly integrated and implemented in practice. Teachers were typically looking for one-off resources that addressed an immediate need that they were facing, be it planning a unit or lesson or finding an activity or assessment that matched a particular learning objective. As a result the knowledge and expertise that teachers constructed was primarily performative, enabling teachers to perform particular tasks in their practice more efficiently and effectively. Teachers tended to give little consideration to how it contributed to their abstract or broader knowledge of and for teaching. When evaluating the implementation of a resource, teachers assessed it in relation to how well it served their immediate needs and gave little thought to whether it continued to influence their practice. The nature of teaching means that as teachers move through the curriculum they are teaching new content and skills constantly, which often requires new resources. As a result, a resource that was used one day may not be relevant or applicable the following day, meaning that the individual resource never has the opportunity to become embedded into a teacher's practice. The short life span of a resource in an individual teacher's practice meant that the majority of participants associated the platforms and the knowledge they provided with short-term influences on their learning and instruction.

Georgina, during her first interview, explained why she believed so many of the resources she had taken from TFANet had not become embedded in her practice:

I think there are things that I continue to use maybe like worksheets but you know that's once in a year that you know you would use a worksheet. So you know, it doesn't. You know, it's not entrenched in my practice.

The transient nature of many teaching resources and activities, which are often used only once a year, makes the physical artefact unlikely to become embedded within a teacher's long-term practice. While a specific resource might not become embedded in a teacher's practice, the underlying knowledge or pedagogical strategy the resource contains may. Georgina was able to identify two practices that she had taken from resources located on TFANet that had become embedded within her teaching practice. These were using hand gestures to represent letter sounds, and a specific method for assessing her students' writing. Georgina explained why she thought these particular practices had become integrated into her teaching practice while so many others had not:

Maybe because both of those are integral to instruction. You know, you have to teach letter sounds. And putting a gesture to it becomes an everyday practice. The writing became my only way to assess writing. So I had to use that or there was no assessment. So because it's used so frequently I guess that's why I kept coming back to it.

These two practices were employed consistently throughout the school year, rather than on just one occasion, like so many of the resources on the platforms. Georgina's repetitive engagement with these two practices enabled them to become embedded in her teaching instruction.

There is a distinction being drawn here between specific resources, which are used once and often not returned to, and the pedagogical concepts or knowledge associated with a resource, underlying and informing its use. Pedagogical knowledge often shapes the teaching of a variety of concepts or skills and is reused by teachers in relation to a range of different resources and teaching activities. While participants struggled to identify individual activities or specific resources that had become embedded in their practice, they were able to identify pedagogical practices that they had learned through engaging with the resources and information available on the platforms. The most common of these, discussed by participants from both organisations, was the specific lesson planning structure promoted by each organisation. This form of lesson planning, which was used for nearly all of the lesson plans shared on the platforms and consequently was encountered frequently by teachers, had become embedded in their practice. As Claire explained during her first interview:

I think something that we do really well and the resources on TFA Net have kind of modelled that for me really well, [is] the I do, we do, you do model. Lesson plans on TFA Net have that model and they have to have that model. If people don't upload something like that, someone's going to call you out and be like this is not a good resource, they are not teaching this correctly. So that's something that I think is really strong on the stuff that's on TFA Net. But I, nothing else really jumps out.

The following section will explore in greater detail the distinctions teachers made between the short-term benefits associated with using individual resources and the longer-term learning that came when the pedagogical knowledge and pedagogical content knowledge contained within resources was embedded in their practice.

5.5 Influence and learning

The data suggest that teachers perceived two levels of influence arising from their engagement with the platforms: short-term influences on their professional practice resulting from specific episodes of engagement or the utilisation of individual resources, and longer-term influences that arose from use of the platforms over an extended period of time. The journal logs and second interviews, which asked participants to record and discuss, respectively, specific episodes of use, focused on identifying the shorter-term

impacts of engagement while the first interviews provided an opportunity for participants to reflect more generally on how their engagement had shaped their professional learning and practice over time. Because the research question guiding this section of the data collection and analysis was focused on teacher perceptions, the findings presented here reflect how teachers conceptualised the impact and learning arising from their engagement. A deeper interrogation of these perceptions and how they relate to broader themes in the literature will be presented in the following chapter.

Asking the participants to reflect on the influence engagement had on their learning and practice provided insight into how teachers think about their professional learning. Most teachers did not associate use of the platforms with learning and instead conceptualised them as a tool to support their work, enabling them to become more efficient and effective practitioners. During his first interview Scott described this perception of the division between influence on learning and influence on practice. Scott did not believe that file sharing was educational. He claimed that while his engagement with AKO Net had increased his efficiency as a teacher, it had not contributed to his professional learning. However, Scott went on to describe how he believed his ongoing involvement with AKO Net had influenced his practice:

I think it's had a great impact on my classroom practice ... I think it has helped me understand different activities in class to deliver content. I think it has helped me understand the tone that I want to use with my kids because I watched the videos.

While Scott did not consider accessing other teachers' resources to be part of his professional learning, the knowledge he had accumulated from engaging with AKO Net had helped to shape his practice and change his thinking and actions, outcomes that fit with the definition of learning presented in Chapter 2. Teachers were better at identifying and discussing concrete changes and specific developments in their practice than discussing learning in more abstract terms, as it occurred through and developed from their engagement in their day-to-day work.

5.6 Situated learning

The nature of the resources available on the platform, combined with the informal and often ad hoc way that teachers engaged with them, promoted teachers' perception that engagement had primarily short-term influences. Teachers approached the platform with a practice-based need rather than a learning agenda. As the discussion in Chapter 2 indicated, online teacher platforms and communities generally are discussed as part of

teachers' professional learning and continued professional development and researchers tend to assess them in relation to how well they cater to and support teachers' professional learning needs. Analysis of the data in this study, however, suggests that teachers did not perceive either platform as forming part of their professional learning (at least in a formal sense) but rather considered them to be part of their workplace practice. The platforms formed an integral part of many teachers' professional practices and became entrenched in their day-to-day work, as a tool that they engaged with as part of the planning and preparation process. While most discussions of teachers' work focus on classroom practice – the processes of teaching and engaging with students – the work that teachers do outside of the classroom to prepare for their lessons is a pivotal, if somewhat overlooked, part of their work.

The learning that arises from teachers' engagement with the platforms is conceptualised here as situated workplace learning. The platforms are understood to be extensions of teachers' workplaces. In situated learning, learning emerges as a by-product of practice and workplace activities and actions (Eraut, 2000). The learning is informal and often non-deliberate, taking place in the spaces around activities which have a more overt formal purpose. Teachers engaged with the platforms primarily to gain resources to support for their planning and to help them in the preparation and creation of their lessons and teaching materials. As a result, teachers evaluated the outcomes of their actions in relation to how well the resources supported them in their planning and preparation rather than in relation to any learning that may have occurred. Learning, therefore, was a by-product rather than the explicit intention of engagement. And any changes that arose in teachers' understanding or practice were conceptualised by teachers as part of their general expertise, rather than evidence of learning having occurred.

5.7 Short-term influence

Teachers' perceptions of the influence that their engagement with the platform had on their professional learning and professional practice shifted depending on whether they considered individual encounters with the platform or use over time. Teachers were more inclined to associate learning with longer-term use and the accumulation of knowledge that occurred from engagement over an extended period of time, while shorter-term impact arose from specific episodes of use. The short-term influences identified by teachers primarily focused on how the resources supported them in

performing particular tasks in their practice. This support either helped teachers to perform tasks more efficiently or provided access to the information and resources that teachers required in order to fulfill their job effectively. Day-to-day use of the platform typically is oriented around the fulfillment of an immediate need and teachers evaluated influence in relation to how well their immediate need was met. Caroline reinforced the need for prolonged engagement to bring about long-term learning. Her infrequent engagement with AKO Net meant that she only was only able to identify short-term influences. She explained during her first interview:

I think [the platform] impacted on a handful of lessons. Has it made my life easier? Yes. Has it made some of those lessons better? Yes. Have I had a bigger set of questions and ideas to pull from for a handful of lessons? Yes. But broadly no.

Engagement supports a teacher's work by providing access to bite-sized pieces of knowledge that are easily accessible and immediately actionable in their practice. The type and nature of the information provided on the platforms is well suited to addressing an immediate and specific issue, question or gap that teachers have in their practice, providing quick and relevant support that is available in any place and at any time. The importance of the anytime, anywhere support offered by AKO Net was explained by Ariana:

It's definitely saved my life many a days, sometimes I don't know what to do and I've gone and typed in a name and stuff has popped up so I have a plethora of resources I can actually utilise.

The platforms provide immediate gratification of a pressing need that teachers face by offering support in a form that they can incorporate directly into their practice. Having easy access to ready-made, reliable resources helps teachers to feel supported in their work and provides guidance on how to structure the planning materials and classroom resources that they have to create for and implement in their lessons.

The nature and format of the resources also helps teachers to understand better the expectations of their jobs. Brittany reflected on the importance of having access to ready-made teaching materials as a first year teacher during her first interview:

I think for something like planning, obviously the text based is helpful because that's what you're going to be producing ... It just kind of normed me to what, to literally what does a worksheet for a high school student taking the history of US regions look like. How should I set up notes? And things like that.

Accessing teacher-created resources gave teachers exposure to how to perform their work in a way that theoretical texts could not. Michelle similarly reflected on how engaging with physical exemplars of planning and classroom resources provided insight

into the more practical elements of teaching. She explained how looking at resources on AKO Net had helped her with organising the sequencing and timing of her lessons:

And so sometimes I look to see what other teachers are doing in terms of, are they letting their kids have 30 minutes on this activity or 15 minutes ... It'll break it down that way. And it just gives me an idea of how long kids might be, be at that span.

The resources provide teachers with specific types of knowledge that are unique not only to teaching as a whole but also often to teaching a particular subject or grade level.

Engaging with the platforms enabled teachers to extend and enrich their practice by providing them with access to new materials and the ideas of teachers situated outside their immediate school context. James explained during his first interview the benefits of encountering new ideas and practices:

I think it helped me open up to new ideas and different practices that helped me become a better teacher. And it helped me to think outside the box a little bit more and to become a more creative teacher.

For most teachers the impact of gaining access to new ideas and teaching materials did not extend beyond a single lesson or learning activity. Changes in a teacher's thoughts and actions typically were short term. This is because for a resource or idea to become embedded in a teacher's practice their cognitive framework must be extended to incorporate the new piece of knowledge permanently. For these changes to occur teachers need to extract the abstract knowledge or broader knowhow the resource contains and consciously take steps to integrate the knowledge into their wider practice and pedagogical understandings. This is achieved most easily through ongoing engagement with a resource and the knowhow it contains over an extended period of time.

Having access to planning resources and classroom materials enabled teachers to be more efficient in their practice. The planning and preparation support freed up teachers' time, allowing them to engage more heavily in other aspects of their practice. Chris explained during his first interview how being able to rely on ready-made curriculum materials and pre-set math questions, even if he did have to modify them before use, had allowed him to reorient his focus towards building meaningful relationships with his students and gave him the time to utilise more effectively the data he collected on student achievement to redirect his practice and teaching focus. Chris' thoughts were supported by Jasper, who reflected during his first interview:

Now, when I need a resource for extra practice I'll take full advantage of AKO Net. And with that, what that allows me to do is give me more time to reflect where the kids are in the

classroom. I don't have to worry about finding resources. I know resources are available if I need it.

The additional layer of support the platforms provide teachers in their planning and preparation allows them to be more effective and efficient practitioners by providing them with the time to focus on developing other aspects of their teaching practice.

It is both the nature of the knowledge and types of resources available on the platforms combined with a teacher's mindset and approach when engaging with the platform that promotes short-term impacts. The majority of teachers appear to engage with the platforms for a quick fix, looking for a one-off resource or piece of knowledge that will help them during a particular lesson. Teachers evaluate their actions based on how well they fulfill their primary aim. Fewer teachers consider how the know-how contained in the resource could help them to develop their practice more generally. The tension between the platforms operating a workplace tool that supports teachers in performing particular elements of their practice and how their modification and implementation of the resources results in the creation of new knowledge, which is indicative of learning having occurred will be discussed in greater detail in the following chapter.

5.8 Limitations of the platforms

Teachers also spoke about the limitations of engagement with the platforms, especially when compared to sharing resources and interacting with teachers face-to-face. The participants valued having access to teacher-created knowledge; however, they believed that in-person peer-to-peer learning and resource sharing provided a richer learning experience. Participants were more likely to associate professional learning with discussions and resource sharing that occurred in-person than with the same activities online. When sharing knowledge in-person teachers found it easier to supply contextual information about the resource, such as where it fitted within a unit of work or the nature of the student population with which it was used. During in-person resource sharing learning arose primarily through the collaboration and socialisation that occurred around a resource, which facilitated insight into the interactive, classroom-based elements of a teacher's practice. In contrast, when acquiring a resource from an online source, learning occurred as each teacher individually made sense of and internalised the knowledge the resource contained and integrated it with their existing knowledge.

When dialogue did occur online, predominantly on the TFA content communities or through email, teachers felt that it differed substantially from in-person conversation. Written communication lacked the depth and nuance that could be achieved with oral dialogue. As neither platform allowed for synchronous communication there was always a delay between the asking and answering of questions, and questions often went unanswered. Zoe described her experience of the limitations of communicating on the TFANet content communities:

I've found that typically, if I reply, I don't necessarily go back in and look and see if someone replied right back to me and have like dialogue. I mean, I post and then the following week when I get the updates I see if anyone else has updated. And I might go back in and post again but it's not like sitting face-to-face where it's back and forth.

Zoe's comments encapsulate the limitations of online, asynchronous written communication.

When online learning was offered in conjunction with offline learning, teachers perceived online learning to be more effective. Anna, a content community leader on TFANet noted how engaging with members offline before moving the conversation online enhanced the learning outcomes:

Just because I'm also the bilingual lead teacher for Teach for America Chicago and so I do a lot of face time, like face work with corps members and I find then that we do something in person and then we go onto something like the forum the information they get online is much more valuable than just delivering it online.

There was general consensus among participants that they felt more comfortable connecting with a teacher online if they had met them in-person first. Michelle observed during her first interview that she would have been reluctant to interact online if she had not first met the other teachers in person:

I guess because I've met them and I know them it feels more comfortable than sending out an email to a person ... it feels kind of like, hey I'm this person that you've never met and I'm looking at your unit plan and I think it's great ... I don't know ... It just feels, like kind of intrusive, even though, it's, that's like the change in times.

5.9 Long-term learning and influence

Over time elements of knowledge gained from engagement with the resources became integrated and routinised in the practice and behaviour of teachers. If teachers engaged frequently with similar types of resources, the practical know-how contained within the resources could be extracted, internalised and integrated with teachers' existing knowledge and eventually embedded in their practice. While the individual resources were often discarded, the knowledge they contained became part of a teacher's mental schema. By internalising a resource during the reconstruction process teachers were able

to extract its underlying knowledge. The knowledge extracted and retained by teachers appeared to be largely pedagogical in nature.

Both TFA and AKO promote specific ways of teaching and the majority of resources on both platforms subscribe to these prescribed practices. Several participants relied heavily on uploaded lesson plans during their first years in the classroom and while they no longer continued to access lesson plans on the platforms, the core planning principles contained in these resources had become embedded in their own practice. Ariana discussed during her first interview how AKO's five-step lesson plan had become a habitual part of her planning progress, something that she instinctively did, without needing to view external stimuli such as resources from AKO Net. She also reported that viewing the resources which other, more experienced, teachers used enhanced her understanding of how to structure her lessons and activities to develop student learning. She explained:

I think it's definitely helped me get better at teaching and structuring information so that students understand it in a better way ... I think just seeing example lessons and knowing, oh, this is what a rigorous lesson would look like. This is what an engaging lesson would look like. And I think just being able to see those exemplars just helped me see, ok I'm just doing something right or this is a way that I can improve.

Ariana's comments show that when teachers look at resources through the lens of wanting to develop their wider practice, rather than of how they could help them in just one lesson, they are more likely to experience long-term learning.

Several teachers discussed how prolonged engagement had influenced and shaped their teaching style and classroom routines. Scott's recurrent use of the resources created by a specific teacher, Francesca, helped him to reshape and redirect his pedagogy. Scott described how he initially interpreted Francesca's resources in relation to his own teaching philosophy and practice. Over time, however, he began to change parts of his practice as he adopted certain aspects of Francesca's:

Like what's their style versus what's mine? Like I'd say that Francesca's AP course always like had this great cycle to it ... it was really helpful for me to see that linear style, which I hadn't really developed and I'm getting closer to now.

The embedding process occurred after consistent engagement with Francesca's materials over an extended period and required the conscious decision by Scott that he wanted to reorient his own practice. Change in practice requires intentionality and teachers must take deliberate steps to integrate and utilise new ideas and pedagogic strategies in their

teaching. Over time, these practices may become embedded in a teacher's practice and an habitual part of their work.

Sustained engagement with the platforms also promoted reflection as a routine behaviour for teachers. Reflection is an important part of the learning and professional development process. The knowledge reconstruction process, discussed in the previous section, requires teachers to engage in reflective practice. Before teachers can employ another teacher's resource in their own practice they must think about it in relation to their own classroom and teaching context and modify it according to their specific needs. During her first interview Anna described how engaging with the ELL and bilingual content community had prompted her to think more deeply about her students and to ensure that her teaching practice was responsive to their needs:

It's definitely made me more reflective of my students as English language learners and as what other people use as practices and considering different options. It's made me really more reflective of what I'm doing and purposeful in it and thinking it through a little bit more.

Engaging with resources created by other teachers, who each operate in a different context, made teachers more conscious of the importance of developing localised knowledge for their practice. Through reflection on their own contexts and instruction teachers were better able to reconstruct knowledge taken from the platforms in their own practice.

A number of teachers also adopted a reflective stance when sharing resources or contributing to the discussion forums. During her first interview Zoe described how she would decide whether to reply to a post on the content community:

So I haven't replied to like a ton but I would say I've probably replied five or six times over the course of the past year or so. ... It's usually if it's something that I can relate to. So there were a few posts about switching grades, which is something that I've done. So if I can relate to it, then I typically post. Or also if I have resources for it.

Zoe would contribute only if she believed that she had something worthwhile to share. Reflection enabled teachers to become more conscious and discriminating contributors.

The long-term learning associated with ongoing engagement with the platforms was not restricted to teachers' professional practice and behaviour. In some cases it included changes in teachers' beliefs. The most pronounced change in belief was increased recognition of the importance of sharing. Extended engagement with the platforms normalised the sharing process and enabled teachers to recognise the benefits, to

themselves and others, that arose from sharing. During her first interview Amelia explained how as a first and second year teacher she was possessive of her resources and reluctant to share them with other teachers. She felt that she had spent a long time creating her materials and believed that other teachers should have to experience the same struggle and effort that she had gone through. Engaging with AKO Net, both to find resources and to share her lesson plans (as mandated by her school), Amelia came to appreciate the benefits of sharing and in time became more open about sharing her ideas and resources, both online and offline. During her first interview Amelia described how she now understands the sharing process:

Giving back, yeah. It's so hard and we're all doing the same thing, so why not work together. And we, I guess a big thing in AKO is that the children like belong to all of us, so, just because I don't teach in AKO LA, like those [AKO students] are my [AKO students] too just like all the [students in this school] here are my [students] regardless of if I'm in the classroom with them every single day. What I do impacts them. So it's a really good way to help just outside my school, outside AKO Houston. Just to help everyone.

Engagement with the platforms also promoted an understanding among participants of the importance of developing connections between teachers and establishing professional communities. While there was limited interaction and community building on both platforms, and the majority of participants relied more heavily on their in-person connections and professional communities than those developed online, for several participants having access to the platforms was useful for recognising the importance of teacher-to-teacher interaction and knowledge sharing. Tom, a first year TFA corps member who had made limited use of the content communities and had not interacted with any teachers via TFANet, spoke of how engaging with the platform had developed his understanding of teaching as a communal and cooperative profession. He remarked during his first interview:

[it] actually helps you understand that teaching is not just about you as a person. It's about a bigger community and I think with TFANet it demonstrates that.

Engaging with TFANet reminded Tom that he is part of a wider community of practitioners, all working towards the same mission and goals, and even if he does not interact with them directly, he is a part of a collective group. Engaging with teacher-created knowledge on the platforms helped teachers to recognise the importance of community and shared knowledge in teaching.

The following chapter will build upon the key ideas and themes presented in this and the previous chapter, exploring them in greater depth and relating them to the existing literature.

Chapter Six: Discussion

This chapter works towards the creation of a new theoretical framework for understanding the nature and the roles played by the knowledge shared on the platforms as well as the operation and outcomes of the learning processes arising from Internet-mediated knowledge mobilisation. The existing, commonly employed frameworks in the fields of online learning, teacher-knowledge creation and knowledge mobilisation do not fully or accurately capture the knowledge or learning occurring in this study or the interplay and interconnections that exist between the online and offline contexts of teachers' work. The model developed in this chapter presents an alternative perspective and new framework for interpreting and evaluating the processes involved in, and outcomes resulting from, Internet-mediated knowledge mobilisation.

The construction of the theoretical framework is developed through the exploration of five primary areas:

1. The dual contexts of the platforms, which are situated both online and within a teacher's school-based practice.
2. The nature of the resources available on the platforms, the types of information they contain and the knowledge teachers construct from and around them.
3. The factors influencing teachers' engagement with the platforms and how they shape the knowledge reconstruction and learning processes.
4. The nature of the knowledge reconstruction process and the different learning that occurs throughout the process.
5. The nature of the learning that occurs, including how Internet-mediated knowledge mobilisation results in different learning processes for in-person knowledge sharing.

These five areas are brought together to underpin the establishment of the theoretical framework for explaining the nature of knowledge construction and the learning processes involved in Internet-mediated knowledge mobilisation.

6.1 Dual mediating contexts: online and offline

The platforms in this study are dually situated, online and within a teacher's school-based practice [Figure 6.1]. While the platforms themselves are situated online, teachers conceive of and engage with the platforms and their resources as a practice-based tool

that supports their planning and instruction. As a result, the platforms become embedded within the daily actions and contexts of a teacher's school-based practice, with engagement arising from and associated directly with the execution of teachers' work. To understand how the platforms operate and the nature of the learning and knowledge teachers create through their engagement with them, it is necessary to consider both the online and offline contexts and the relationship and interconnections that develop between them.

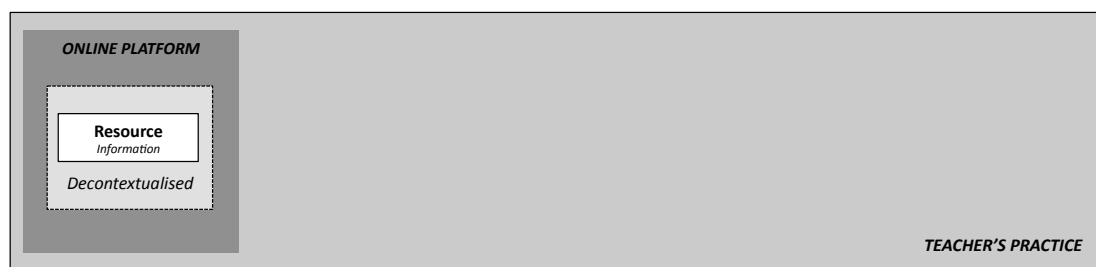


Figure 6.1 Dual mediating contexts of the online platforms

The online setting of the platforms is pivotal both to teacher engagement and to the outcomes teachers receive from this engagement. Specific affordances are associated with the platforms' virtuality and in particular the breaking down of geographical and temporal boundaries. This facilitates anytime, anywhere learning and the opening up of a teachers' school-based practice to a wider range of ideas and perspectives. Internet-mediated knowledge sharing plays an important role in facilitating learning by providing easy and constant access to knowledge and learning opportunities (Dede, 2006; Granger et al., 2002; Lock, 2006). Teachers are able to engage with resources as and when they need them, giving them control over their knowledge acquisition and learning. The platforms personalise knowledge mobilisation, offering differentiated opportunities and enabling individual teachers to select the knowledge they require. This ensures that engagement is targeted to teachers' immediate and particular needs in a way that is not yet possible in offline knowledge mobilisation. The dual contexts of the platforms enable teachers to extend their practice beyond the physical limits of their school and to connect with other teachers from across the country while remaining firmly situated in and focused on their immediate school setting and individual professional needs.

While a teacher's practice and the knowledge they construct continues to be enacted primarily in the offline classroom setting, the online platforms infiltrate and insert themselves into this setting, enabling teachers to move fluidly between the two contexts.

Teachers do not appear to differentiate between the two settings when engaging with the resources, interpreting the platforms as an additional in-practice tool they can draw upon to support their work and development. As a result, the platform becomes part of practice rather than an external resource that is additional to, rather than integrated with their daily work tasks. The conception of the platforms as dually situated is at odds with typical discussions of online platforms for teachers (see e.g. Barab et al., 2003; Dede, 2004; Dede et al., 2009; Schlager et al., 2003 and 2009). These position platforms as formal professional development resources that are external to and removed from the school-based contexts of teachers' practice. They are seen largely as interventions that are applied to teachers, with the locus of control residing outside the individual teacher.

Situating the platforms both online and within a teacher's practice and positioning individual teachers in control of their engagement not only breaks from previous conceptualisations of online platforms, but also has important implications for the breaking down and merging of boundaries between online and offline contexts. Situating the platforms within teachers' practice acts to collapse the division between the online and offline contexts of teachers' work. The socio-cultural context of a teachers' school-based practice is extended into the online setting, allowing teachers to move easily between online and offline contexts and enabling knowledge to flow freely between the two settings. The online platforms are not separate from teachers' workplaces but rather are integrated within them, which helps to explain why much of the learning that arises from engagement is situated learning.

The embedding of the platforms in the work tasks and school settings of teachers references the increasing ubiquity of the Internet in everyday life and the access it provides to a constant stream of knowledge (Bakardjieva, 2011; Gackenback, 2006; Joinson et al., 2007; Wellman and Haythornthwaite, 2002). The platforms represent a form of on-demand problem solving and idea gaining, as teachers seek information and resources to address a specific issue or to gain new perspectives on a particular topic. People are constantly using the Internet in all aspects of their life, both professional and personal, to answer questions and to find particular knowledge bites quickly. As a result, using the Internet to answer questions and find knowledge is increasingly becoming a routinised behaviour for many people. This has important implications for the learning process. Using the Internet to locate information or knowledge is frequently unplanned

and reactive, and the learning and new knowledge they gain from their actions is often not consciously recognised or perceived as such. The findings of this study suggest that teachers' engagement with the platforms reflects these trends for easy access to new knowledge and ideas.

6.1.1 Situated learning

The embedding of the platforms within the context of a teacher's practice results in the learning that arises from engagement also being situated in a teacher's practice. The platforms form an integral part of some teachers' professional practices, with engagement rooted within their daily tasks. They operate as one resource within a teacher's wider collection of tools that support planning and provide ideas and support for instructional practice. When teachers lack the necessary knowledge, expertise or time to address a specific planning or teaching situation, or if they want to find a new approach to a routine activity, the platforms function as a tool to support their needs. The actions teachers take and the processes they undertake when they are unable to cope with a situation unthinkingly or in a routine way facilitate potential learning opportunities (Lohman, 2000). In these circumstances, learning arises largely unconsciously through the actions and thought processes teachers undertake when they select resources from the platforms and reconstruct them in their teaching practice. Though the selection of resources is deliberate and targeted, much of the resultant learning that accompanies this process is unintentional, situated and in many cases unrecognised.

The learning that arises as a result of engagement with the platforms is reactive and informal (Eraut, 2000) rather than intentional. It occurs spontaneously in response to using the platforms to address a particular work issue or professional need, without time set aside specifically for learning. Eraut (2000) suggests that the learning that occurs in these situations is unlikely to be recalled unless it is associated with a dramatic outcome. The learning opportunities associated with the resources found on the platforms were not just restricted to the "pre-active" or planning phase of teaching but also the "interactive" phase, when teachers implement a resource from the platforms in their instructional practice and have to react and respond to the situations and ideas, both expected and unanticipated, that arise during the lesson (Mutton et al., 2011). In both these phases learning is situated in the acts and contexts of practice with teachers associating their new understandings with general improvement in lesson quality and

growth in expertise rather than to learning. Teachers consider the knowledge they gain from engaging with the resources to be part of their general teaching capability (Eraut, 2004) rather than something that has been learned specifically.

Other studies have found that teachers appear to lack awareness about how particular actions within their practice contribute to and support their cognitive development and professional learning. Hodkinson and Hodkinson (2003), in their ethnographic-style study of a teacher's participation in his school setting, suggest that much teacher learning is voluntary and informal, and that teachers largely remain unaware in these situations that they are learning. This aligns with the findings of this study. The embedding of the knowledge reconstruction process in a teacher's practice and the importance of contextualising and localising newly constructed knowledge means that teachers predominantly associate knowledge reconstruction with the acts of practice rather than the acts of learning. In this situation the two kinds of act are indistinguishable. Action represents learning and learning arises through action.

This blending of action, cognition and learning reflects Lampert's (1998) classification of teaching as a 'thinking practice', where reasoning and knowing must be integrated with action to shape teachers' knowledge and practice. The nature and format of the teacher-created teaching materials that are available on the platforms also have an impact on teachers' interpretation of the knowledge reconstruction practice. The resources are intimately connected with teachers' work. They are a tangible artefact arising from practice and as such they are principally associated with teachers' instructional practice rather than with learning opportunities. When engaging with and adopting new teaching resources, teachers interpret them as part of their practice rather than as a part of a systematic approach to professional development (Davis and Krajcik, 2005).

6.1.2 Blending contexts

The blending of online and offline contexts is fundamental to the theoretical framework being constructed in this study. It builds upon the social shaping of technology approach (Lievrouw and Livingstone, 2006), which provides a means of understanding the interaction between technology, individual agency and teachers' actions and contexts in this study. While the platforms have unique affordances, which play a role in structuring teachers' engagement and outcomes, this must be understood and interpreted within the

wider context of a teacher's practice. The online platforms are understood not in relation to the effects they have on users but rather by how users choose to engage with and take advantage of what they offer. This aligns with the critical approach to educational technology discussed in Chapter 2. The platforms are understood in this study not as autonomous forces but are contextualised within the broader settings in which they are situated.

The accessibility of the Internet and the immediate access it provides to information and resources is reshaping the nature of learning in everyday and professional life. This results in an intrinsic and mutual relationship being established on the platforms between the working contexts and learning opportunities of and for teachers (Ellstrom, 2001). Billett (2004) suggests that workplaces and the activities and interactions they encompass represent highly structured learning opportunities that have inherent (if unplanned and often unrecognised) pedagogical value. However, Billett (2001, 2004) also emphasises that the pedagogy of the workplace does not operate in isolation. He conceptualises learning as a reciprocal process, which is 'shaped by interactions between what is afforded by the workplace and how individuals elect to engage with what is afforded' (Billett, 2004: 3). The outcomes of engagement with the platforms are moderated by the dual contexts of the platforms as well as by a range of factors that shape the behaviour of individual teachers. These factors and their impact on engagement and knowledge reconstruction will be discussed in greater detail in sections 6.3 and 6.4.

6.2 Understanding the resources

Knowledge (or resources) rather than people form the nexus of engagement on the two platforms in this study. The platforms' design enables users to engage directly with the resources or knowledge artefacts, by-passing the need to interact with the knowledge creator in order to access the resources. As will be discussed in greater detail in section 6.5, this results in greater emphasis on the individual in the knowledge reconstruction process, with learning and knowledge creation relying less on the development of relationships and social interactions between users and more on an individual teacher's ability to select, modify and implement a resource independently in their practice.

The resources that are shared on the platforms in this study are conceptualised as providing teachers with information, which once internalised and implemented in

practice and integrated within a teacher's existing cognitive structures becomes knowledge. In this approach, knowledge does not reside in the resource itself but rather in the actions and thinking that occur around and in relation to the resource and its implementation in practice. Consequently, the potential knowledge teachers can construct from a resource is not preordained or static but rather is determined by the needs, actions and existing cognitive structures of each individual teacher and the events surrounding and shaping a resource's implementation.

The resources provide information that supports teachers in two key areas of their practice: their planning and preparation, and their instructional, classroom-based practice. The unit and lesson plans, behaviour management plans, and scopes and sequences provide teachers with insight into how to structure and organise their teaching practice. They afford teachers both a general understanding of the planning process as well as supplying them with specific examples of how to configure individual units of work and how to incorporate specific content or skills into individual lessons. The ability to read resources for both general principles and specific, episodic knowledge adds to the potential richness of the resources and the learning opportunities they provide, helping teachers to create flexible knowledge and to abstract from a specific episode or situation to a general rule or rationale (Davis and Krajcik, 2005) and vice versa.

The worksheets, classroom activities and teaching materials, PowerPoint presentations, tests and assessments, and rubrics, represent the types of resources that teachers employ in the classroom (rather than before they enter the classroom as part of planning). They support teachers' knowledge of what to teach and how to present content and teach skills in ways that best support student learning. This helps to develop teachers' subject-matter knowledge, pedagogical reasoning and their knowledge of specific instructional strategies. Curriculum materials play a variety of roles, helping teachers to understand their daily tasks (Brown and Edelson, 2003) as well as supporting their more general knowledge of students and student learning, and promoting the development of content knowledge and pedagogical reasoning (Ball and Cohen, 1996; Ben-Peretz, 1975; Brown and Edelson, 2003; Davis and Krajcik, 2005). The ready-made nature of the resources is particularly valuable to teachers. They operate in the same way as worked examples for student learning (Hattie and Yates, 2014), enabling teachers to make the transition from

simply acquiring knowledge to seeing and understanding how this knowledge is applied in an instructional context.

6.2.1 Defining the knowledge

Classifying and theorising the nature of the information the resources contain and the knowledge that teachers create from the resources is challenging. Little attention has been paid in the literature to the physical resources and artefacts that teachers create in and through their work. Discussions of teacher knowledge typically focus on the personal, practical knowledge that teachers create through participation in and reflection on the acts of teaching. This knowledge is primarily tacit in nature and embedded within the spatial and temporal contexts of instructional practice. Teacher-created knowledge is connected closely to and in many cases is indistinguishable from practical expertise and teachers' actions. As a result, discussions of knowledge mobilisation focus primarily on socialisation, the process identified by Nonaka (1994) (see also Nonaka and Toyama, 2003) as facilitating the sharing of tacit knowledge through direct engagement with an individual teacher and their knowledge in the context of practice. While it is true that much teacher knowledge is tacit in nature and knowledge mobilisation in education predominantly relies on direct interaction between teachers, the findings from this study suggest that the planning materials and instructional resources teachers create and share on the platforms have the potential to provide other teachers with information, which can facilitate the construction of new tacit knowledge.

No single framework fully encapsulates the nature of the information contained within or the knowledge constructed from the resources in this study. There are commonalities between the resources and Cochran-Smith and Lytle's (1999) 'knowledge-for-practice', which they conceptualise as:

The ways teachers organise lessons and units of study, the activities and materials teachers use for various groups of students, the sequence of content matter teachers present, the ways teachers structure lessons and classroom interactions, and the methods teachers use to assess individual and group progress. (Cochran-Smith and Lytle, 1999: 257)

The resources also reflect Kennedy's (2002) prescriptive knowledge, which she suggests 'is invoked mainly to address concerns about what to teach or what students should be learning' (363) and is derived from among other sources, textbooks and curriculum frameworks. Similarities also exist with one of Shulman's (1987) four sources of teacher knowledge; educational materials and structures: he defines these as comprising both

‘tools of the trade and the contextual conditions that facilitate or inhibit teaching efforts’ (9-10).

The resources however also extend beyond these descriptions of knowledge. In their discussions of teacher knowledge Shulman, Kennedy and Cochran-Smith and Lytle all maintain a strict division between the explicit knowledge provided by curriculum materials and teaching resources – which they identify only as being created outside the teaching-context – and the personal wisdom (Shulman, 1987) and tacit, craft knowledge (Kennedy, 2002) that teachers create in the contexts of their practice. The knowledge potential of the resources in this study comes from the merging of these two categories to produce knowledge that is both teacher created and explicit, encompassing ‘knowledge-in-practice’ as well as ‘knowledge-for-practice’. While the resources lose much of their personal knowledge and situated richness when they are uploaded on to the platforms, the potential derived from their creation in the acts and contexts of a teacher’s practice remains. Consequently, this study rejects the division between the tacit, craft knowledge of and for teaching created by teachers and the explicit knowledge for teaching constructed by those outside the profession.

The resources on the platform are constructed in the context-rich setting of a teacher’s practice and are shaped by a teacher’s personal, tacit knowledge. Yet they also represent a tangible product or explicit output of a teacher’s practice and the knowledge creation process. While they cannot fully capture the tacit, situated elements of teachers’ personal knowledge, they do provide some insight into their workplace practices and instructional contexts, enabling the partial reconstruction of teachers’ practice and personal knowledge. As such, these resources embody and exemplify the knowledge that teachers develop in their teaching practice. The presentation of this knowledge in a static, tangible format enables other teachers to access and engage with it more easily. The resources represent the route map that guides a teacher’s practice. However, it must be noted that teachers modify, refine or embellish the map frequently during the acts and in the context of their instructional practice. As Eraut (1994) explains, the ‘hot-action’ context of the classroom requires teachers to adapt and adjust their ideas and thinking to accommodate changes that occur and issues that arise in the classroom. The resources by themselves provide limited insight into the iterative decision making process that teachers undertake during their lessons (Calderhead, 1996; Clark and Lampert, 1986; Mutton et al., 2011). As a

result, the resources provide an overview or framework for instruction, which individual teachers must adjust, add-to and personalise before and during their implementation in practice. The resources' creation within the work contexts of teachers is pivotal to their value. Teachers consider resources produced and used by other teachers to have greater authority and authenticity and to be more relevant and closely aligned to their own needs and settings than materials created by external experts.

While the creation of the resources is embedded within and enriched by their implementation in the instructional context, when shared on the platforms the resources become largely decontextualised, removed from their context of creation and separated from what Nonaka and Toyama (2003) term their *ba*. Consequently, teachers have to analyse and interrogate a resource without recourse to its original setting or purpose of use, and with no knowledge of how it was actually employed. This differs from the primary modes of in-person knowledge sharing, where teachers are able to provide rich insight into the contexts in which a resource was used and the events surrounding its implementation in practice. In contrast, the resources on the platforms lack this contextual detail. Teachers have to recontextualise the resources in their own practice independently by extracting the relevant knowledge and applying it to and integrating it with their own personal context of practice. Learning is primarily individual and knowledge construction occurs most frequently without direct interaction with other teachers, ideas that will be discussed in greater detail in section 6.5.

6.2.2 The roles the resources play

Teachers' interpretation of particular resources and the impact they have on their practice and learning is dependent both on the nature of the resource and each teacher's professional needs and intentions. The resources play four primary roles in teachers' practice, providing:

- (1) an understanding of what to teach and how to teach it
- (2) access to new ideas and different perspectives
- (3) a quick fix for an immediate issue and a time saving device
- (4) support for weaker areas of knowledge or when beginning a new role or teaching a new subject or grade level.

Two categories of knowledge can be created from the resources: general principles, the broad, abstract knowledge that shapes teachers' overall practice; and specific, episodic

knowledge that enables teachers to perform in particular situations. While teachers rely on a body of abstract knowledge – including pedagogical reasoning and general instructional approaches to shape their overall practice – to fulfill their day-to-day roles they must transform this abstract knowledge into specific ideas and targeted pedagogical content knowledge, which enables them to prepare and implement individual lessons and learning activities.

Teachers engage with the resources most often to gain specific strategies that they can implement directly into practice. They conceptualise the platforms as a tool to support a particular need or an immediate issue or challenge they are facing. In this instance they are not looking to develop a deeper understanding of broad teaching principles but rather to acquire very specific, episodic knowledge or support that allows them to address an immediate issue or gap in their practice. Their engagement is intimately connected to their immediate situation and reflects the unique circumstances of their professional practice. For example, when Scott searched for a multiple-choice history test to use as a quick assessment activity to measure how well his students were mastering the course content, he did not want to develop his knowledge of how to construct assessment materials more generally. Rather he wanted a resource that matched his need for a specific activity, on specific subject matter, in order to fulfill a particular lesson objective, without having to create the test from scratch himself. This reflects ‘just-in-time’ learning rather than ‘just-in-case’ learning, which is centred on learning for unknown future needs. The importance of focusing learning and knowledge acquisition around immediate needs is supported by Scardamalia and Bereiter (2002) in their theory of knowledge building. They suggest that ‘knowledge needs to be of value to people in their current lives, not merely banked against future needs’ (para. 15).

While Scott was not looking to develop broader knowledge of assessment, in certain situations engaging with a resource for a specific purpose leads to the development of more general knowledge, as teachers establish a rationale for using a particular instructional approach or pedagogical strategy. In these situations the knowledge is applied beyond the single lesson for which it was originally intended and becomes part of a teacher’s knowledge base. These general teaching principles typically emerge from ongoing engagement with the resources on the platform, as teachers make connections between the underlying instructional approaches or pedagogic rationale of

multiple resources (Borko and Livingston, 1989; Davis and Krajcik, 2005; Gudmundsdottir and Shulman, 1987). Teachers are able to identify the common approaches and make connections between the specific knowledge within the resources to establish broader principles that inform their planning and instruction over the long term. The most commonly cited example among the teachers in this study was their adoption of a standardised lesson-planning structure. Through engaging with multiple lessons over time teachers synthesised the key elements of effective lesson planning and used these to structure their own lesson plans. The general principles of lesson planning were extracted from individual lesson plans and became embedded in teachers' daily practice.

Teachers found it more difficult to identify and articulate particular episodes where they gained general knowledge from the resources. A purposive agenda and intentionality underpinned the engagement of teachers who acquired general knowledge or broad principles. These teachers were consciously looking to develop their knowledge base or to adjust an aspect of their pedagogical approach or teaching style. This was evident particularly in the accounts of Alicia and Scott. Alicia wanted to reorient her practice towards the Socratic approach and used the resources to improve her questioning skills. Scott sought to develop a more linear progression in his lesson sequencing, and used a specific teacher's lesson plans to remodel his own approach. In both examples the teachers were conscious of their longer-term goals and sought resources that would support their progression towards them. The resultant knowledge and learning that arises through engagement with the resources, and in particular the differences between specific ideas and general principles and the degree of recognition and intentionality behind teachers' learning and actions, will be discussed in greater detail in section 6.4 in relation to the knowledge reconstruction process.

6.3 Engagement factors

Three categories of factors – individual, organisational, and school and community level – combine with the design and context of the platform and the nature of the resources it contains to influence and shape teachers' engagement [Figure 6.2].

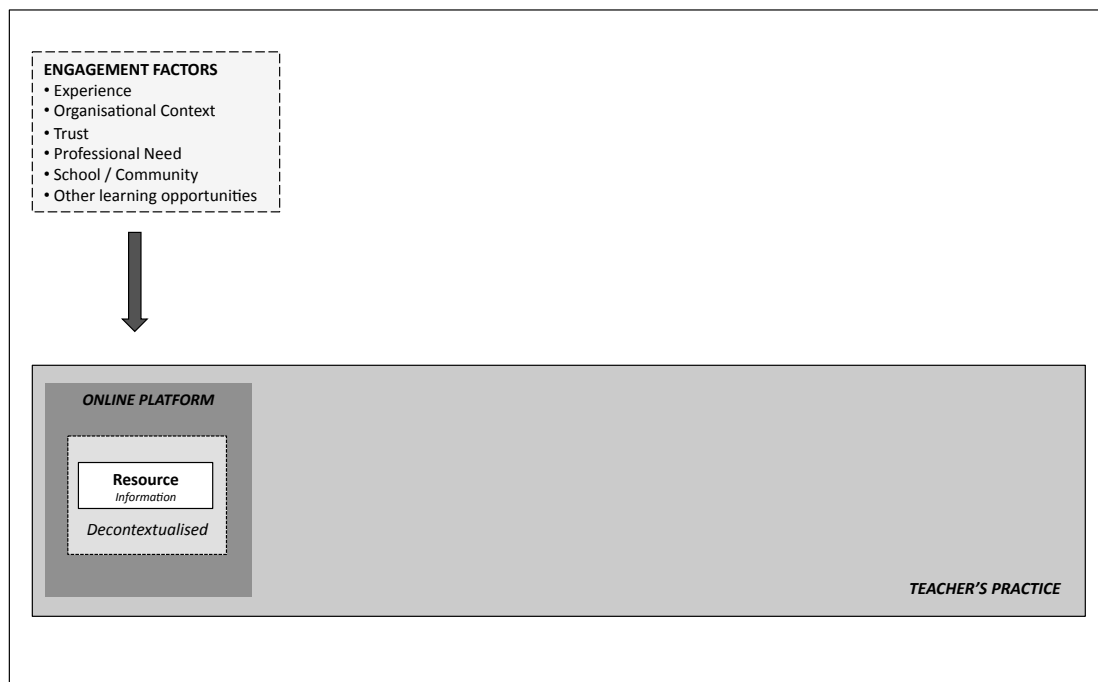


Figure 6.2 Factors influencing teachers' engagement with the platforms and their resources

6.3.1 *Trust and organisational factors*

Trust is the central foundation underpinning teachers' engagement as both knowledge contributors and knowledge consumers on the platforms. Teachers' trust, however, is not connected directly with the platforms but rather with their officiating organisations, TFA and AKO. Teachers exhibit strong organisational affiliation with and affective commitment towards the educational missions of TFA and AKO. Much of their professional identity stems from their membership of these organisations and the sense of mutual enterprise and shared beliefs and values they offer. The trust teachers feel towards the organisations and their agendas is transferred to the platforms and their resources, with teachers interpreting them as online extensions of the organisations. Teachers do not differentiate between the organisations and the services they provide; their trust in the organisations in most cases automatically engenders trust in the platforms, their resources and the other users.

The transfer of trust between the offline and online settings of the organisations reflects the earlier discussion of the collapsing of boundaries between the offline and online spaces of teachers' work. Teachers relate and transfer meaning readily between the multiple contexts of the organisations. The role that pre-existing trust in the platforms

plays in strengthening online engagement is highlighted by the absence of similar levels of commitment to and trust in other online platforms and teaching websites. Even in cases where teachers were engaging more regularly with platforms other than TFANet or AKO Net, they remained more cautious about the resources on these non-affiliated platforms, and less trusting of the other users. This is consistent with previous studies, which determined that connections made offline between users help to strengthen online connections and trust (Haythornthwaite, 2007, 2000; Matzat, 2010; McCully et al., 2011; Wellman, 2001; Wellman and Gulia, 1999) and that it is easier to establish trust online when it first has been developed offline and in person (Haythornthwaite, 2000). What differentiates this study from previous studies is that rather than pre-establishing trust between individual users, trust is developed between individuals and the organisation. Organisational trust takes the place of trust between users, with the shared organisational membership serving as an automatic connection.

Trust in and commitment to the organisation also underpinned teachers' desire to share and contribute knowledge on the platforms. The greater a teacher's commitment is to their organisation, the higher their trust is in its members and the greater their willingness to share knowledge (Hinds and Pfeffer, 2003). Teachers recognised that by sharing their knowledge and resources they could not only support other TFA and AKO teachers but also could also give back to their organisation and actively contribute to its educational mission. Recognition of the benefits that sharing resources brings to the organisation and its members is a powerful motivator for teachers (Ardichvilli et al., 2003; Chiu et al., 2006; Hsu, et al., 2007; Wasko and Faraj, 2000). Many teachers further recognised the value they had gained from having access to the resources on the platform and wanted to reciprocate for other teachers. While organisational trust promotes online engagement, online engagement also appears to enhance teachers' commitment to and trust in their organisation. This was particularly evident among TFA alumni who were no longer as actively involved in TFA but were able to maintain their sense of identity as TFA teachers and connection to the organisation through engagement with TFANet. In this situation trust became bidirectional, both shaping engagement and emerging from engagement.

6.3.2 *Individual factors*

A range of individual-level factors shape engagement. The most influential of these is a teacher's years of teaching experience. Different professional needs and learning agendas at various career stages lead to differences in how teachers perceive the impact and importance of engagement to their achievement or practice (Eccles, 1983). As Billett (2004) explains, individuals determine both how they engage with an opportunity and what they construct from it. It is not just an individual's needs that shape engagement but also their past experiences, personal histories, beliefs and values. Scribner (1985) contends that an individual's personal history or ontogeny engenders their identity and personal subjectivities, which Billett (2004) suggests in turn promotes particular ways of knowing and engaging with opportunities. As a result of their personal histories and subjective view of the world, individual teachers' engagement with the platforms and resultant learning will always be unique (Valsiner, 2000). This is supported by the findings of Widden and colleagues (1996) in a study of how teachers acquired and used knowledge in the context of a school reform project:

The use teachers make of knowledge in their thinking, particularly with respect to changing their practice, is more a function of their own contextual imperatives than it is a function of the knowledge itself (201).

The manifestation and implications of the individual factors and their intersection with and influence on school level factors will be explored in the following sections.

6.3.3 *First year teachers*

Beginner teachers in their first year in the classroom tend to engage with the platforms more frequently than teachers with more than a year of teaching experience do. This reflects the more consistently valuable role of the resources in their practice. Beginner teachers enter the classroom with comparatively weak knowledge of and for teaching and limited classroom experience. This was particularly evident in this study as seventeen of the twenty teachers had undertaken only a five-week, intensive training course before entering the classroom and two teachers had received no initial teacher training. Their limited training and teaching experience meant that when entering the classroom most struggled to know how best to perform their roles. The teachers described their initial difficulty in knowing what to teach and how to teach it, and the challenges they faced trying to translate their content knowledge into meaningful pedagogical strategies. Their limited training and experience means that they have fewer personal experiences to draw upon to support their practice. Furthermore, beginner teachers have not had the

opportunity to develop their own collection of teaching resources and often are not yet members of a professional community that can support their development and act as a first point of reference for answering questions and providing guidance.

As a result, novice teachers typically use the platforms in order to work out what to teach and how to teach it, with many engaging daily or weekly to fulfill their need for a constant supply of planning and teaching materials. Their lack of experience and of teaching-specific knowledge means that their focus primarily is on surviving and fulfilling the basic roles of teaching (Calderhead, 1989). Grossman and Thompson (2004) similarly found that one of the most critical issues facing beginner teachers is determining what to teach and finding or creating appropriate resources to support instruction. Beginner teachers' limited pedagogical knowledge means that they often struggle to transform subject matter into forms that are both pedagogically powerful and readily adaptive to the various students in their class (Calderhead, 1996; Green, 2014; Gudmundsdottir and Shulman, 1987; Shulman, 1987). The resources provide them with support for their planning and helps them to structure their lessons. They further provide examples of teaching activities, demonstrating for teachers how to design instructional materials that support student learning.

The situation of beginner teachers influences not just the frequency of their engagement and the types of resources they require, but also the nature of their engagement. They tend to focus principally on short-term planning, directing their engagement towards identifying resources and materials to support their immediate needs. Their narrower frames of reference and difficulty identifying their exact knowledge needs means their engagement often lacks structure and they are less discerning in their selection of resources. Other studies have similarly found that beginner teachers tend to engage primarily in short-term planning, focusing on how to present subject matter in a way that is meaningful to students in a single context (Borko and Livingston, 1989; John, 2006; Mutton et al., 2011) rather than conceptualising their practice more holistically and creating connections between concepts (Gudmundsdottir and Shulman, 1987).

While this difference in approach between beginner and more experienced teachers was identified largely through the reflections of more experienced teachers, it also was apparent in the contrast between the language and insight displayed by more experienced

teachers and the two first year teachers in the study. Neither Michelle nor Tom could articulate their teaching philosophy or instructional style clearly or definitively, and both also struggled to describe with any specificity why they selected particular resources from the platform and how they related to their practice more generally. They lacked the knowledge of and for teaching and the practical experience to interpret fully their own actions and practice and to make connections between their resource selection and teaching objectives.

6.3.4 Change over time

Teachers' stories suggest that their experience in the classroom and engagement with a range of learning activities (including the platforms) led to the rapid development of their personal, practical knowledge over the course of their first year in the classroom. As their knowledge developed and they became more comfortable within their practice, their engagement with the platforms shifted. Not only did the frequency of their engagement decrease, but their use became more structured. By their second year teachers have a greater understanding of their specific needs and requirements, enabling them to be targeted in their searches and more selective in their resource selection. Their more complex and interconnected cognitive schemata (Borko and Shavelson, 1990) and broader and richer set of mental representations for how to teach particular topics or concepts (Clermant et al., 1994; John, 2006) make experienced teachers better able to identify useful resources and to connect them to their existing knowledge.

This difference in engagement between teachers in their first year of teaching and those in their later years reflects the findings of the literature on teacher learning and development. Studies show that beginner teachers often feel overwhelmed by the complexity and workload of teaching (Day, 1999; Kagan, 1992; Shulman, J., 1987), and experience 'praxis shock' (Goddard and Foster, 2001; Kelchtermans and Ballet, 2002) when attempting to navigate the responsibilities of the role while developing all-important practical, personal knowledge. Teachers in their first year tend to operate in survival mode, developing the teaching strategies and procedural knowledge they require to survive. It is difficult to determine to what extent the engagement of beginner teachers in this study is representative of all beginner teachers or is heightened by their limited training and lack of experience in the classroom. The substantial differences in teachers' engagement between their first and second years, both observed by the teachers

themselves and noticeable in the differences in the depth of perception and ability to articulate more complex ideas between the first year teachers and the more experienced teachers in the study, indicate the steep learning trajectory of teachers during their first year in the classroom.

It perhaps also reflects the higher needs of TFA and AKO teachers when they first enter the classroom, as compared with traditionally trained teachers. TFA teachers and the majority of the AKO teachers who participated in the study undertook a five-week, intensive initial teacher education programme. The short timeframe provided teachers with limited time or opportunity to accumulate the range and depth of knowledge necessary to effectively fulfill their work as teachers. Moreover, teachers had few opportunities during their training to implement and consolidate their knowledge in the classroom context. This is particularly problematic given evidence that suggests that effective initial teacher education programmes require teachers to spend at least twenty weeks in school settings (Mourshed and Barbour, 2007). It is important to note, however, that there is no definitive US-based research linking particular forms of initial teacher education to student achievement and teacher behaviour (Levine, 2006; Wilson et al., 2001) and studies suggest that all teachers, regardless of their entry route into the profession, experience substantial changes in their teaching abilities during their first years in the classroom (Clotfelter et al., 2007; Harris and Sass, 2011; Kane et al., 2006).

The impact of alternative training routes and particularly TFA's training programme on teacher performance and student outcomes has been the subject of several studies (Darling-Hammond et al, 2005; Glazerman et al., 2006; Heilig and Jez, 2010; Kane et al., 2006). These studies suggest that in their first year TFA teachers are less successful in supporting student achievement in both literacy and numeracy than traditionally trained teachers are. However, by the end of their second year this gap is diminished and by the end of their third year TFA teachers outperform other teachers. While the studies do not specifically measure teacher knowledge, the weaker student outcomes of first year TFA teachers suggest that these teachers do hold more limited professional knowledge. The improvement in student outcomes between first and second year teachers is reflected in teachers' changing engagement with the platforms over this time. As teachers gain experience in the classroom not only does their dependence on the platforms decrease but their greater professional knowledge enables them to be more targeted and focused

in their engagement. The platforms and the specific types of information provided by the resources appear to have special importance and particular affordances for the teaching populations in the two cases in this study.

While the engagement of first year teachers is primarily focused on short-term outcomes and immediate, practical needs, a large number of participants identified the role that engagement with the resources had on their long-term learning about and knowledge of lesson planning. Lesson planning emerged as one of the very few examples of longer term learning that teachers could confidently associate with their engagement with the platforms. While it is impossible to know for certain the reasons for this, it is possible that it relates to the training the teachers received before entering the classroom. Lesson planning is one of the key practices taught during TFA's five-week intensive training programme. It is possible that this emphasis on lesson planning during training supported the development of initial schemata related to the processes of planning, which teachers are then able to draw upon when engaging with the resources on the platforms. Teachers' ability to recognise how the resources have supported their learning about lesson planning may in part reflect the presence of existing cognitive schemata, which were developed during their initial training.

6.3.5 More experienced teachers

Teachers' engagement with the platforms shifts during their second year. This not only reflects their increased knowledge but also changes in their professional lives and learning agendas. More experienced teachers typically have larger collections of resources and activities to draw upon to support their practice and learning, reducing their dependence on the platforms as the main source of their teaching materials and ideas. Many teachers become part of professional communities during their first year and develop a larger pool of resources and people to draw upon to support their practice. Their learning agenda also broadens, moving away from focusing simply on what to teach and how to teach it to more specific and higher level learning, reflecting their desire to refine and augment their practice (Day, 1999; Day et al., 2006). Rather than focusing on how to improve a single lesson, more experienced teachers tend to focus on their practice more holistically. As a result, the format of the resources and the knowledge they contain is not as directly relevant to teachers' day-to-day needs and consequently they engage less frequently.

It is not just the format of the resources but also their perceived quality that leads to decreased engagement among more experienced teachers. More experienced teachers generally have more elaborate and complex pedagogical content knowledge (Borko and Livingston, 1989; Clermant et al., 1994) than their less experienced counterparts and prefer to engage with teachers and resources created by teachers who have more experience than themselves. This, however, is problematic for the more experienced teachers at AKO and TFA. The average age and years of experience of both TFA and AKO teachers is well below the national average (Feistritzer, 2011). Both organisations have high teacher dropout rates, meaning that there are fewer experienced teachers uploading resources to the platforms. The perceived lack of experienced teachers to learn from on the platforms reduced the outcome expectancy of engagement for several more experienced teachers and consequently led to their lower levels of engagement. Teachers' limited initial training results in their higher knowledge and learning needs and the increased frequency of engagement during their first year in the classroom. However, the low teacher retention rates means that there are fewer incentives for more experienced teachers to continue engaging because the resources become less appropriate to their needs.

As teachers gain experience in the classroom and develop their knowledge of content and pedagogy, become more comfortable in their planning and build up their own collection of teaching resources, the platforms tend to become a place for a one-off, quick fix. The platforms and their resources become a timesaving tool for some teachers, with the resources supplementing rather than directing their practice. By enabling teachers to fill gaps and to streamline their planning, they allow teachers to focus more time and attention on other parts of their practice. The platforms provide easy access to the resources, which are in a form that can be easily transferred and used in their practice. When using the platforms in this way, teachers conceptualise them as a tool to support their practice, rather than as a learning resource to support their knowledge acquisition and professional development.

More experienced teachers engage with the platforms to find new teaching ideas and to be exposed to different perspectives. They value the access the platforms provide to the ideas of a far wider range of teachers than they would have access to within the bounds

of their daily, school-based practice. By breaking down spatial and temporal boundaries (Chui et al., 2012) teachers have access to a potentially greater range of knowledge and resources and a broader cross-section of teachers than would be possible in their everyday, offline professional contexts (Haythornthwaite, 2000, 2008). The platforms enable teachers to establish weak ties, which are pivotal for exposing them to a wider range of resources than is available in their individual school setting and to new information, opinions and ideas that are different from their own (Haythornthwaite, 2008). All the teachers recognised the importance of engaging with new ideas and with teachers from outside of their schools and most sought to engage actively with a range of teachers. Only two, Scott and Chris, were reluctant to engage with teachers with whom they did not share a previous connection. For them, the platforms principally served to strengthen existing ties rather than providing the opportunity to establish new connections. They were less concerned about gaining access to a cross-section of perspectives and ideas, preferring to engage with the resources of a few, carefully selected teachers.

As well as providing easy access to new ideas and different perspectives, the platforms also played a role in supporting more experienced teachers in areas of their practice where they lacked specific pedagogical or content knowledge. This often arose when teachers took on a new role or began teaching a new grade level, or when they were teaching a particular topic for the first time. In these instances the teachers' engagement was reminiscent of the engagement of beginner teachers, with the resources supporting their knowledge of what to teach. However, their experience and generally greater knowledge base meant that experienced teachers are better at recognising the specific types of knowledge they require and are better able to identify and integrate potentially useful resources into their practice effectively and efficiently. Borko and Livingston (1989) similarly suggest that when encountering a subject for the first time both novice and experienced teachers will struggle with planning and knowing what to teach.

6.4 Knowledge reconstruction as learning

Learning occurs through and emerges from the knowledge reconstruction process. It is through the cognitive processes and actions of teachers as they reconstruct a resource in the contexts of their own practice that learning occurs. The knowledge reconstruction process enables knowledge to be fully known and enacted in practice, and the permanent

or semi-permanent changes that occur in teachers' thinking and actions as a result of this process represent learning (Billett, 2004). Learning occurs at all three stages of the knowledge reconstruction process. However, the nature of the learning and the knowledge created is different at each stage. The sequence of learning opportunities throughout knowledge reconstruction has parallels with Scardamalia and Bereiter's (2002) knowledge building trajectory which:

Offers value all along its course, not just at its upper reaches. At all stages people are building authentic knowledge that is immediately useful to themselves and their community in making sense of their world. (n.p.)

While similarities exist between the concepts of knowledge reconstruction and knowledge building, there are some fundamental differences. These differences represent some of the new concepts being proposed in the theoretical model that is developed in this chapter. Both knowledge reconstruction and knowledge building focus on the continued extension or improvement of ideas and resources. However, in this study these developments were realised primarily by the individual teacher who was engaged in reconstructing a particular resource for their personal practice. In contrast, in knowledge building the benefit to the individual is always subsumed by the overriding advancement and value that knowledge building brings to the wider community. The outcomes of knowledge building are distributed across the whole community, while in knowledge reconstruction the outcomes are primarily personal. This is because while other teachers can help to shape the knowledge reconstruction process, the knowledge that is created is personal, value-laden and intimately connected to the perspectives and personal histories of each individual teacher (Alavi and Leidner, 2001; Bandura, 2001; Fahey and Prusak, 1998). Knowledge reconstruction also is context rich. Following Calderhead's (1996) contention that planning occurs within a teacher's practical and ideological context, the knowledge reconstruction process (which encompasses planning) is situated in the specific acts and settings of a teacher's practice. This means that even though two teachers may engage with the same resource or collaborate throughout the reconstruction process, their personal beliefs, values, past experiences and professional context ultimately will determine and differentiate how they each choose to interpret and utilise the knowledge.

The following section examines the actions, thought processes and learning that occur throughout the stages of the knowledge reconstruction process. It further considers how

a range of learning factors – including a teacher’s experience, personal ontology, beliefs and values, school context and the degree of conscious intentionality they employ – influences and shape the knowledge reconstruction and learning processes.

6.4.1 *Selection – learning through reflection*

When assessing the resources on the platform teachers examine or visualise individual resources in relation to their own professional contexts. The selection process requires teachers to reflect on their own needs and teaching practice and to interpret the resources through their individual instructional frameworks [Figure 6.3].

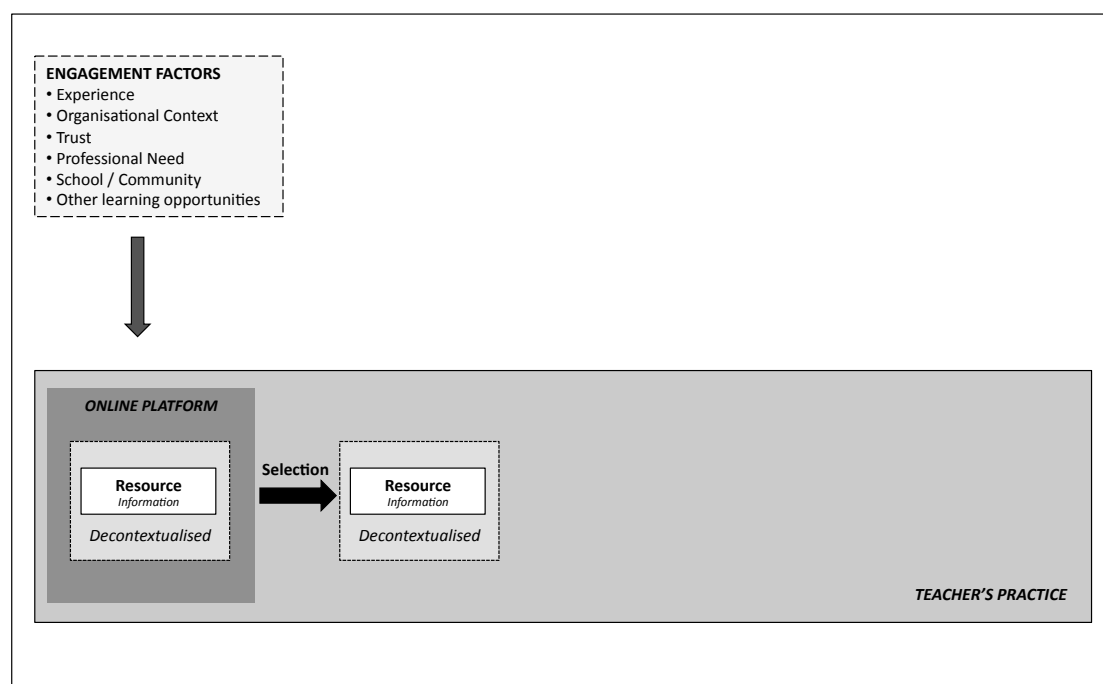


Figure 6.3 The selection process

The reflective process encourages teachers to recognise the propositional structures of their own pedagogical content knowledge (Borko and Livingstone, 1989; Grossman and Thompson, 2004) and to interrogate potential new knowledge through these structures. When selecting resources teachers adopt the stance of reflective practitioner (Schon, 1983), engaging in thoughtful contemplation about their practice. Reflection requires teachers to assess critically and make judgements about their own actions, both past and future – a process Schon conceptualises as continual learning. Teachers are acutely aware that selected resources must suit not only their own needs and match their learning objectives and pedagogical approach but also serve the needs of their students and

school contexts. Assessing a new resource in relation to their work contexts encourages teachers to gain new insights into their practice, allowing them to make adjustments to and develop new understandings of their instructional practice.

The importance of selecting knowledge that aligns with their personal style, professional needs and local context means that teachers primarily select resources that closely match and complement their existing knowledge, propositional structures and teaching philosophy. Teachers favour resources that will reinforce and refine, rather than reorient their existing practice and procedures. Their engagement, therefore, functions predominantly to hone and strengthen what they already know and do (Anderson, 1982; Billett, 2004). Teachers interpret and appropriate teaching resources in relation to their personal understandings of subject matter, pedagogy and student learning and their own beliefs and values about teaching and learning (Brown and Edelson, 2003; Putnam and Borko, 1997). This congruence between selected resources and teachers' beliefs was also determined by Squire and colleagues (2003) in their study of how teachers assimilated a specific curriculum initiative into their classroom. They too found that teachers selected tools and resources that matched their strengths, were consistent with their pedagogical beliefs and that they considered would be engaging for their students.

The organisational affiliation and inherent connection that exists between teachers who use TFANet and AKO Net, by virtue of their membership of AKO or TFA, facilitates knowledge transposition. The teachers' membership to the organisations and their subscription (to varying degrees) to the mission and beliefs of their organisation reduces the contextual and philosophical gap between teachers (Lampe et al., 2010). Teachers receive the same initial training and continued professional development opportunities and develop relatively consistent pedagogical practices and teaching philosophies. This establishes considerable alignment between the resources on the platform and the underlying beliefs and teaching approaches of the users. Research shows that knowledge mobilisation is reliant on a degree of congruence between teachers' current ideas and perspectives and those presented in the resources (OECD, 2000). Teachers are more likely to engage with platforms and resources that reflect their own beliefs and values as this simplifies the process of transferring and transposing the knowledge into their practice. The close connection between the platforms, their resources, the educational missions and agendas of the organisations and the teaching practices and philosophies of

the users establishes commonality and consistencies that support and streamline the reconstruction process.

The findings indicate differences between the actions and thought processes of first year teachers and teachers with more teaching experience. Beginner teachers possess weaker understandings of their own practice, and their teaching philosophies and pedagogical approaches are often under-developed. They find it more challenging to identify their professional needs, to interpret resources in relation to these needs and to visualise how a resource will function within their practice (Davis and Krajcik, 2005). Beginner teachers lack the frameworks possessed by more experienced teachers for organising new ideas about teaching as well as the knowledge to imagine how lessons will play out in the classroom (Borko et al, 1992; Davis and Krajcik, 2005). As a result, their selection of resources is often less structured and systematic. While reflection is an instinctive part of the selection process for most teachers, it is a learned action for beginner teachers, and is refined and improved through experience. It is through experience that beginner teachers learn the importance of personalisation and localisation, and over time, as their knowledge of practice deepens, so too does their ability to reflect on and visualise how a resource will contribute to their practice. This explains why a number of teachers described how the efficiency and effectiveness of their engagement increased over the course of their first year as they became more adept at selecting resources that matched their personal requirements more directly.

6.4.2 Modification and implementation – learning through action

During the modification and implementation stage the knowledge potential of a resource is extracted and is personalised and situated within the practice of a new teacher [Figure 6.4].

As noted in Chapter Five, teachers typically adopt one of four modification profiles: the ideas gainer, the amalgamator, the cosmetic modifier and the substantial modifier. The profile teachers assume tends to be based on their particular agenda and needs as well as on the nature of the resource they select. While each profile focuses on different elements of a resource, they all result in the reconstruction and reapplication of knowledge into the personal contexts of teachers. Teachers adopt the profile that will allow them to reshape the knowledge into the form that is most applicable and relevant

to their personal needs and contexts. It is during this stage that a resource is recontextualised and its knowledge potential becomes new personal knowledge as it is integrated into a teacher's cognitive structures and enacted in practice.

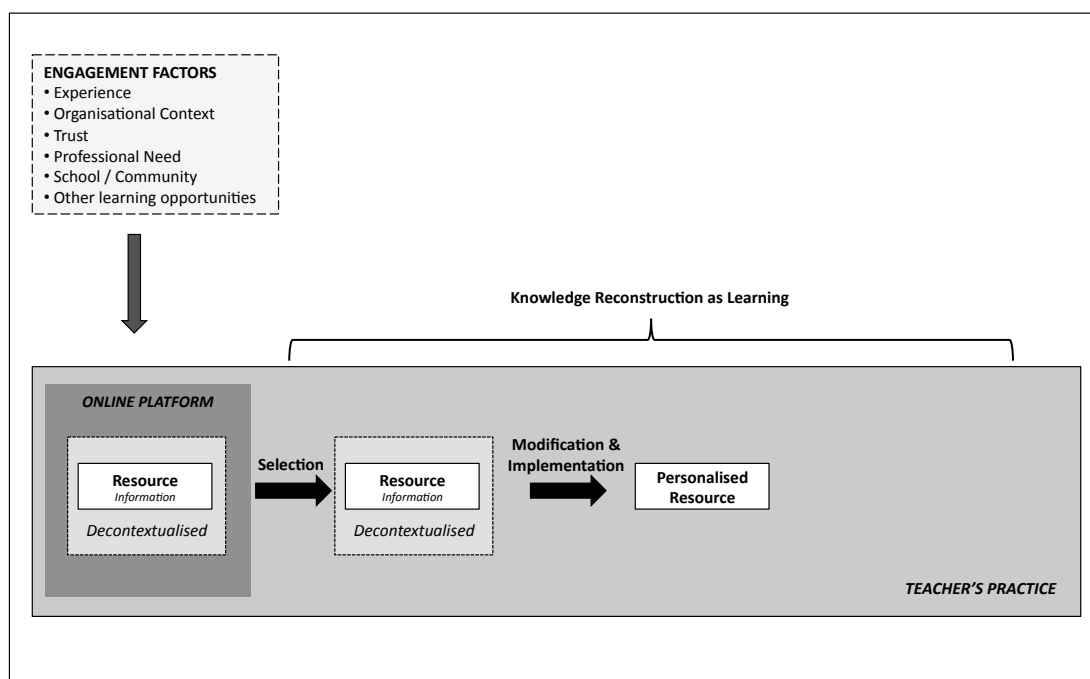


Figure 6.4 The knowledge modification and implementation process

The recontextualisation of the resource is critical to the learning that occurs and the knowledge that is developed. Knowledge experienced, modified and enacted in different contexts holds different meanings (Siemens, 2006). During modification and implementation the knowledge becomes integrated into a teacher's cognitive structures and situated within their work context. This context not only informs how a teacher modifies the resource but also imbues it with additional personal knowledge that is created when the resource is implemented. As a result, the recontextualisation of a resource results in learning because teachers have to adjust their cognitive frameworks and update their personal knowledge to accommodate the new knowledge that is created. Each sphere of existence or context of enactment has a specific culture and set of influencing factors, which become 'perspective-points' or lenses for perceiving and filtering knowledge (Siemens, 2006). When teachers modify a resource, the knowledge that is created is personal to the teacher and situated within and informed by the specific context and circumstances of its use. And if a teacher were to reuse a resource, its new temporal (or spatial) context of implementation would result in additional learning taking place (Fahey and Prusak, 1998).

Teachers' prior knowledge and beliefs, including their personal interpretations of teaching and learning, their values, past experiences and their school and organisational context all combine to influence how they assess and utilise a resource. Teachers' understanding and beliefs about subject matter, their familiarity with instructional processes and pedagogy, and their knowledge of their students also shape the reconstruction process (Brown and Edelson, 2003; Pajares, 1992; Sherin and Drake, 2009; Squire et al., 2003). This helps to explain why teachers are more likely to select resources that are aligned with their personal approaches and philosophy. Knowledge transfer and knowledge transposition are much easier when the knowledge aligns with teachers' own understandings and beliefs, as it can be integrated more fluidly into their existing cognitive schema. Teachers make sense of and modify resources in relation to their existing professional knowledge and practice (Putnam and Borko, 1997), thereby establishing cognitive structures that are self-strengthening over time.

The reconstruction process and the integration of new knowledge into existing cognitive schemata is more streamlined and efficient when teachers have a strong body of existing knowledge, as this provides a substantial framework within which to situate new knowledge. More experienced teachers tend to possess stronger content and pedagogical knowledge as well as a more detailed understanding of their sites of practice. Their knowledge is embedded in clusters of experiences (Eraut, 2000), and as they engage with the resources they seek new knowledge that will complement and expand these clusters. This results in self-strengthening structures (Kagan, 1990), which support the efficient modification and implementation of new knowledge. While experienced teachers primarily add to existing frameworks when reconstructing knowledge, beginner teachers, who possess weaker frameworks, often have to modify and elaborate their cognitive schemata (Borko and Livingston, 1989) when integrating resources from the platforms in their practice, making the reconstruction process more challenging and time consuming. Ausubel (1968) claims that prior knowledge is the most important single factor influencing learning. It is much easier to build upon existing knowledge than to establish entirely new conceptual frameworks.

This helps to explain why the amalgamator stance is adopted most commonly by first year teachers. Beginner teachers possess weaker conceptual frameworks and find it more

difficult to transform knowledge and represent concepts in ways that promote student learning (Feiman-Nemser and Parker, 1990) or to make decisions about how best to serve their students (Grossman, 1989). Amalgamating elements from multiple resources means that the teachers rely more heavily on the resources for providing the knowledge structures and therefore integrate less of their own knowledge into the resource they produce. Beginner teachers' difficulty in assessing how a resource relates to their local context and personal style makes them more likely to amalgamate multiple resources.

Ariana's 'Frankenstein' lesson, see section 5.3.2, encapsulates the result of teachers applying too little of their own knowledge or local context when modifying a resource. Possessing clear objectives and a strong vision of how the final modified resource relates to their practice is critical to the successful implementation of a resource in practice. The importance of personalisation and localisation during modification is emphasised by the accounts of teachers who had attempted to implement a resource in their practice directly from the platform. Without adapting the resource to fit their specific needs and context the implementation process typically was less successful. John (2006) describes learning to plan effective lessons as an iterative process for the beginner teacher. As they gain more information about their students and become more comfortable with framing and presenting their content, more concrete plans emerge.

Absorptive capacity appears to be related, at least in part, to teachers' years of teaching experience. Experience in the classroom and greater personal knowledge extends teachers' cognitive schema, which enables them to access and interpret new information and activities more quickly in relation to their existing knowledge. The development of cognitive schema appears to occur alongside increases in absorptive capacity. Szulanski (1996), in his study of the stickiness of knowledge, identifies a lack of absorptive capacity and the absence of enough pre-existing knowledge to assimilate new knowledge efficiently as two of the primary factors impeding the mobilisation of knowledge. He claims that unsuccessful transfer occurs 'less because organisations do not want to learn but rather because they do not know how to' (Szulanski, 1996: 38). This was true for teachers in this study. More experienced teachers were more adept at navigating and utilising new knowledge and resources found on the platforms, while beginner teachers' lack of background knowledge and experience led to several struggling to interpret and modify the resources efficiently or accurately.

6.4.3 *Personal resource creation*

When a resource has been modified and implemented in practice it no longer remains decontextualised but becomes a personal resource, embedded within the contexts of a new teacher's practice and informed and shaped by their existing personal knowledge and expertise. Personal resources are shaped by the needs, existing cognitive structures and beliefs of the teacher as well as by the context within which they are utilised. The implementation of a single resource is typically associated with a particular lesson or part of a lesson and the learning that arises through its construction and implementation in practice (either at the planning or the instructional stage) is focused around a single lesson. Consequently, the process of constructing a personal resource supports teachers in the creation and adoption of specific ideas, such as a particular instructional strategy, or in the development their content knowledge and pedagogical content knowledge of particular subject matter. This echoes previous descriptions of planning as learning (Beyerbach, 1988; Mutton et al., 2011)

For most teachers, the impact of gaining access to new ideas and reconstructing resources in and for their practice was principally focused on a single lesson. The personal resource that a teacher creates helps to shape a specific episode and typically is not regarded by the teacher as contributing to their practice more broadly. Teachers perceived the changes in their thinking and actions to be short term and associated only with the immediate lesson they were planning. Teachers' focus on short-term outcomes and immediate gratification and impact reflects the nature of their work as well as the types and form of knowledge they require for this work. While teachers rely on a body of abstract knowledge, including pedagogical reasoning and general instructional approaches to shape their overall practice, to fulfill their day-to-day roles they must transform this abstract knowledge into specific ideas and very targeted pedagogical content knowledge, which enables them to prepare and implement individual lessons and learning activities and teach specific content and skills.

This focus on immediate outcomes is connected to the mindset of teachers when engaging with the platforms and their resources. As previously discussed, platform use is typically associated with an immediate need or issue that teachers are facing or a gap in their knowledge base. The resources are associated with the direct fulfillment of these specific needs. Teachers associate improving a single lesson, and often just one activity

within a lesson with a momentary improvement in practice rather than seeing it as indicative of enhanced knowledge and evidence of learning having occurred. This lack of identification of resource creation with learning generates several ideas. Firstly, teachers have limited definitions of learning and the processes and outcomes that are indicative of learning having occurred. The teachers in this study overwhelmingly associated learning with formal professional development activities and intentional attempts to develop their practice at a broader, more general level. This may include changing or reorienting their pedagogical approach or the subject matter they choose to engage with. The day-to-day actions they undertake when preparing a lesson or creating a particular instructional activity and the predominantly small-scale changes they result in are not necessarily connected with learning having occurred. The lack of association of knowledge reconstruction with learning also reflects the situated nature of the platforms. Engagement with the platforms and knowledge reconstruction is embedded largely within teachers' practices and is therefore associated with developments in practice rather than with learning. Teachers tend to conceptualise their professional practice and learning as separate, albeit inter-related, activities.

The second factor influencing the lack of recognition of the occurrence of learning is the distinction between the physical resource being shared and the knowledge that is created around it. The resources are not the same as the knowledge they contain. While the physical artefact that a teacher constructs may not be reused, the knowledge it contains and the personal knowledge they accumulate as they employ the resource in their practice may be retained and reapplied to new situations. Teachers found it difficult to recognise the knowledge they had retained from a resource. Knowledge is accumulated incrementally, with new knowledge being integrated with and building upon existing knowledge structures. This makes it difficult for teachers to differentiate retrospectively between knowledge obtained at different times and from different sources. When teachers engage with the platforms with a short-term mindset they do not consciously attempt to extract the broader knowledge or principles from a resource or to extract out from the particular lesson to expand their general knowledge. Nor do they regard these changes as being indicative of learning. This does not mean that they are not also developing their general knowledge but rather that they are not consciously or intentionally doing so. As will be discussed in the following section, despite primarily perceiving and reporting short-term impacts to practice and learning, there is evidence to

suggest that the personal knowledge developed around a resource is often retained and continues to shape teachers' practices.

6.4.4 *Embedding*

Embedding refers to the extraction and retention of knowledge from the creation and implementation of a personal resource [Figure 6.5].

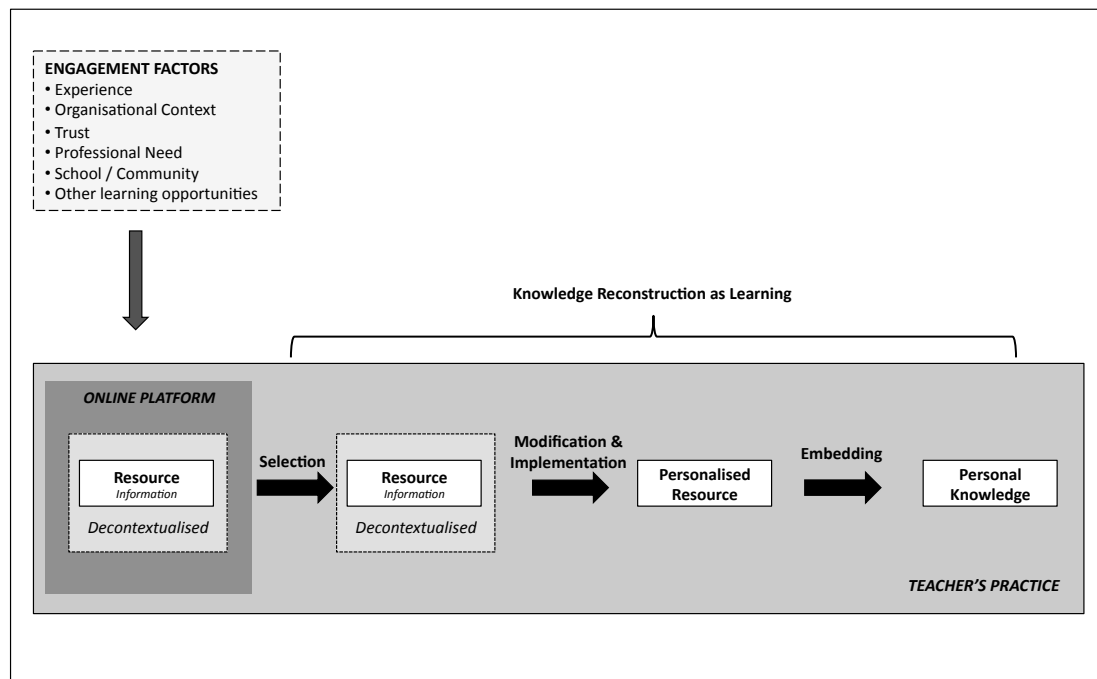


Figure 6.5 The knowledge embedding process

Some of the personal knowledge teachers create within their practice becomes embedded within their cognitive structures and is combined with their existing knowledge and expertise to inform future actions. Through the processes of integration or embedding, the knowledge developed during the modification and implementation of a resource is combined with a teacher's existing knowledge base to create new personal knowledge. Teachers perceived embedding to be an ongoing, long-term process that occurred as they continued to re-engage with and reutilise knowledge rather than associating it with a single, isolated event (MacDonald, 1995). The personal knowledge developed is associated generally with more abstract or general knowledge rather than with the more episodic knowledge associated with the modification stage.

During embedding, teachers extract out from the individual resources to establish general ideas that are applicable to a range of situations. The personal knowledge teachers create

when using a resource in their work context becomes a valuable part of their ongoing practice. It is through the embedding of knowledge that teachers not only develop their abstract, generalised knowledge of and for instruction, but also start to make connections between different parts of their knowledge. The embedding of knowledge is important for enabling teachers to move more flexibly between their different sources of knowledge, applying abstract knowledge to specific ideas and episodes and similarly recognising how specific situations reflect and relate to broader concepts and principles (Davis and Krajcik, 2005).

During the embedding process, the information extracted from a resource is combined with the personal knowledge that is generated when the resource is employed in practice. The actions of both the teacher and their students and the outcomes of a lesson combine with the resource to contribute to and inform the knowledge that is created. Teachers are engaged continually in reflecting on their work and actions and use these insights to inform their future work. Teachers described the various ways in which they evaluated the effectiveness of a particular resource or lesson. These typically were subjective and self-driven. Throughout the course of a lesson as well as upon its conclusion teachers assess how well it is going. This is often gauged by observing how students are responding to particular activities or ideas and monitoring levels of engagement and the behaviour of students. These observations and reflections are combined with the learning that occurred during the resource modification process to contribute to the teacher's personal, practical knowledge.

The know-what and know-how involved in and resulting from reconstructing a resource and implementing it in practice provide new cognitive resources. These new cognitive resources combine with teachers' existing cognitive structures and knowledge, their past experiences, beliefs and values and become part of a teacher's wider body of personal knowledge. Teachers construct meaning and make sense of the personal resources they create through action. Embedding reflects the interpretation of personal knowledge as information that has been internalised, so that it changes the mental modes (beliefs, values, perceptions) or actions (practice, behaviour) of the teacher. While all teachers engage with these processes, some teachers are more aware than others of the learning that is occurring and the nature of the knowledge being embedded. For other teachers the embedding process and the new knowledge created largely remains unrecognised.

Consequently, embedding is considered to occur in two main ways: firstly, unintended and unconsciously; and secondly, through intentional actions and conscious thought processes.

Most teachers struggled to identify what knowledge became embedded in their practice or how this process occurred. Because the knowledge reconstruction process and the act of reflection are often undertaken unconsciously by teachers and are interpreted and situated as a workplace task, teachers do not think actively about the knowledge that is created and retained from these processes. Many struggled to recognise and isolate the different sources of their knowledge retroactively. As a result, they did not associate engagement with the platforms with long term changes in their teaching practice or with the creation of new knowledge. As Widden and colleagues (1996) explain, '[when new] knowledge interacts with their personal knowledge and practice, it becomes difficult to determine which form of knowledge is most influential in driving subsequent change' (191-92).

Long-term engagement with similar types of resources on the platform can support the embedding of knowledge. Eraut (2008) claims that some artefacts that are in daily use carry information in a standard way that beginners soon learn to understand. This process of gradual knowledge accumulation and the embedding of procedures and knowledge was most evident in the ways beginner teachers developed their lesson planning structure. Both TFA and AKO promote particular lesson planning formats and the majority of resources on the platform conformed to this style. Consistent and continued engagement with the lesson plans resulted in the specific style of lesson planning becoming a routine part of the teachers' practices. In this situation embedding was largely unintentional, resulting from prolonged exposure to the same pedagogical approaches across multiple resources.

In other instances embedding was associated with a degree of intentionality and teachers' desires to make long-term, sustained changes to their teaching practice. This typically occurs when teachers engaged with the resources with the specific intention of extracting the broader, general knowledge they contained, rather than to support them in a single lesson. Several participants in the study could identify knowledge that had been embedded in their practice and speak in some detail about how their engagement with

the platforms facilitated this long-term learning and had a lasting impact on their teaching practice, and it seems likely that embedding occurs more often than the data suggest. Teachers primarily interpreted the resources and assessed the impact of the new knowledge in relation to how well they served their immediate learning needs.

It is easier for teachers to assess the impact of a resource on a single lesson and to remember whether they reused the resource on subsequent occasions. It is more challenging to keep track of what happens to the knowledge the resource provides over time. Teachers struggle to determine whether and how it informs future practice or how it is combined with existing knowledge and is reapplied in new situations. Teachers connect new knowledge with existing knowledge, embedding it within existing cognitive schema. The knowledge constructed from individual resources or particular learning activities is integrated rather than remaining as isolated episodes.

The next section will examine in more detail the theoretical nature of the learning and how it compares to previous conceptualisations of the learning resulting from online platforms engagement and Internet-mediated knowledge mobilisation.

6.5 Reinterpreting learning

The learning that arises from the knowledge reconstruction process in this study has key differences from the learning processes typically associated with online platforms. As discussed in Chapters 1 and 2 several big claims and broad theoretical positions have developed around online platforms. Social network theory and communities of practice, with their emphasis on learning through socialisation and the importance of ties between users for enabling the flow of knowledge, have dominated discussions. In contrast, the nature of learning emerging from this study suggests that new ways of thinking about learning in relation to online platforms and knowledge mobilisation are needed. In the model developed in this chapter greater importance is given to the individual for determining and shaping the learning process. While the learning occurring throughout the knowledge reconstruction process can be either social or individual, the design of the two platforms in this study, combined with the attitudes and approaches adopted by the teachers, led to a predominance of individual learning [Figure 6.6].

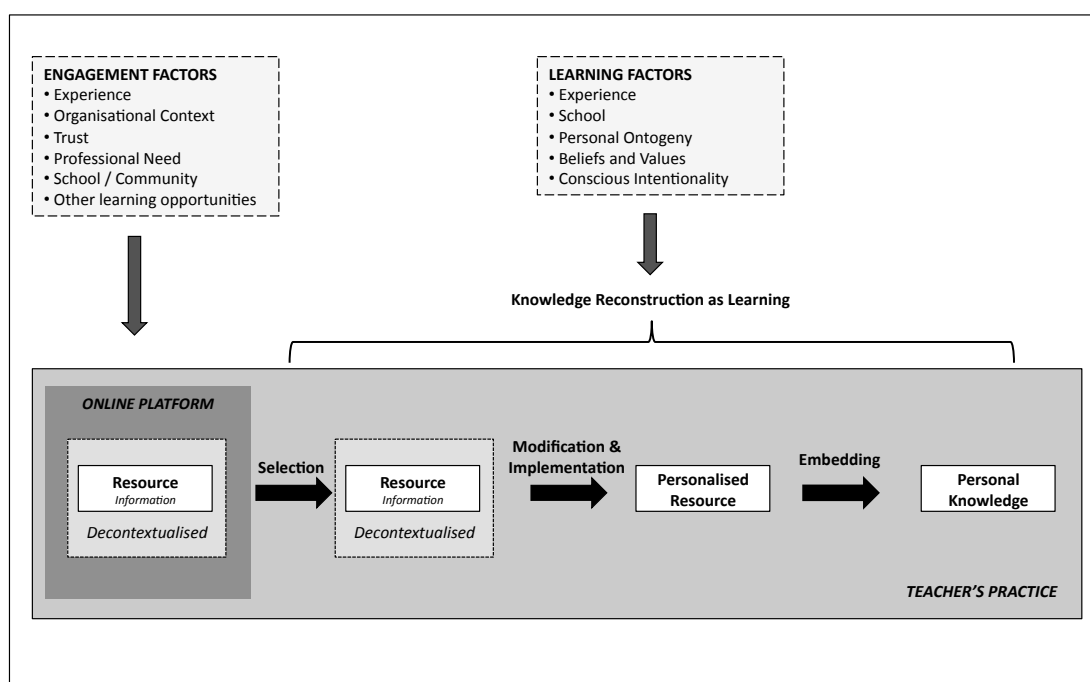


Figure 6.6 Factors influencing the learning and knowledge reconstruction processes

6.5.1 Individual learning

The knowledge reconstruction process and resultant learning are primarily mediated individually. Individual teachers select, modify and implement the resources and extract their knowledge potential without the support or substantial input of other teachers. This is at odds with many previous teacher-based studies, which position socialisation and interaction between users as central for establishing effective online platforms and facilitating knowledge mobilisation (Barab et al., 2001; Dede, 2000; Hew and Hara, 2007, Schlager and Fusco, 2003; Schlager et al., 2009).

The predominance of individual learning reflects the mindset and contexts of the teachers as well as the design of the platforms. The merging of agenda, context and design aligns with Kling and Courtright's (2003: 223) notion that online forums are,

... structured sociotechnically, co-configured not only by the constraints and affordances of the technologies involved but also – and primarily – by social, economic, and institutional factors.

Engagement with the platforms is motivated by individual teachers' knowledge requirements rather than by a desire to cultivate social connections. The structure of the platforms facilitates this user orientation, with knowledge rather than people forming the nexus of engagement. The platforms enable users to engage directly with the knowledge artefacts, by-passing the need to interact with the knowledge creator in order to access

the resources. This results in knowledge being visible and readily accessible on the platforms, while learning remains predominantly invisible, taking place outside the platforms in the cognition and practice of individual teachers.

The platforms offer few opportunities for interaction between users, and when interaction does occur it rarely results in true collaboration or social learning. The discussion forums on TFANet allow teachers to interact with and ask direct questions to other users. However, forum posts typically do not build upon each other and rarely progress to a deeper level of analysis or understanding, a finding consistent with previous studies of online forums (Scardemalia and Bereiter, 2002; Gunawardena et al. 1997; Hara et al., 2000; Larson and Keiper, 2002). The dialogue that occurs on discussion forums and in personal messages sent between users is structured around the immediate knowledge and learning needs of teachers, with users seeking specific advice and support that they can use directly. The just-in-time learning approach adopted by teachers when using the platforms means that they are looking primarily for immediate answers rather than in-depth discussions or social connections. Teachers rarely engage with other teachers on the platforms with the intention of entering into an in-depth collaboration, which results in shared learning and co-constructed knowledge. Instead, teachers want an answer to a specific issue or question that they can assess and internationalise independently. Similarly, teachers answer emails and forum posts to support the learning of other teachers, rather than to develop their own personal learning agenda. Consequently, the learning that arises through online discussions tends to be one-sided and individually mediated, and does not result in true collaboration or shared learning between teachers. Interaction on the platforms reinforces the roles of knowledge supplier and knowledge consumer, rather than establishing teachers as co-creators and co-learners.

Interaction rarely evolved into the development of personal connections or relationships on the platforms. Even on AKO Net, where teachers can engage directly with the resources of a specific teacher, the relationships that develop between teachers generally remain one-directional, with limited reciprocity or sociality occurring. In the majority of cases the knowledge creator remains unaware of the tie created between themselves and another user. Teachers engaged with the resources of specific users primarily as a timesaving measure, to gain a more direct route to knowledge. When teachers did contact other teachers with a specific question about resources, the communication tended to be

limited to a single question-and-answer exchange. Four AKO teachers, who had received emails requesting further information from other platform users, suggested that as the knowledge sharers they would welcome deeper and more prolonged interactions with the users. This implies that the limited interaction is driven primarily by the knowledge consumer, whose focused learning agenda means that they only engage directly with another teacher to receive specific support rather than an ongoing, personal connection.

Two teachers, Chris and Scott, did adopt a more social approach to the knowledge reconstruction process, engaging with specific users frequently in order to gain greater insight and more contextual detail about the resources they were using. This interaction helped to facilitate the knowledge reconstruction process, with additional knowledge being constructed through the online conversations that were occurring around the resources (Eraut, 2004). For both teachers, their online interactions were preceded by and founded upon relationships they first established offline and in-person and then transferred to the online setting.

6.5.2 Online versus offline

The nature of learning occurring when teachers share knowledge between themselves online is different from the learning processes involved in offline knowledge sharing. Teachers recognised key differences between the learning processes they employed when reconstructing information shared online compared with information shared offline and in-person (Haythornthwaite and Kendall, 2010; Matzat, 2010). When teachers shared knowledge in person, learning is typically more social. These differences reflect three aspects of Internet-mediated knowledge mobilisation: (1) the nature and form of the knowledge being shared via the platforms, and the learning this inspires; (2) the mindset of teachers when engaging with the platforms; and (3) how the platform, its design and capabilities structure teachers' engagement and resultant learning.

On the platforms the primary source of knowledge is the individual resources and the explicit knowledge they contain. There are limited opportunities for teachers to exchange tacit knowledge or to provide additional contextual information about the resource and its previous implementation. In contrast, offline knowledge mobilisation primarily is discussion based and is focused largely on the sharing of tacit knowledge. During in-person sharing teachers engage in conversation around a resource, contextualising it and

sharing more of their personal knowledge. In offline contexts knowledge is generated predominantly through the socialisation that occurs around a resource (Eraut, 2004), enabling teachers to share the cognitive load of learning with others (Kirschner et al., 2011). In contrast, on the platforms the resources are the primary knowledge source and teachers have to assess a resource and reconstruct it in their practice individually and independently, with limited recourse to supplementary information or additional support. When reconstructing teacher-created resources offline teachers adopt more collaborative learning approaches, combining the resource with their existing knowledge as well as the personal knowledge and experiential insight of other teachers.

Even when dialogue and socialisation accompanies the knowledge mobilisation process online, the written discussions tend to be shorter and less detailed than their offline equivalents (Gao et al., 2013; Yang and Liu, 2004), with minimal co-construction of knowledge. When communicating online, especially asynchronously, as occurs on both platforms, teachers find it difficult to achieve the same level of detail and specificity that they do in face-to-face conversations. On the platforms teachers do not share a common contextual setting and have limited knowledge of other users' school settings and professional contexts. Consequently, they find it more difficult to provide tailored and personal advice on the platforms. The one exception to this is when teachers engage online with colleagues with whom they have an offline connection. In these circumstances, the foundation of trust and common understanding that is developed offline can be developed and extended online (Haythornthwaite, 2007; Matzat, 2010), encouraging deeper and more collaborative exchanges.

Not only do the minimal interactive provisions on the platforms limit the types of knowledge being shared and the forms of learning occurring, but as mentioned earlier, the platforms in this study do not promote the development of ties or connections between users. Because it is possible to access all of the resources on the platforms directly without forming connections with the knowledge creator, the need for socialisation or social interaction between users is minimal. Consequently interaction and social learning becomes a choice rather than a necessity. The lack of social learning and interaction between users in this study also reflects the mindset of the teachers when accessing the platform. The teachers associate the platforms with providing a quick and easy information source, which facilitates on-demand, targeted learning. Teachers want

the fastest route to the resources and information, which results in their primarily engaging with the individual resources directly. Dialogue and communication between users typically only arises when teachers are unable to find the information they require from the resources alone, or if they have a pre-established, offline relationship with one of the knowledge contributors and use online dialogue as a means for deepening and extending their offline connection.

6.5.3 The role (or lack) of community

For most teachers community appears to play little part in their engagement with the platforms or in shaping and facilitating the knowledge reconstruction process. Teachers do not need to be members of an online community to share or access knowledge on the platforms. Nor does the act of logging on to the platform represent membership of or participation in an online community. The absence of overt community building on the platforms is at odds with common conceptualisations of online platforms in the literature, where community formation is considered fundamental to teachers' engagement (Barab and Duffy, 2000; Dede, 2006; Granger et al., 2002; Hew and Hara, 2007; Lock, 2006; Schlager and Fusco, 2003; Schlager et al., 2009) and communities are framed as the gatekeepers of knowledge online. Community creation is connected closely with the establishment of trust between users, encouraging participation and facilitating the flow of knowledge and ideas between members, and is understood as being fundamental to learning. In the theory of communities of practice it is membership to the online community and the subscription of members to the shared agenda, goals and purposes of the group that facilitates the co-construction of knowledge and social learning. In this study community, as it is conceived in communities of practice, was largely absent from the platforms and common agendas and shared meaning making definitely were not a pre-requisite for knowledge exchange or learning.

Teachers' membership to AKO or TFA appears to provide enough of an underlying community structure to support engagement on the platforms. Organisational membership and the affective commitment it engenders in teachers establish the connections and commonalities between users that normally would have to be developed through community formation online. The pre-existence of organisational ties between users is coupled with the design of the platform to reduce the need for community formation. Because users can access the knowledge resources directly, their dependence

on establishing connections and ties with other users in order to locate knowledge is reduced. The majority of teachers do not rely on specific users to locate resources. When social connections do develop, primarily on AKO Net where teachers can access teachers' profile pages and resources directly, they tend to remain personal connections between two users rather than collaborations between multiple users. The connections facilitate access to knowledge without developing into a shared learning experience or reciprocal knowledge sharing exchange. In many cases one-directional relationships develop without the knowledge provider ever being aware of the connection.

On AKO Net the majority of the ties established between users are extensions of pre-existing offline relationships. It is relatively rare for a relationship where teachers interact with each other, as opposed to just with the resources or knowledge artefacts, to be cultivated solely online through the platforms. Even for Scott, who identified most strongly with the notion of the platforms as online community, his engagement with other teachers did not constitute true community. While he had a number of teachers with whom he engaged, he did so one-to-one, rather than collectively. Consequently, the connections that developed and knowledge sharing that occurred remained personal to Scott rather than communal.

The content communities, particularly those on TFiANet, where interaction between users is facilitated through the discussion forums, have the potential to promote community formation. However, it is questionable whether the forms of engagement and nature of interaction on the content communities represent true community. Definitions of community are notoriously vague; see for example Grossman et al.'s (2000) critique of the indiscriminate use of community in education. As mentioned in Chapter 2, community, as it is developed in relation to online platforms, goes beyond mere groupings of users to suggest the existence of shared knowledge, common beliefs and collective goals among members – what Grossman and colleagues (2000) term the 'assumption of collectivity'. If community does exist between members of a content community, it is founded on weak connections and limited interaction. Teachers tend to engage with the communities sporadically, as and when they have a specific need of the knowledge and support they can provide. The content communities are based more on their bounded virtual setting as a separate page within TFiANet and their focus on a specific subject or grade level, rather than a consistent membership population.

Members of a content community do not 'know' the other members, nor do they engage with the communities in order to form social connections. The content communities operate as a space where teachers can receive more specific and specialised information that they cannot gain from other sources within their practice or from the resource exchange. Teachers use the content communities most often to gain knowledge capital rather than social capital, which is commonly associated with communities (Putnam, 2000). While subject-specific knowledge and advice from other teachers may be the primary motivating need for teachers' engagement with the communities, gaining a greater sense of belonging than what is offered by the resource exchange appears to be a secondary motivating factor for a number of users. Teachers, both active contributors and passive observers, engaged with the content communities to access an additional support network and to connect with other teachers who were going through, or had been through, similar challenges and understood their situation. Reading the discussion posts helped teachers to feel a sense of camaraderie with other teachers. It did not appear to matter whether teachers actively contributed to the forums, as both active and passive members reported similar benefits of engagement (Kollock, 1999; Matzat, 2010).

The sense of connection and the identification of common situations and experiences were particularly important for teachers in isolated regions who had few TFA teachers in close proximity, and for those teachers with limited or no access to an in-person, offline professional community. In these situations the online content communities served as a substitute for offline support. However, when previously isolated teachers gained membership of an offline professional community, their online participation decreased or stopped. This suggests that teachers see the online content communities as a temporary substitute to offline, in-person communities rather than as a more permanent replacement. Similarly to how the nature of learning shifts between offline and online contexts, so too do the outcomes and benefits of being part of a teaching community. The nature of engagement and interaction is altered when communities are transferred or created online.

While the content communities provide some teachers with a heightened sense of belonging and provide access to more specialised knowledge and greater support than that provided by the resource exchange alone, the way that the knowledge reconstruction process operates and learning occurs via the content communities remains consistent

with earlier descriptions. The platforms are not socially orientated and learning remains primarily individual and knowledge construction personal. Personal relationships and social ties do not facilitate the flow of knowledge online nor do social interconnections facilitate the learning process. Engagement and resultant learning generally are not premised on collective learning or a shared agendas (Lave and Wenger, 1991), or reliant on meaningful relationships and mutual interdependence between members (Barab and Duffy, 2000).

The absence of communities of practice on the platforms in part relates to how teachers approach the content communities. Discussion posts follow a question-and-answer formula, with prolonged dialogue that builds upon previous posts rare. When teachers post on a forum they do so to get a quick answer to a specific question, rather than to engage in an ongoing discussion or collaborative knowledge building. Similarly, when users answer a question, while their motivation is to help support a fellow teacher, their engagement stays impersonal. Though the teachers are connected by the subject that they teach and their grade level, they are not seeking to create a combined or collective practice or to engage in joint activities and shared learning. Teachers engage as individuals and the benefits they receive from their engagement are understood and constructed individually.

Knowledge rather than people is the foundation of engagement, and individualism rather than collectivism defines user engagement. This reflects the notion of networked individualism (Castells, 2004 and 2005; Wellman, 2001, 2002; Wellman et al. 2003).

Castells contends that,

Individualism [is] the dominant culture of our societies, and the new communication technologies perfectly fit into the mode of building sociability along self-selected communication networks, on or off depending on the needs and moods of each individual. So, the network society is a society of networked individuals. (Castells, 2005: 12)

This view of networked individualism is quite different to the socially orientated view of networks frequently presented in the education literature. While the platforms are not conceptualised in this study as networks, primarily because the methods typically associated with network theory studies were not well aligned with the research design and aims of this study, they bear resemblance to Castells' vision. Individual teachers, each with their own needs and agendas use the platforms platform to connect with knowledge artefacts and other teachers to support their practice and professional learning.

Engagement and learning both occur without the establishment of a community of practice.

6.6 The theoretical model

The proposed framework [Figure 6.7] provides an alternative model for how to think about Internet-mediated knowledge mobilisation, the knowledge that is produced and the learning that occurs through the reconstruction process. It emphasises the connection between offline and online contexts and the role the platforms play in breaking down the boundaries between teachers' school-based practice and online resources and learning opportunities. The framework encapsulates the combining of the individual and their contexts of action, together with the platform and the information and knowledge it contains, to determine and shape the operation of the knowledge reconstruction process and the learning that transpires.

The various elements of the proposed framework come together not only to shape the knowledge reconstruction process but also to influence teachers' learning and practice. Internet-mediated knowledge mobilisation facilitates the development of teachers' personal, practical knowledge. It provides insight into the work and tasks of teachers, providing examples of instructional strategies and planning designs, which when used by teachers enable them to develop their teaching-specific knowledge. The platforms expose teachers to new ideas and perspectives, supporting the expansion of their propositional structures and knowledge base, as well as enriching their episodic knowledge. Access to relevant, teacher-created materials increases the efficiency and effectiveness with which teachers can undertake elements of their practice, while also promoting the development of new knowledge and engagement in learning opportunities. The Internet, as a knowledge mediator, opens up new possibilities that are not available in teachers' offline contexts. Not only does it break down boundaries between teachers, but it also collapses boundaries between the various settings of teachers' professional practice and learning, effectively merging the offline and online contexts of teachers' work. The dual contexts of the platforms offer specific affordances that help to shape teachers' engagement, while also acting to promote new learning processes that do not exist in offline knowledge mobilisation.

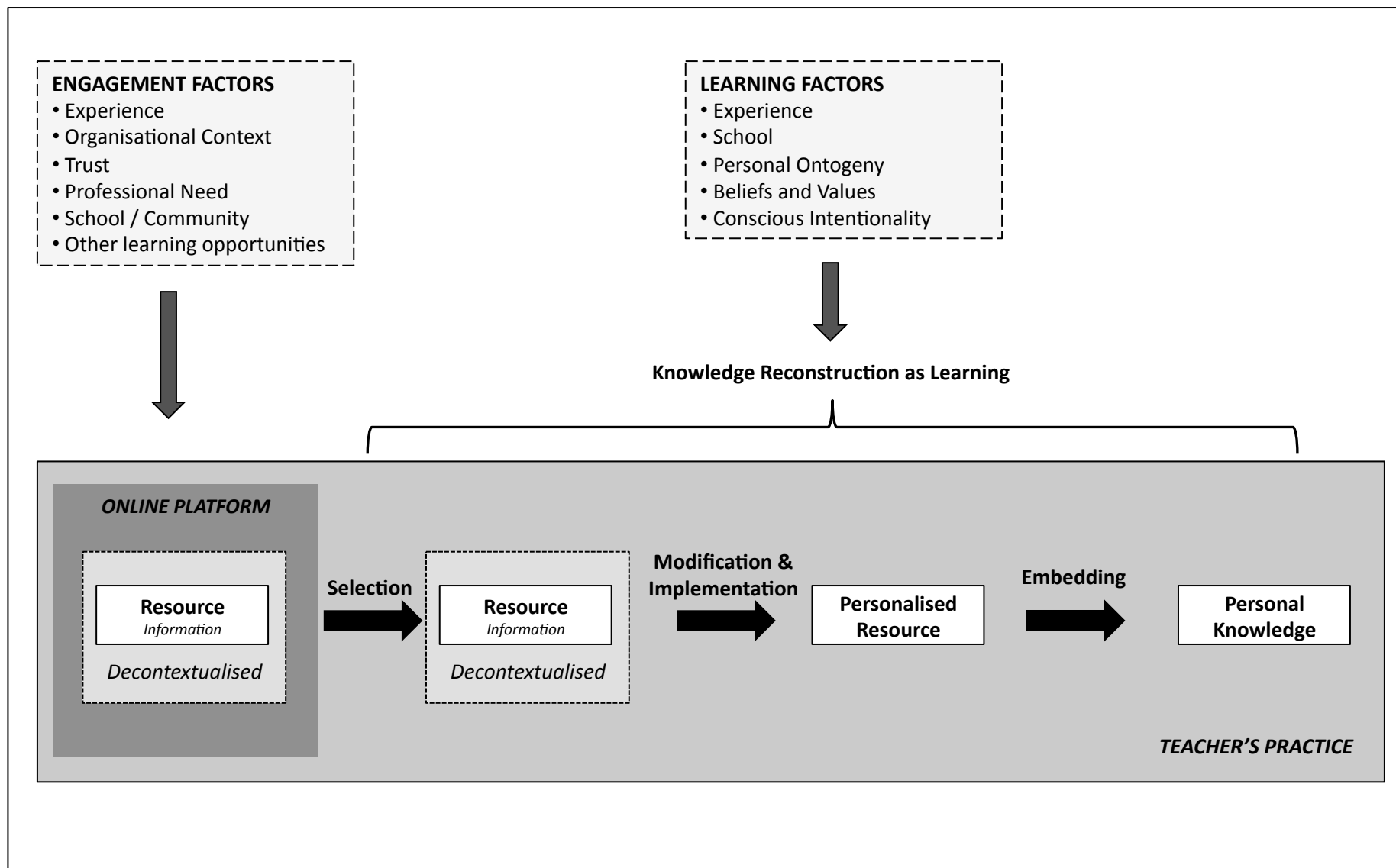


Figure 6.7 Theoretical framework of Internet-mediated teacher-to-teacher knowledge mobilisation

Chapter Seven: Conclusions

This study has demonstrated the need for a new way to think about Internet-mediated knowledge mobilisation. One that not only questions the current dependence on social network theory and communities of practice but also captures the entire spectrum of the knowledge mobilisation process, from engagement with the platforms and the information they contain through to the implementation of this information in practice and the learning these processes inspire. The theoretical model presented in the previous chapter situates online platforms and the learning they support within the wider contexts of teachers' professional lives. Engagement and learning are interpreted not as separate entities, isolated from external influences and offline settings, but rather integrated with and shaped by the wider lives and contexts of teachers' work. The framework facilitates new conceptualisations of how users individually and collectively engage with online platforms, together with new observations on the nature of the learning arising from teacher-to-teacher Internet-mediated knowledge mobilisation. It further enables fresh insight into the types and forms of knowledge teachers both require and produce in and for their practice, and importantly the factors that shape teachers' capacity to utilise ready-made resources and to construct new knowledge.

This chapter builds upon the findings and discussion chapters to present the overarching themes and arguments that have emerged from this study. The conclusions are organised into five sections, each representing a key idea: (1) The connection between online and offline contexts; (2) the nature of resources and knowledge; (3) the role of experience; (4) knowledge reconstruction as learning; and (5) the nature of learning. These are brought together and framed by the theoretical model constructed to conceptualise the nature of knowledge and learning in teacher-to-teacher Internet-mediated knowledge mobilisation. In conjunction with presenting the key conclusions, this chapter explores the ideas and further questions that arise from the findings and considers how future research efforts could help to provide deeper insight and understanding of these areas.

The conclusions combine analytical generalisations relating to the theorisation and interpretation of teacher knowledge and learning with more specific observations related to and reflecting the unique nature of the two cases, TFA and AKO, their online platforms and teaching populations. The teaching populations of the two cases in this

study make the platforms with which they are engaged particularly rich research sites. The findings suggest that the organisational cultures of TFA and AKO and the systems and processes that they employ play a role in shaping how and why their teachers engage with the platforms. This was particularly true for the engagement of beginner teachers in the study. Though the manifestations of engagement and learning as they emerge in this study may be particularly connected to the two cases, AKO and TFA, the broader themes and conceptualisation of the processes involved in Internet-mediated knowledge mobilisation are relevant to a broader cross section of teachers and online platforms. The conceptualisation of the key phenomena in this study – knowledge and learning – may be generalised to and used to measure and understanding multiple teacher populations.

7.1 Online and offline intersection

Online platforms are dually situated, both online and within teachers' school-based practice. The platforms, together with teachers' engagement with them, are intimately connected with and must be understood in reference to both the online and offline contexts in which they operate. Each setting provides unique affordances that shape engagement and outcomes, with the combining of contexts facilitating the extension of the socio-cultural context of teachers into the online setting. The collapsing of boundaries between the online and offline settings of teachers' work and learning enables knowledge to flow more freely between the two spaces.

The online setting facilitates teacher-directed, anytime and anywhere learning, which is targeted and personalised to the individual user's immediate needs. The affordances of the online platforms offer possibilities for action, which individual teachers must negotiate. Because teachers control their own engagement they have a greater ability to tailor their experience to suit their specific knowledge and learning requirements. Teachers further have the option to reach beyond the confines of their immediate school setting to engage with the resources of a broader cross-section of teachers. These affordances, whilst powerful enablers and shapers of teachers' engagement and learning in their own right, gain greater influence when the platforms are simultaneously embedded within teachers' offline, professional contexts.

Teachers conceptualise and utilise online platforms as a workplace tool, which is embedded within their professional routines and contexts and is intricately connected to

their daily tasks. The positioning of platforms as part of practice has important implications for how learning is constructed and perceived by teachers and more broadly for how teachers assess the usefulness and purpose of the platforms and their resources. The platforms are entrenched in teachers' day-to-day work. They operate as one resource within a teacher's wider collection of tools, which supports them in their planning and preparation and in extending the scope of their instructional practice. The absence of an explicit or purposive learning agenda, and the typically informal and ad hoc way in which teachers engage with the platforms, means that learning occurs as a by-product of engagement. Learning is situated in the contexts and acts of teachers' practice. It is largely unintentional and the new knowledge teachers construct is conceptualised not as evidence of learning having occurred but rather as part of their general capabilities and expertise.

The interplay between online and offline is critical for interpreting the nature of, and reasoning and motivation behind teachers' engagement as well as the operation of the knowledge reconstruction and learning process. Situating the platforms within teachers' primarily school-based practice and conceptualising them as a work-based tool breaks from typical portrayals of online platforms in the literature. Rather than studying online platforms as formal professional development interventions, which are located outside of teachers' practices and applied to teachers, in this study teachers are placed in a position of control. Engagement with the platforms is reactive and informal, occurring spontaneously in response to a particular work issue or professional need. Internet-mediated knowledge mobilisation is embedded within and functions as part of a teacher's practice rather than as a separate learning intervention. This collapsing of boundaries between the online and offline contexts of teachers' work represents broader trends surrounding the intertwining of the Internet with everyday activities. Engagement with the Internet to troubleshoot or to find knowledge is increasingly becoming a routinised behaviour for many people, with the learning and new knowledge they gain from their actions interpreted as an everyday activity rather than a specific episode of learning.

Despite the merging of online and offline settings, important differences exist between the nature of Internet-mediated knowledge reconstruction and offline, in-person knowledge reconstruction. In-person teacher-to-teacher knowledge mobilisation is focused predominantly on the socialisation that occurs around a resource. Knowledge is

shared through discussion and the sharing of personal stories and experiences. In contrast, Internet-mediated knowledge mobilisation, such as it occurred in this study, was primarily individually mediated, as teachers independently searched for, selected and implemented resources from the platforms, without recourse to supplementary, contextual information or input from the resources' original creators. While teachers appreciated the quick and constant access to resources the platforms facilitated and used them in order to receive the immediate gratification and support they provide, they also realised that the experience and product they received differed from, and in most cases was considered inferior to, the information they obtained from in-person knowledge mobilisation.

Interpreting the platforms as dually situated has important implications both for future research into Internet-mediated knowledge mobilisation and the construction and design of online platforms. Similarly to the critical approach (Oliver, 2011; Selwyn, 2010), this study advocates examining online platforms *in situ*, incorporating the contexts of both the platforms as well as their users. Developing context-rich studies and analyses of Internet-mediated knowledge mobilisation enables the knowledge teachers construct and the learning outcomes they derive to be determined not only by the technologies themselves but also by how teachers use them in the contexts of their practice. This perspective has important implications not only for future research but also for the design of online platforms. By understanding how teachers approach information and resources shared online more fully and the processes they move through when reconstructing new knowledge in their practice it is possible to implement strategies, both design-based and process-based, that support teachers to make best use of Internet-mediated knowledge mobilisation.

7.2 Reconceptualising teacher-created resources

The resources on the platforms embody and exemplify the knowledge that teachers develop in their teaching practice and for their practice. In contrast to typical conceptualisations of the knowledge teachers develop in and through their practice, which focus primarily on the intangible and tacit nature of this knowledge, the resources shared on the platforms present knowledge in a tangible and static form. It is the ability of the resources to capture and present elements of teachers' personal professional knowledge as physical artefacts that makes them particularly beneficial and instructive to

teachers. Teachers perceive them as holding greater validity and authenticity because they have been developed and previously employed in the instructional setting and consequently are imbued with a teacher's tacit knowledge, while the resources' tangible and static nature allows them to be more easily disseminated.

The resources support teachers in knowing both what to teach and how to teach it. In line with the findings of previous research (Ball and Cohen, 1996; Ben-Peretz, 1975; Brown and Edelson, 2003; Davis and Krajcik, 2005), this study has found that the resources provide teachers with specific, episodic knowledge as well as general, abstract knowledge. The resources supply teachers with specific strategies and targeted information to apply to a particular situation arising from their practice, resulting in the development of episodic knowledge. Through the embedding process, as teachers make connections between the individual resources and their existing knowledge, they are also able to develop their general knowledge of and for teaching. In this way the resources not only potentially promote the creation of both specific and general knowledge but also teachers' ability to move freely and flexibly between the two categories, applying abstract knowledge to specific ideas and recognising how a particular episode or situation relates to their broader knowledge of practice and pedagogy.

The roles the resources play in teachers' practices and the forms and types of knowledge they represent strengthen claims for the importance of teacher-created knowledge in supporting other teachers and the need to encourage collaboration and the sharing of knowledge among teachers. Teacher-created planning resources and teaching materials afford insight into the ways teachers structure and apply their knowledge within their work, providing valuable exposure to the roles of teachers and the actions and processes they undertake. This in turn helps to further the argument that teaching requires specific knowledge, which is unique to the profession and its tasks. This study goes beyond the promotion of the importance of teacher-created knowledge as a whole, to suggest that different groupings of teachers not only require different types of knowledge but value and engage with the resources on the platforms in quite different ways. For example, beginner teachers with their lack of teaching specific knowledge and limited experience in the classroom benefit from engaging with ready-made, teacher-created resources that support them in transforming their existing knowledge into the forms of teaching-specific knowledge required in the classroom in order to teach particular skills and topics.

They further facilitate the construction of new episodic and abstract knowledge that contributes to teachers' professional knowledge base.

The effectiveness of teacher-to-teacher knowledge mobilisation relies not only on the supply of resources but also on the supply of the 'right' resources. The 'right' resources refers both to high quality material as well as to the ability of teachers to identify the right resource for a particular situation, something that many beginner teachers in particular struggled with. More attention is required to determine how the quality of user-created materials shared on online platforms can be effectively assessed and communicated to users as well as to how the resources can best be designed to ensure maximum impact on teachers' learning and development. Teachers' self-identified perceptions of the impact that the resources had on their practice, captured in both the interviews and the journal logs, provided rich data on how teachers were conceptualising and utilising the resources. Having established this critical foundational understanding of the roles the resources play in teachers' practice, it now would be interesting to examine now how these perceptions evolve over teachers' careers. Tracing how teachers engage with the resources over an extended period of time and the impact their engagement has on their pedagogy and practice as well as their students' learning outcomes, would provide valuable insight into the role of ready-made resources in teachers' development. Given the differences in engagement and behaviour between beginner and more experienced teachers identified in this study, it would be useful to follow beginner teachers from their first engagements with the platforms through their first years in the classroom.

7.3 Experience matters

Individual teachers determine how they engage with the platforms and their resources. Their engagement is situated within their knowledge and experiential trajectories, informed and shaped by their personal histories, professional contexts and needs, and their learning agendas. A teacher's years of teaching experience proved particularly important for shaping how and why they engage with the platforms and what they construct from their actions. Experience not only shapes teachers' knowledge needs but also how they conceptualise, utilise and reconstruct new knowledge. Recognising the roles that experience plays is important for understanding the relationships between teachers' attitudes towards and interactions with knowledge and Internet-mediated

knowledge mobilisation as well as the learning outcomes they construct from their actions.

Beginner teachers had the greatest need for the types of resources available on the platforms. Their more limited personal and pedagogical content knowledge and their lack of experience in the classroom means that many struggle to discover how best to perform their roles. Their less developed cognitive schema makes it more challenging for them to organise and interpret new ideas, resulting in their less structured engagement with the platforms. Beginner teachers also tend to be more reactive in their engagement, focusing on short-term planning and the fulfilment of immediate needs. In contrast, more experienced teachers typically have less frequent need for the types of resources available on the platforms and engage more sporadically. Their engagement also tends to be more structured and discerning, using the resources to refine and expand their personal knowledge and to develop greater multiplicity in their practice. The changing patterns of engagement of teachers as they gain experience are matched by a change in their fluency and ability to reconstruct the resources. Teachers' absorptive capacity is linked with experience. As teachers gain experience in the classroom and become more familiar with the acts of teaching, they are able to identify useful resources and to integrate new knowledge into their practice more effectively and efficiently. Beginner teachers, in contrast possess weaker frameworks and often have to modify and elaborate their cognitive structures when implementing new resources, making knowledge reconstruction a more challenging and time-consuming process.

The role of experience in shaping teachers' engagement with resources and the fluidity of the knowledge reconstruction process, while not originally anticipated, has emerged strongly from the data. The importance of experience is magnified in this study by the nature of the two cases. The teaching populations of TFA and AKO exhibit key differences from the general population of teachers in the USA. TFA and AKO both have a high percentage of early career teachers as well as a majority of teachers (all at TFA) with limited initial teacher education and training. Their teachers enter the classroom with little instructional experience and limited teaching-specific knowledge, resulting in many relying heavily on resources that can support them in developing the necessary understanding of and knowledge for their roles and tasks as teachers. The platforms represent one such resource. With the quick, anytime access they provide to

ready-made, trusted resources, they are particularly valuable tools for beginner TFA and AKO teachers.

The identification of the weaker knowledge reconstruction skills of the beginner teachers in this study adds weight to the claims of other studies suggesting that TFA teachers during their first two years in the classroom are less effective at supporting student learning (Darling-Hammond et al, 2005; Glazerman et al., 2006; Heilig and Jez, 2010; Kane et al., 2006). These teachers' limited basic knowledge of and for teaching and their lack of previous experience in which to ground their new knowledge not only make their job more challenging, but also make these teachers less confident. These findings are particularly relevant in the US context where debates around initial teacher education and alternative teacher certification are intensifying. While studies have examined beginner teachers' impact on student achievement, few have specifically explored how a teacher's knowledge influences their performance. The findings of this study suggest the need for greater attention to be given to examining how different teacher training programmes influence teachers' accrual of teaching specific knowledge and how this in turn shapes both teachers' performance and practice during their first years in the classroom as well as their subsequent engagement with learning opportunities. And though greater attention is being paid to the knowledge and skills teachers require in order to be effective practitioners (see Green, 2014 for an overview of these attempts) there remains much uncertainty about exactly what teachers need to know and to be able to do when they enter the classroom and how best to prepare them for their work.

Beginner teachers' greater difficulty in reconstructing knowledge found on the platforms in their practice leads to questions about the skills teachers require for their work. The stories of more experienced teachers collected by this study suggest that knowledge reconstruction is a learned skill, which is developed over time through experience and trial and error. While learning from experience has long been held to be one of the foremost ways of learning how to teach, this study suggests that beginner teachers would benefit from additional guidance on how to reconstruct new knowledge in and for their practice. This study was able to determine differences in the knowledge reconstruction process between beginner and more experienced teachers; however, there was no way to trace the evolution of improvement in teachers' abilities over time other than relying on teachers' retrospective accounts. By observing and tracing the development of teachers'

ability to reconstruct knowledge it would be possible to identify the factors that both facilitate and hinder this process. This would provide valuable data for developing new training and support opportunities for teachers.

The declining frequency of engagement by more experienced teachers raises questions about the range of knowledge and activities facilitated by Internet-mediated knowledge mobilisation. While the teacher-created resources on the platforms in this study continue to remain valuable to teachers in particular circumstances, more thought needs to be given to how Internet-mediated teacher-to-teacher knowledge mobilisation can be structured to provide greater support to more experienced teachers. Consideration also should be given to how Internet-mediated knowledge mobilisation can not only strengthen teachers' existing knowledge structures but also support the reorientation and transformation of teachers' practice.

7.4 Knowledge reconstruction

Learning occurs through and from the knowledge reconstruction process. It arises out of the cognitive processes and actions of teachers as they reconstruct a resource in the contexts of their own practice. Though different types of learning occur at each of the three stages of the knowledge reconstruction process – selection, modification and implementation and embedding – two processes permeate and shape the entire process: personalisation and localisation. Successful knowledge reconstruction requires that teachers personalise resources, adapting them to their personal teaching style and instructional needs, and localise resources, making them appropriate for and applicable to their school and classroom contexts as well as meaningful and relevant to their students. The importance of personalisation and localisation to the knowledge reconstruction process emphasises the need for teachers not only to select carefully resources that are aligned with their needs and context but also to modify and adapt resources, further fine-tuning them so that they best facilitate student learning.

Personalisation and localisation require that teachers not only have a good grasp of knowledge for teaching but also intimately know themselves and their school contexts so that they can apply and implement new information and resources effectively. It is less the physical artefacts than how individuals elect to engage with and modify them that determines the impact of knowledge reconstruction. So while having access to high

quality materials is essential, the onus is on individual teachers to implement them effectively in their practice. This reinforces the importance of both knowledge transfer and knowledge transposition in the knowledge mobilisation process. While commonalities in school contexts and student populations between the teachers using TFANet and AKO Net helped to reduce the transposition ‘distance’, personalisation and localisation continued to remain pivotal building blocks in the knowledge reconstruction process.

The overall weaker knowledge reconstruction skills of beginner teachers and their struggle to identify not only their own needs and the types of resources they require but also to comprehend the needs of their students adequately, reinforces the role of experience in shaping teacher learning and practice. It further calls into question how teacher training and ongoing professional learning should be structured to ensure that teachers gain the necessary knowledge and skills to allow them to undertake their practice effectively. It is not just the limited training period of TFA teachers and many AKO teachers that is important in this instance but also the limited exposure these teachers have to actual classroom contexts and hands-on teaching experience before they enter the classroom as fully fledged teachers. While teachers can be taught the principles of localisation and personalisation, these processes can only be fully learned, applied and developed in practice. Before teachers can reconstruct knowledge effectively they must first understand their own teaching style and knowledge needs and the unique nature of their school environment and students. This knowledge can only be learned only in the school setting and must be relearned with every new class and in each new school. Beginner teachers quickly identified the need to personalise the resources they were using; however, the process of learning how to shape and apply these resources effectively in their unique instructional settings only developed over time through experience. The need to situate the learning of how to personalise and localise resources and knowledge within instructional settings suggests that in-school learning and the use of mentors who are familiar with a teacher’s specific school context could be particularly beneficial to beginner teachers.

The role of personalisation and localisation in shaping teachers’ use and reconstruction of curriculum materials is important in the light of current movements in the USA, especially among charter schools, to standardise teaching materials and lesson plans. This

movement was apparent, to a small degree, in the introduction of the feature teacher initiative on AKO Net, where one teacher produced the teaching curriculum to be followed by all teachers of that grade and subject. While participants recognised that the feature teacher initiative did provide accessibility to trusted and generally high quality resources, they also wanted to retain flexibility when engaging with the resources and to have the option to continue to design their own instructional materials and programme. The findings of this study suggest that it is important for teachers to retain autonomy and the ability to personalise lessons and materials in order to make them relevant and meaningful to their local context. Similarly, teaching resources and classroom materials must be flexible and readily adaptable to the unique classroom context of each individual teacher.

7.5 Nature of learning

Knowledge rather than people forms the nexus of engagement and learning on the two platforms in this study. Users are not reliant on other users to identify or access resources or to facilitate the learning process. Consequently, engagement and knowledge reconstruction are primarily individually mediated. While teachers engage with the platforms in order to access resources and ideas from a broader cross-section of teachers than they have access to in their individual schools, and engagement is often motivated by the absence of a strong in-person professional community, engagement does not primarily revolve around socialisation and interaction nor does it result in community formation.

Individualism is the dominant mode of engagement in this study. The emergence of the individual as the primary actor indicates the need for new ways for thinking about and conceptualising Internet-mediated knowledge mobilisation, which do not rely on the construction of a social network or community of practice between users to facilitate learning. The new theoretical model proposed in Chapter 6 provides not only a new perspective, which downplays the roles that communities and social ties play in mobilising knowledge, but also provides a more flexible lens for interpreting online spaces and the types of learning they facilitate. The new model does not reject the potential role of socialisation or community formation but rather does not default to them as the primary mode of interpretation. The disintermediating power of the Internet gives control to the individual teacher to regulate not only how and when they engage

but crucially to determine the outcomes they construct from their actions. Consequently, the online platforms are understood principally not in relation to the effects they have on users but rather on how users choose to engage with and take advantage of what they offer. More research could benefit from adopting this interpretative approach, focusing less on the affordances of technology and more on understanding how people conceptualise the technology within their contexts of actions. Developing a more robust understanding of how both social and technical elements influence teachers' engagement and resultant learning should also play a greater role in the design of online platforms. This would facilitate closer alignment between designer's intentions, platform design and outcomes of engagement.

The predominance of the individual mediation of knowledge in this study reflects both the structure of the platforms and the mindset of teachers. The design of the platforms enables users to engage with knowledge artefacts directly, by-passing the need to interact with the resource's creator in order to gain access and results in the individual user as the primary unit of action. The dominance of the individual in the knowledge mobilisation process, however, also reflects the predominant mindset of teachers using the platforms. Teachers engage with the platforms to gain a quick solution for an immediate issue they are facing in practice and consequently take the most direct route to the information they require. Because engagement is motivated primarily by knowledge needs rather than by the desire to cultivate social connections, even when interaction and online discussion does occur between users it rarely resulted in true collaboration or two-way learning. Interaction continued to be centred on individual mediation rather than the collective, social construction of knowledge.

Just as engagement and learning do not require the development of social interaction or meaningful connections between users, the act of logging on to the platform and utilising resources does not represent community formation. True community denotes more than just an oblique sense of connectedness between individuals founded on the decision to use the same online platform. It requires meaningful, mutually beneficial interaction and the establishment of more personal connections between individual users and groups of users, which are based around the adoption of a shared learning agenda and common needs. In contrast, on both TFANet and AKO Net teachers continue to operate

primarily as individuals, with their personal needs and unique learning agendas guiding their actions and taking priority over common goals and community obligation.

Despite the absence of true community on the platforms, community-oriented ideas are essential to, and underpin teachers' engagement with both platforms. Teachers trust the platforms and their resources because they are administered by TFA and AKO. Teachers possess strong organisational affiliation. They exhibit affective commitment towards the educational missions of TFA and AKO, with much of their professional identity stemming from their membership of these organisations. And while teachers do not engage in much community building behaviour on the platforms, they still feel a sense of kinship and camaraderie with other users because of their offline, organisational connection. The platforms provide an additional level of connection to the organisations. However, this offline connection does not necessarily translate into online community or shared purpose and collective learning agendas between users. In both the cases, teachers' primary affiliation and connection is to the organisations rather than to their members and a similar dynamic is established online. Teachers trust the platforms and their resources because they are operated by TFA and AKO. This overriding trust in the officiating organisation and the services they provide reduces teachers' need to establish trust and personal relationships with individual platform users.

The importance of organisational affiliation and offline connection between users to the development of trust in the platforms, their resources and other users raises a number of questions about how these factors manifest and influence engagement on other online platforms that are not affiliated with a specific organisation or pre-existing teaching group. In order to develop and consolidate the theoretical model proposed in this study it is necessary to ask further questions about how teachers establish trust on a platform where they do not have a pre-existing connection developed offline. Do teachers experience the same feelings of belonging and connection in these settings? And with the absence of pre-existing, underlying trust and connection, does interaction between users and the formation of online communities become more important? Is the prevalence of individualism in this study not just related to the design of the platform and the mindset of users but also result from the connection and organisational affiliation that exists between members and the platform provider? The social shaping of technology approach, which has been embraced by this study, provides a means for further

questioning of how teachers' contexts of action shape both how they engage with and what they construct from the opportunities presented on the platforms, including the intersection of trust, individualism and socialisation.

This questioning of the relationship between trust, organisational affiliation, individualism, community formation and socialisation raises a broader area for consideration. The theoretical framework created here needs to be tested and investigated in relation to other online platforms and sites of teacher-to-teacher Internet-mediated knowledge mobilisation. The model is designed to allow for flexibility, positioning knowledge mobilisation as a dynamic process involving and shaped by a range of interrelated factors. By identifying the factors that appear to shape user engagement and knowledge reconstruction and learning most strongly, this study provides a strong foundation for future research into Internet-mediated teacher-to-teacher knowledge mobilisation. It was necessary for this study to identify and delineate the processes and factors involved in knowledge mobilisation before this research could be undertaken. Future research should focus on further understanding the degree of importance and the interrelatedness of each factor identified in this study for promoting teacher engagement and learning outcomes. Alongside more qualitative work, undertaking a large quantitative study of Internet-mediated knowledge mobilisation and employing statistical modelling to analyse the data would enable the identification of the significance, links and degree of correlation between the factors.

The role of the factors must further be considered in relation to the contexts within which the platforms and their users are situated. While the platforms have unique affordances, which play a role in structuring teachers' engagement and learning outcomes, engagement and learning outcomes must be understood and interpreted within the wider contexts of both the platform and teachers' practices. The findings of this study illustrate how subtle differences in design between the two platforms shape the engagement of teachers as well as how differences between the organisational structures and operation of TFA and AKO and the variation between teachers' professional contexts influence engagement and the impact this engagement has on teachers' practice and professional learning. Using the model created in this study to investigate the operation of a wider range of online teacher platforms will help to confirm the ideas and conceptualisations

being proffered here as well as opening up new possibilities and approaches to Internet-mediated knowledge mobilisation.

7.6 The importance of teachers in knowledge mobilisation

The teacher-to-teacher knowledge sharing opportunities available on the platforms in this study provide teachers with exposure to a range of relevant and practice-based materials that can support them in the development and extension of their practice and teaching knowledge. The platforms represent a step towards Hargreaves' (1999) proposal for teachers to be central players in the creation, application and dissemination of professional knowledge about what works in schools and classrooms by placing control for the mobilisation of this knowledge in the hands of teachers. However, an important theme emerging from this study is that it is not enough just to provide opportunities for knowledge mobilisation and resource sharing. The learning and knowledge-creating potential of teacher-made resources is realised only through teachers' participation in the knowledge reconstruction process. Teachers must engage with the resources actively, using them as a framework for creating their own personalised knowledge that is relevant to their local settings. It is through the processes of selection, modification, implementation and embedding that new knowledge is constructed and learning occurs. Consequently, it is necessary to go beyond the provision of a mechanism for mediating knowledge sharing, to equip all teachers with the skills and competencies to enable them to utilise and reconstruct knowledge in and for the specific contexts of their practice.

The complex and multifarious relationship between offline and online contexts that has emerged from this study has important implications both for the design and employment of online platforms and also more generally for understanding how teachers perceive and operate in their practice. The potential ability of the Internet to break down geographical and temporal boundaries and to connect people with a wide range of ideas and knowledge sources is well established. What this study shows is the further potential of the Internet to collapse the division between different contexts of operation, enabling teachers to situate their practice simultaneously online and offline. This acts to extend the socio-cultural context of teachers' practice, opening up new informal learning opportunities, and situating teachers' professional learning and practice across multiple settings.

Schools, together with teachers' professional learning and instructional practice, must be adapting and developing constantly in order to serve the learning and knowledge needs of students best and to prepare them to become meaningful contributors to society and the economy. For these changes to be successful teachers must play a central role in shaping and fulfilling the evolving schooling agenda. Teachers possess important knowledge for determining and developing this agenda and hold considerable power to effect change within the classroom. Teachers can and must be active players in the creation and dissemination of their knowledge with other teachers, as well as contributing their knowledge to wider conversations about the future directions of education and schools more generally. The Internet and online platforms provide a valuable means for connecting teachers and facilitating the sharing of their knowledge and ideas. More thought now needs to be given to how the potential of the Internet as knowledge mediator and teachers' personal, practical knowledge can be combined to promote greater professional learning opportunities for teachers as well as advancements in teaching and learning.

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APPENDICES

Appendix A: Pre Survey

Initial Survey To Teachers

Basic Details

1. Name
2. Age
3. Grade level(s) taught
4. Subject(s) taught
5. How many years have you been teaching?
6. Please list any additional positions of responsibility that you hold at your school
7. School Name
8. Town/City and State

Contact Details

9. Phone number
10. Email Address

Use of Platform

11. How often do you log onto TFANet?
12. How often do you look for teaching resources on TFANet
13. How many learning communities do you engage with on at least a monthly basis?
14. How often do you access your most commonly used learning community?
15. Have you uploaded any resources to TFANet over the past year?
16. If yes, approximately how many resources?
17. Have you asked a question on TFANet during the past year?
18. Have you answered a question or contributed to a discussion forum on TFANet?
19. Have you used any other teacher resource sharing websites during the past year?
20. If yes, which websites?

Consent

By consenting to participate in this research study you are agreeing to participate in:

- An in-person interview
- A follow up interview via skype (or similar)
- Completing a 5 minute survey each week for 8 weeks about your use of TFANet
- Both interviews will be audio recorded. The audio recording will be for the researcher's use only and will not be shared with any other parties.
- The data collected from this research will be anonymized. It will be used for my doctoral dissertation and potentially for journal publications. Anonimised data will be shared with TFANet.
- TFANet has reviewed and endorsed this project

Appendix B: Letter to Teachers



University of Oxford

Department of Education

15 Norham Gardens, Oxford OX2 6PY

Dear AKO teacher,

My name is Nina Hood. I am a researcher at the University of Oxford in England. My research is examining how the Internet can facilitate teacher-to-teacher knowledge sharing and I am investigating how AKO Net supports teacher knowledge exchange.

I am writing with the hope that you might be interested in participating in my study and sharing with me how you are using AKO Net and how it impacts your classroom practice and professional learning. The study is being undertaken between September and December 2013. Participation will consist of 2 interviews, scheduled at the teacher's convenience. The first interview will take place in person, while the follow-up interview will be via phone, skype (or similar). I will also ask participants to take a 5-minute survey once a week for 7 weeks recording how they have used AKO Net that week. You will receive your choice of either an Amazon gift card or a Starbucks gift card for your participation.

Surprisingly little is known about how teachers share knowledge in online environments, how teachers adapt this knowledge to their particular classroom contexts, or the impact that this has on teachers' practice and professional learning. This study, which is supported by AKO, will enable us to learn from practitioners, such as yourself, in order to maximize the impact that online teacher networks have as sites for knowledge sharing and collaboration among teachers.

I know how hectic your days are but it would be fantastic if you could consider participating in this research project. Please contact me if you would like to discuss the study further or would like to connect about participating in the study.

Best wishes,

A handwritten signature in black ink, appearing to read 'Nina Hood'.

Nina Hood
nina.hood@education.ox.ac.uk

Appendix C: Interview Schedules – First and Second Interviews

First Interview Schedule

Part One: Use of Platform

- Can you tell me a bit about how you use TFANet?
- What types of knowledge or resources are you looking for on TFANet? (content, pedagogical, classroom strategies)
- How do you select what resources you're going to look at or use?
- Do you use the videos?
 - How would you contrast the knowledge and learning from videos as opposed to written resources?
- How important is the reliability of the material on TFANet/ how do you establish trust of the resources?
- Can you tell me a bit about the resources that you've shared on TFANet?
 - What were they and did you have to modify them before sharing?
 - Motivations for sharing
- Have you posted any comments, asked or answered a question or rated a resource?
- How do you think your use of TFANet has changed over your teaching career?
- Do you use TFANet to connect with other people in TFA teachers?
- How does TFANet connect with to your engagement with TFA as a whole?
- How important is it that TFANet is just for TFA teachers?

Part Two: TFA Net Platform

- How do you find using the TFANet platform from a design and technology point of view?

Part Three: Professional Learning

- Can you talk about your professional learning and the current activities you undertake for professional learning?
 - Where else do you go to find resources and knowledge for your practice?
 - How does your use of TFANet fit into your professional learning both now and previously?

- How important do you think it is that TFANet is designed to support teachers learning from and gaining ideas from other teachers?
- How does learning from teachers on TFANet contrast to learning from teachers in other contexts?
- How do you think your use of TFANet has impacted on your classroom practice?
- To what extent have the ideas and resources you've gained on TFANet become integrated into your practice?
- What other online learning platforms or education websites do you engage with?
 - How does your use of TFANet contrast to your use of other websites?

Part Four: Knowledge Reconstruction

- When you read or see something interesting on TFANet, how do you think about it in relation to your own teaching?
 - How do you assess and select resources?
- How do you make the knowledge or resources that you find on TFANet useful in your classroom practice?
 - How do you adopt and adapt knowledge for your own use?
 - What do you have to think about and what actions do you need to take before using the resources in your own teaching?
 - How do you have to change the resources before you use them?
- How do you evaluate the knowledge or new resources that you have used in your teaching?

Part Five: Conclusion

- Are there any changes or adaptations that you'd like to make to TFANet?
- Introduce learning log and complete first entry
- Discuss collecting artefacts to discuss in second interview

Second Interview Schedule

- Discussion of Log entries / any clarifications
- Follow up questions from first interview

Discussion of Resources

- What resources have you selected to talk about today?
- What were you searching for when you found this resource?
- Why did you select this resource?
- How did you modify the resource before you used it in your teaching practice?
- How successful was this resource in your teaching?
- Do you think that you will continue to utilise any aspect of this resource or knowledge gained from its use in your teaching practice?

Any other comments

- Since our first interview, do you have any thoughts or observations about how you use TFA Net and how you utilise the resources from TFA Net in your classroom practice?

Appendix D: Online Teacher Journal Logs

Georgina's weekly survey

Form Description

Use of TFANet this week

Have you used TFANet this week?

If you haven't, you do not need to complete the rest of the survey

- ☐ Yes
☐ No

Approximately how long have you spent on TFANet this week?

- ☐ Less than 30 minutes
☐ 30 minutes to 1 hour
☐ 1 to 2 hours
☐ 2+ hours

What did you look at on TFANet?

(select all that apply)

- ☐ Resource Exchange
☐ Video Hub
☐ My Region
☐ Groups
☐ Career
☐ People Finder
☐ Advice and Guidance
☐ Data and Tracking
☐ Professional Development
☐ Planning Resources

Was your use of TFANet primarily structured or unstructured?

Did you have particularly things that you were looking for on TFA Net or did you browse through the site?

- ☐ Primarily structured
☐ Primarily unstructured
☐ Mixture of structured and unstructured

Most significant resource, activity, action

The purpose of this section is for you to identify how specific activities or actions you have undertaken on TFA Net have impacted your professional learning and/or classroom practice.

You will be asked to select on resource, discussion forum, video or activity that you found on TFA Net this week that has been significant for your classroom practice and/or professional learning.

What is the action, activity or resource that you think has been most significant (either positively or negatively) to your classroom practice and/or professional learning this week?

What has your chosen action, activity or resource provided for you?

This could include new knowledge or skills, connections with new people, new ideas, methods or processes

How have you used your chosen action, activity or resource?

How have you adapted or modified the resource or activity to make it relevant to your classroom and teaching context?

What impact do you think that it has had on your professional learning and/or classroom practice?

How might your use of the action, activity or resource change or develop in the future?

Have you shared your learning with others?

☐ Yes

☐ No

If yes, with whom and how did you share it?

Appendix E: Platform Administrator Interview Schedule

Interview Schedule – Network Administrators

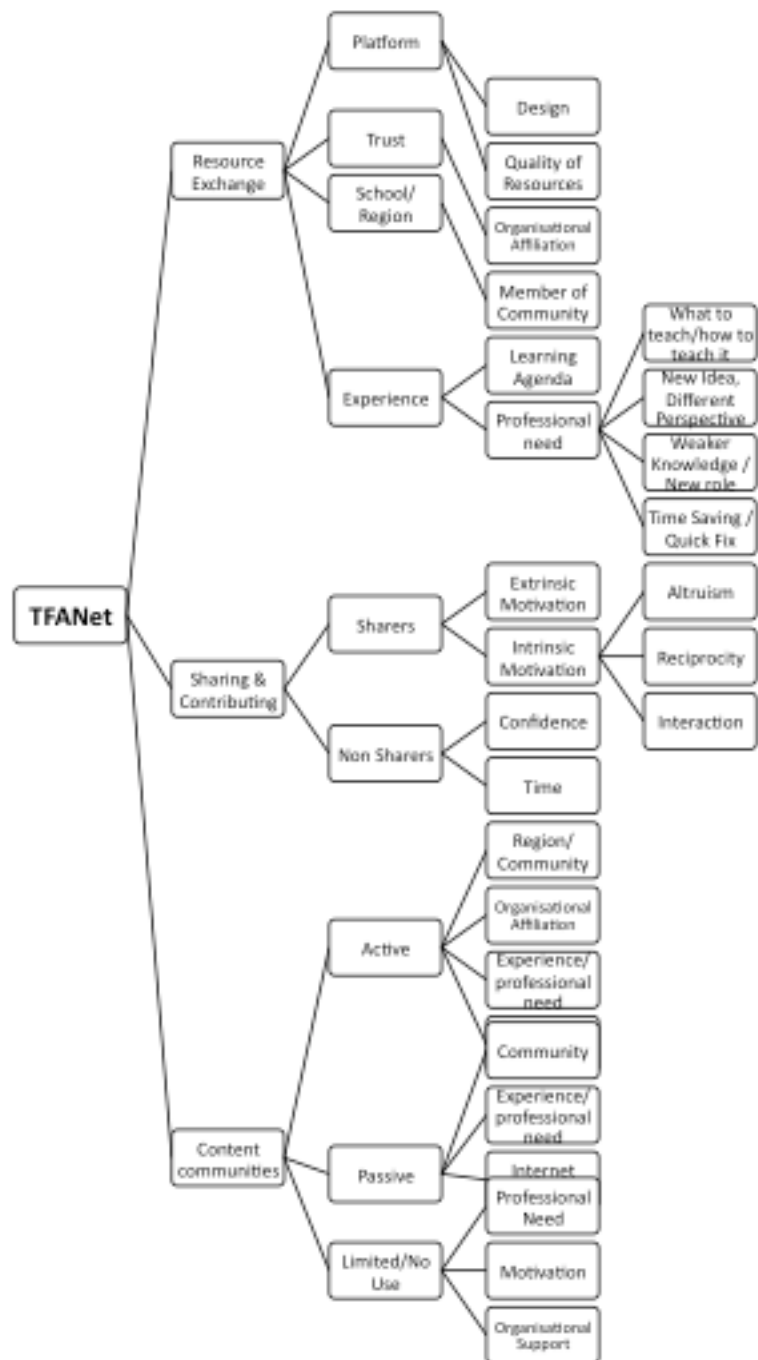
- Can you tell me about the function and purpose of TFA Net is?
- TFA Net is a teacher-to-teacher sharing site; can you talk about why this format was chosen?
- How are TFA members using TFA Net?
- How do the “experts” on TFA Net work?
- Can you tell me about the types of knowledge and formats of knowledge on TFA Net?
- I’m interested in how knowledge is being transferred from one teachers’ practice to the practice of others via TFA Net. How does TFA Net facilitate this process?
- How successful do you think TFA Net is facilitating knowledge sharing and knowledge transfer?
- Is there any form of quality control on TFA Net?
- Are you looking to further develop the network?

Appendix F: Sample Journal Log

Timestamp	Have you used KIPP Share this week?	Approximately how long did you spend on KIPP Share this week?	What did you look at/do on KIPP Share this week?	Was your use of KIPP Share primarily structured or unstructured?	What is the action, activity or resource that you consider has been most significant (either positively or negatively) to your classroom practice and/or professional learning this week?	What has your chosen action, activity or resource provided for you?	How have you used your chosen action, activity or resource?	How have you adapted or modified the resource or activity to make it relevant to your classroom and teaching context?	What impact do you think that it has had on your professional learning and/or classroom practice?	How might your use of the action, activity or resource change or develop in the future?	Have you shared your learning with others?	If yes, with whom and how did you share it?
10/7/2013 12:20:23	Yes	Less than 30 minutes	Add resources to your profile, Look at resources posted by other teachers, Download resources posted by other teachers	Primarily structured	I am coaching other teachers, and I directed one of my teachers to videos online of history teachers. There is a teacher who explains Criteria for Success for one of the AP World History essays, and I showed one of my teachers those videos.	It has provided a lens through which to look at the criteria for success for an essay that's illuminating. The teacher I coach is no longer in the dark as to what's expected of him. It also helps push him to find other resources from the teacher in the video.	I used it to coach a teacher who needed mentoring	I haven't.	It helps inspire my voice and my understanding of what my kids need to do.	I think I could also show it to my students to hook them into the importance of meeting the Criteria for Success for an AP world history DBQ essay	Yes	See above.
10/14/2013 9:40:46	Yes	1 to 2 hours	Add resources to your profile, Look at resources posted by other teachers, Download resources posted by other teachers, Look at a learning community	Primarily structured	I created a "Gold Mine" of resources to help high school social studies work with nonfiction texts.	It has helped me connect with other kipp social studies teachers.	I have used the resources I put together to learn more about how to improve reading comprehension for my students.	I compiled four resources into a document with plenty of hyperlinks to help teachers navigate the internet for helpful resources.	I think it helps make me more aware of what's going on in other teachers' classrooms.		Yes	I shared it with the high school social studies community with an email that I send out once a month.
10/21/2013 12:18:34	Yes	30 minutes to 1 hour	Add resources to your profile, Look at resources posted by other teachers, Download resources posted by other teachers, Send a message to another teacher	Mixture of structured and unstructured	I downloaded a test from another teacher so that I could adapt it to my own class this year.	Just a quick way to create a test, so that I don't have to create it from scratch.	I'm going to administer my adjusted version of the test to my class tomorrow.	I made the questions slightly harder and cut questions that I thought were repetitive.	I think it will help me assess student knowledge on a unit I'm teaching.	I think that as my course becomes more rigorous, I'll augment this resource with more challenging questions from other exams. However, I think that this resource will be great for the future as my life becomes easier in teaching about the Age of Absolutism.	Yes	I collegued someone who had messaged me, asking for access to my resources.

Appendix G: Coding Trees

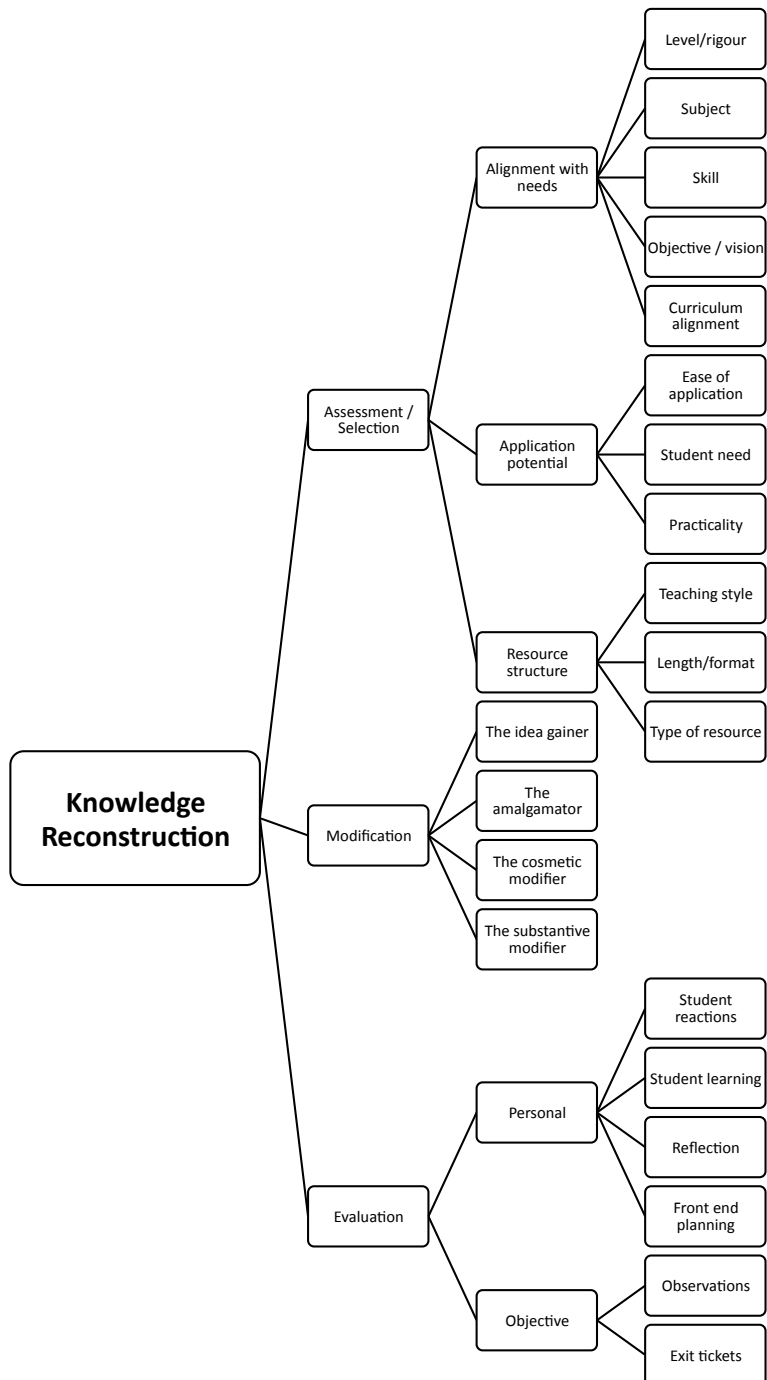
TFANet Engagement



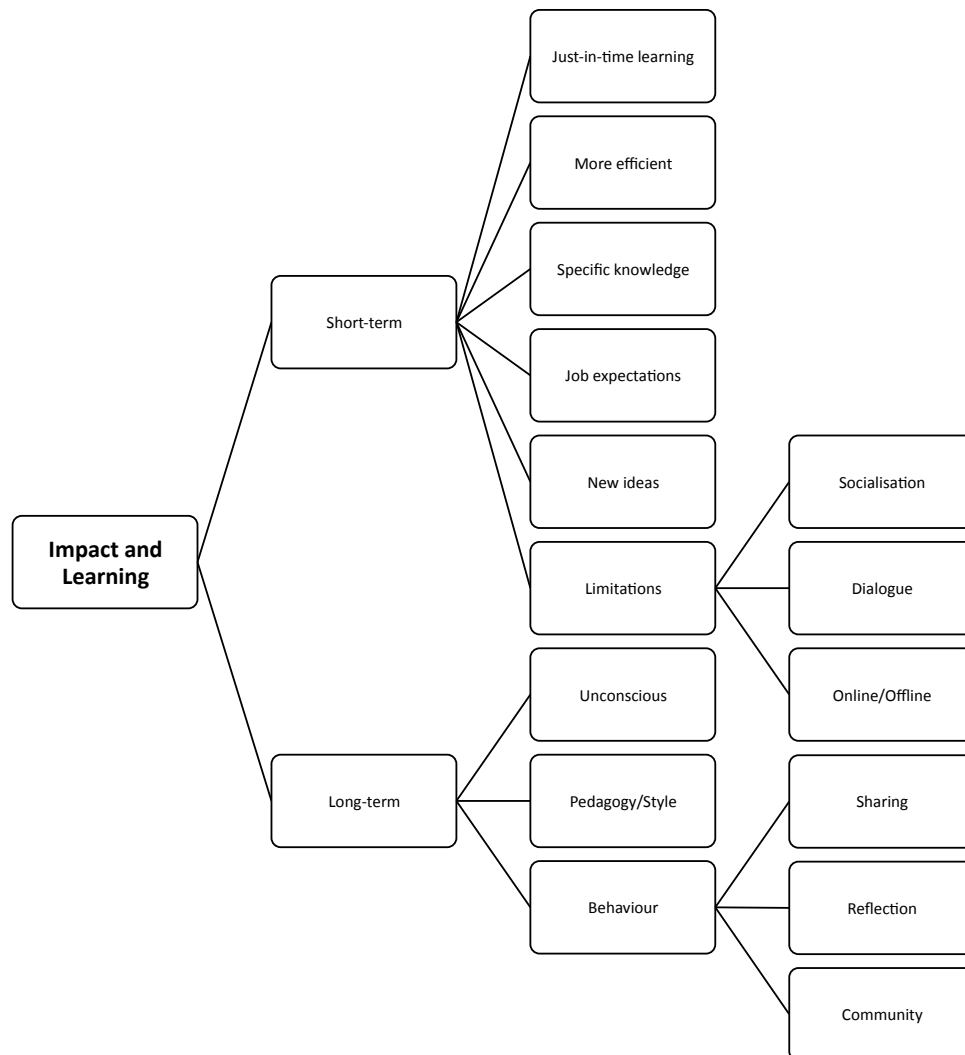
AKO Net Engagement



Knowledge Reconstruction



Influence and Learning



Appendix H: CUREC Approval

Dear Nina Hood

Application Approval

Title: “Online Teacher Networks and the Transfer of Teacher Knowledge.”

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

If your research involves participants whose ability to give free and informed consent is in question (this includes those under 18 and vulnerable adults), then it is advisable to read the following NSPCC professional reporting requirements for cases of suspected abuse

http://www.nspcc.org.uk/Inform/research/questions/reporting_child_abuse_wda74908.html

Should there be any subsequent changes to the project which raise ethical issues not covered in the original application you should submit details to research.office@education.ox.ac.uk for consideration.

Good luck with your research study.

Yours sincerely,

Justina Kurkova

Research Office Assistant

Appendix I: Teacher Consent Forms



A Study Investigating Internet mediated practitioner-to-practitioner knowledge mobilisation

Participant Consent Form

By agreeing to participate in this research project you are consenting to:

- Participating in an in-person interview
- Participating in a follow-up interview via Skype (or similar)
- Completing a 5 minute online survey each week for 7 weeks about your use of TFANet
- Both interviews will be audio recorded. The audio recording will be for the researcher's use only and will not be shared with any other parties.
- The data collected from this research will be anonymized. It will be used for my doctoral dissertation and potentially for journal publications. Anonimised data will be shared with TFA.
- You may withdraw from this study at any stage.

Please select one of the two options below

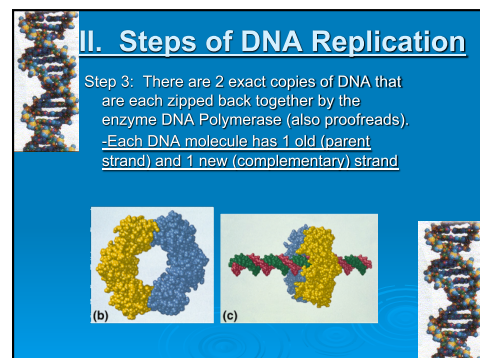
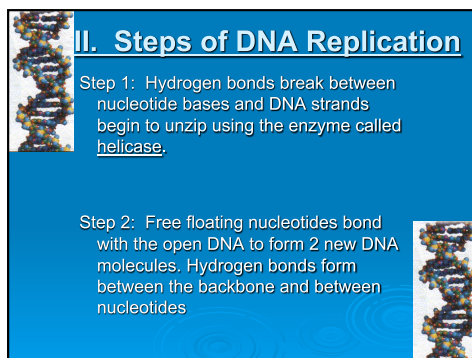
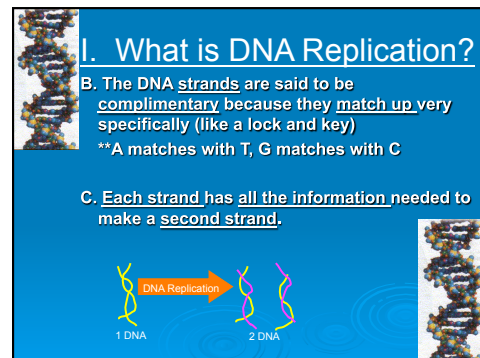
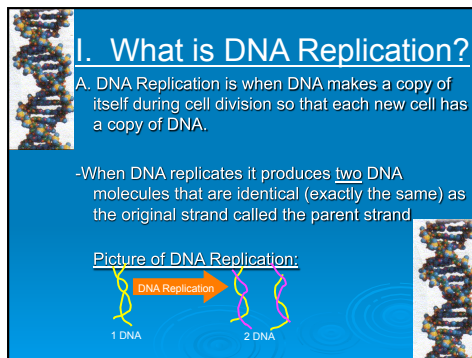
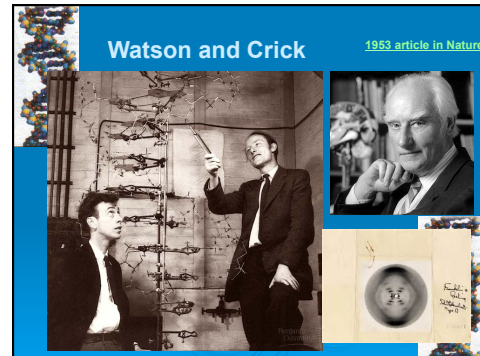
- ☐ I would like to participate in this study
- ☐ I do not want to participate in this study

Name: _____

Signature: _____

Date: _____

Appendix J: Examples of Resources from the platforms



PowerPoint Presentation Slides

Partial Unit Plan



AP ENVIRONMENTAL SCIENCE UNIT 1: Water Pollution

UNIT BACKGROUND					
Unit Title	Water Pollution			Grade Level	11-12
Main Idea	Water pollutants have specific sources and specific effects on the abiotic and biotic components of an ecosystem. Wastewater treatment is a complex, multi-step process.				
Unit Designer	xx	Time Frame		Quarter	AP Boot Camp and Q1
School District	xxx	School	xxxx		
AP Textbook	Miller, <u>Living in the Environment</u>	Chapter(s)	20		

BRIEF SUMMARY OF UNIT
This is the first unit in an AP Environmental Science course in which all students are taking an AP science course (or, for some, any AP course) for the first time. Through reading, lecture, and field investigation, students will learn about the sources and effects of specific water pollutants as well as the steps involved in wastewater treatment. An emphasis will be placed on effective reading and note-taking using Miller's <u>Living in the Environment</u> textbook. Additionally, students will learn how to write a college-level lab report, create a system of organization for their coursework, and establish a means for tracking their progress throughout the year.

STAGE 1: DESIRED RESULTS

ESSENTIAL QUESTIONS
1. How can we set ourselves up for success in this course? 2. What are the causes and effects of water pollution? 3. What are the major water pollution problems in lakes and streams? 4. What are the major pollution problems affecting groundwater and other drinking water sources? 5. What are the major water pollution problems affecting oceans? 6. How can we best deal with water pollution? 7. How can we write college-level lab/field-investigation reports?

ENDURING UNDERSTANDINGS
• Water pollution causes illness and death in humans and other species, and disrupts ecosystems. • The chief sources of water pollution are agricultural activities, industrial facilities, and mining, but growth in population and resource use make it increasing worse. • Streams and rivers around the world are extensively polluted, but they can cleanse themselves of many pollutants if we do not overload them or reduce their flows. • The addition of excessive nutrients to lakes resulting from human activities can disrupt their ecosystems, and prevention of such pollution is more effective and less costly than cleaning it up. • Chemicals used in agriculture, industry, transportation, and homes can spill and leak into groundwater and make it undrinkable. • There are both simple and complex ways to purify groundwater used as a source of drinking water, but protecting it through pollution prevention is the least expensive and most effective strategy. • The great majority of ocean pollution originates on land and includes oil and other toxic chemicals as well as solid waste, which threaten fish and wildlife and disrupt marine ecosystems. • The key to protecting the oceans is to reduce the flow of pollution from land and air and from streams emptying into ocean waters.

- Reducing water pollution requires that we prevent it, work with nature to treat sewage, cut resource use and waste, reduce poverty, and slow population growth.

REAL WORLD CONNECTION AND THEMES

1. Reading about Cuyahoga River catching on fire
2. Reading about sewage overflow in New York City
3. Field Investigation: Assessing water quality in Central Park's Harlem Meer
4. Gulf of Mexico dead zone
5. Gulf Oil Spill Investigation
6. Toilet to people ratio in India reading
7. London Cholera Epidemic

EMPHASIZED SKILLS

1. Effective reading in the Miller Living in the Environment textbook
2. Effective note-taking from the Miller Living in the Environment textbook
3. Effective note-taking from a powerpoint slide and during lecture → what should be written down and what should not
4. Creating a system of organization for coursework using a notebook and binder
5. Self-monitoring of progress on exams and FRQs using a tracker
6. Citing references within a lab report
7. Writing a clear, detailed language in lab reports. Including but not limited to: writing multistep procedures and using data to formulate a conclusion.
8. Navigating googledocs to open a shared lab report template and to create and share their own lab report with teacher.

VOCABULARY

• Water pollution • Point source • Non-point source • Agricultural activity • Industrial activity • Domestic activity • Municipal activity • Water Quality • Runoff • Nitrate • Phosphate • Ammonia • Hardness • Turbidity and secchi disk • Dissolved Oxygen (DO) • Biological Oxygen Demand (BOD) • Oxygen sag curve • Degrading wastes • Non degrading wastes • Biodegradable • Biodegradation • Bioremediation	• Fertilizer • Eutrophication • Oligotrophic • Cultural Eutrophication • Algal blooms • Cyanobacteria • "Dead zones" • Oxygen depleted zones • "Fish kills" • Lagoon • Stratified layers • Aquifer • Groundwater • Plume • Restoration • Prevention • Remediation • Clean up • Clean Water Act • US Safe Drinking Water Act 1974 • Environmental Protection Agency (EPA)	• Sewage • Water Treatment Facility • Lifesraw • Maximum contaminant levels • Biological hazard- viruses and bacteria • Gastrointestinal disease • Red tides • Exxon Valdez Oil spill • Discharge trading policy • Septic tank • Primary sewage treatment (physical/mechanical) process • Secondary sewage treatment (biological breakdown) • Tertiary sewage treatment (chemical) • Bleaching • Disinfection • Chlorination • Composting toilet system
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COMMON MISCONCEPTIONS	
MISCONCEPTION	CLARIFICATION
BOD and DO mean the same thing.	BOD and DO have an inverse relationship. When the biological demand for oxygen (BOD) is high, then the level of dissolved oxygen (DO) decreases.
Distinguishing between expectations of verbs in question stems: discuss, describe, argue, identify, etc.	Students will complete an exercise in Day 1 that will require them to identify, discuss, argue, describe classroom expectations and will see that although each question is on the same topic, it requires a different response.
Distinguishing between prevention, cleanup, and restoration.	Deliberate instruction of prevention, cleanup, and restoration of groundwater pollution using a graphic organizer to categorize the content.

STAGE 2: ASSESSMENT EVIDENCE

ASSESSMENT SUMMARY

FORMATIVE TASKS

- **Lab: Assessing Water Quality in Central Park's Harlem Meer-** To hone their lab and problem-solving skills, students will complete a water quality case study involving Central Park's Harlem Meer. Before going out into the field, students will create a lab report on googledocs and research the background of certain water quality indicators. Students will learn how to cite references within their report. Students will work in groups to write clear, detailed, procedures. Upon arriving to Central Park, students will take qualitative observations about the appearance of Central Park's Harlem Meer and make predictions for the presence or absence and/or levels of certain water quality indicators (Dissolved oxygen (DO), Biological oxygen demand (BOD), phosphate, nitrate, lead, ammonia, turbidity). Students will then conduct water quality tests to assess each indicator. In class the next day, students will present their data and findings. Students will evaluate non-exemplar and exemplar analyses and conclusions from lab reports in order to prepare for writing their own. Students will complete the analyses and conclusion of their lab reports for homework (long break between AP Boot Camp and first day of school).
- **Quiz-** Students have a long break between AP Boot Camp and the first day of school. Students will be instructed to study over the break for a quiz which will contain 20 AP multiple choice questions and 1 FRQ. The purpose of this quiz is to hold students accountable for reviewing material over the break and to expose them to more AP level questions so they can anticipate what the Unit 1 Exam will be like.

SUMMATIVE TASK

- **Unit 1 Exam:** 40 AP Multiple Choice Questions in 50 minutes and 2 Free Response Questions in 50 minutes. Since the AP Environmental Science Exam requires students to complete 100 MC in 90 minutes and 4 FRQs in 90 minutes, students will transition to completing more questions in the allotted time throughout the year. Starting in the 2nd quarter, all exams will be ~2 hours long with 50 minutes to complete 60 MC questions and 45 minutes to complete 2 FRQs. The mid-term and final exams will be a full-length AP exams.

Student Self-Assessment

- Students will self-assess their knowledge of a topic when reviewing classwork at the conclusion of some lessons. Students will ask questions or attend tutoring if necessary.
- Students will use a rubric to guide their work on lab reports.

STAGE 3: LEARNING ACTIVITIES/ RESOURCES

#	Aims and Objectives	Instructional Choice	Resources
1 AP Boot Camp (75 minutes)	AIM: How can we set ourselves up for success in this course? <u>In-Class Objectives:</u> • KIPPsters will be presented with course expectations and explain the importance of meeting each. • KIPPsters will be presented with materials for success: a notebook, binder, and tracker sheet for FRQs and exam scores. • KIPPsters will distinguish between different types of questions and identify what the question is asking for based on its verbiage: identify, discuss, make an argument, describe, etc. • KIPPsters will distinguish between reading to learn, reading to preview, reading to review, and reading to extend. • KIPPsters will analyze data for attendance, homework average, exam average, and AP scores for the 2012-2013 APES Cohort. KIPPsters will identify trends in the data and identify 3 vital behaviors for success in APES. • KIPPsters will watch the 2012-2013 APES highlight video as a hook to begin the year. <u>Homework Objective:</u> • KIPPsters will write a 2 page letter to themselves which they will receive back after their midterm exam in January. KIPPsters will reflect on the following: What are you pumped about for APES this year? What do you think will be your biggest struggle? How will you motivate yourself to meet and maintain the expectations we discussed today?	• Lecture • Data Analysis • Partner Collaboration • Reflection	Notebook Binder Syllabus Powerpoint Powerschool data You tube video

Lesson Plan

TEACHER VERSION

Making it Work #2 Great readers challenge themselves by reading “just right” books. Great readers practice good reading etiquette.
OBJECTIVES: By the end of today, here’s what students will be able to do. SWBAT choose “just right” books using the 5-finger rule & personal interest. SWBAT describe proper book etiquette (we love our books!). SWBAT describe 4 strategies that good readers use to stay focused while reading.
CFU: At the end of today, here’s how students will show mastery. ☐ Exit ticket ☐ Teacher observations during independent reading
MATERIALS/LOOSE ENDS: What will I need? ☒ Notes #2 ☒ How to choose a book poster ☒ Book etiquette poster ☒ Plastic bags (for taking our books home!) ☒ Classroom library check-out system ☒ 1 word journal page per student ☒ ☒ Powerpoint
FIRST FIVE [Guide students through warm-up steps 1 – 5.] Do Now: 1. What are our big goals as a class of readers this year? 2. What goals have you set for yourself as a reader this year? 3. Name two procedures (school or classroom) that help us make the most of our learning time. (5 mins)
CONNECTION: Today’s skill is connected to what we’ve been learning and is important to know. We set some pretty hefty goals for ourselves yesterday! I know that you are all capable of achieving that level of greatness- but it won’t come for free (or even cheap). You’re going to need some tools and strategies along the way.
DIRECT INSTRUCTION: Here’s how to do it...

Let's start with some **guided notes** and a quick story about a friend of mine, Goldilocks.

Raise your hand if you've ever heard the story of Goldilocks and the Three Bears. Who can remind their classmates what that story was about? (Accept reasonable answers).

Right—everything was too big, too small, or **just right**. Books are the exact same way. They can be too easy, too hard, or just right.

We're going to call it the **Goldilocks** rule. We all like to read easy books sometimes, but they don't push us to grow as readers, so we don't want to spend too much time on them.

And even though it makes sense that reading really challenging books would make us better readers, it usually just gets frustrating!

A quick, easy way to see if a book is "just right" is to use the 5-finger rule. (Read a whole page of the book. Each time you come across a word you don't know, hold up a finger. If you don't have **any** fingers up, the book is probably too easy. If you have all 5 fingers up, the book is probably too hard.) You should also ask yourself—"What did I just read?" If you're confused or unsure, you might want to choose a different book.

Strategies for selecting books: (Make Poster; review if time).

1. Look at the cover.
2. Read the back (look for a summary or synopsis).
3. Look for recommendations
4. 5-finger rule

Reading Etiquette

1. Begin reading right away
2. Read silently
3. Eyes on your book!
4. Respect our books

(7)

GUIDED INSTRUCTION: Now let's try an example together...

Walk students through the process of choosing an independent reading book.

"The Cat in the Hat," "Christopher Columbus," and "Stargirl." Ask students guiding questions (How many mistakes did I make? Was my reading smooth or choppy? Etc.) and have them help determine whether each book is too easy, too hard, or just right.

(8)

LINK: Here's how you will apply the strategy independently.

Go over expectations for choosing independent reading books—where the bins will be, how long

we will spend doing this, and the appropriate noise level (library). Once students have chosen their 2 books, they should silently return to their seats and begin reading right away!
INDEPENDENT PRACTICE: Now you will apply this strategy independently. Students will choose two “just right” books and begin reading independently. Teacher will briefly conference with all students to note which books each student has (at minimum) and whether or not the books truly are at the appropriate reading level (ideally). (20)
SHARE: Discuss what you learned. Share with a partner how you did with choosing your book & using reading etiquette. Briefly discuss whole class. (3)
WORD STUDY: Building our vocabulary. Introduce word journal pages (students should have collected the sheet as they came in). Introduce our very *first* vocabulary word: essential. Describe the word for students as <u>of extreme importance; something that is completely necessary</u> . Encourage students to write this description <i>in their own words</i> so that it will be more meaning for them later on. Explain my drawing. Have students create their own drawings. Explain the “word detectives” space at the bottom of the sheet. If you see this word in your independent reading book, on a website, in a newspaper, etc. you should write down the date, <i>when</i> you saw the word, and the <i>context</i> (the sentence or sentences surrounding it). This might translate into extra credit on vocabulary quizzes later on. Have students put the sheet behind the “Word Journal” tab in their binders. Explain that we will have one word journal for reading and writing. (5 mins)
CLOSING: MILLION DOLLAR QUESTION! (special prize for the winning section at the end of each quarter!) 1. Explain the 5 finger rule. 2. Use the word “essential” in an original sentence. 3. What should you look like & sound like as you enter a classroom? 4. What should you look like & sound like as you exit a classroom? (5 mins)
LIFEWOR: What will we do tonight?
DIFFERENTIATION: How will you meet the learning profiles and interests of all learners?

Students choose independent reading books that are differentiated by interest and reading level. Active reading strategies & explicit modeling.
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Writing Rubric

KIPP PHILADELPHIA ELEMENTARY ACADEMY

2011-2012

Kindergarten Writing Rubric

Habits	Level 1 Well below grade level - o Copies print from the environment - o Writes on familiar topics with prompting or assistance - o Writes for self - o Shares work when asked	Level 2 Approaching Grade Level - o Willingly records experiences - o Writes on familiar topics - o Writes for self - o Shares work when asked - o Shows stamina of becoming an independent writer (5-8 minutes of writing without teacher direction) - o Begins to recognize "in-process work" versus completed work	Level 3 Meeting Grade Level - o Willingly records experiences without support - o Writes on familiar topics with details - o Writes for self, but is beginning to keep reader in mind (proper spacing, neat handwriting, and writes as many sounds as he/she can hear) - o Selects personal meaningful topics - o Uses agreed upon criteria to reflect on writing with support	Level 4 Exceeds Grade Level - o Generates own topic and extends work over a number of days - o Writes in a small range of familiar forms - o Is sometimes showing evidence of keeping their reader in mind (proper spacing, neat handwriting, and writes as many sounds as he/she can hear) - o Uses agreed upon criteria to reflect on writing
Ideas and Voice	Level 1 Well below grade level - o Includes drawings - o Never zooms in on a small moment and writes only about big moments - o Drawings may not be completely recognizable - o Includes ideas and drawings which are often repeated	Level 2 Approaching Grade Level - o Includes drawings, labels, and attempts text to convey message - o Is sometimes able to zoom in on a small moment - o Includes ideas and drawings which are often repeated - o One or more ideas are present in the most general way	Level 3 Meeting Grade Level - o Shows some awareness of audience interest - o Is often able to zoom in on a small moment - o Records simple ideas, opinions, responses often around personal experiences - o Includes internal voice (i.e. feelings or thoughts)	Level 4 Exceeds Grade Level - o Elaborates on key ideas and adds personal comments for interest - o Is usually able to zoom in on a small moment - o Shows evidence of a developing personal style - o Shows the beginning of humor or anecdotes
Organization	Level 1 Well below grade level - o Is not planned - o The piece has no title - o The arrangement of pictures or text shows an awareness of the importance of structure and pattern (recognizes where to draw the pictures and where to write the words)	Level 2 Approaching Grade Level - o Is not planned - o Simple clues about order emerge in pictures or text - o May order ideas chronologically - o Sometimes or usually shows a match between texts and drawings	Level 3 Meeting Grade Level - o May order ideas chronologically - o Consistently stretches one moment across multiple pages - o Always shows a match between texts and drawings	Level 4 Exceeds Grade Level - o Begins the use of graphic organizers - o Incorporates transition words and phrases

Name:

Date:

Binder Tab #4

Osmosis – Solutions and Cells

Using the key below and the information given, answer the questions.

key:

solute particle •

cell membrane - - - - -

cell wall = = = = =

in all solutions, the solvent is H_2O

Part I. Fill in the blanks:

A _____ is a fluid in which a substance is dissolved.

A _____ is a substance dissolved in a solvent.

A _____ is a combination of solute and solvent.

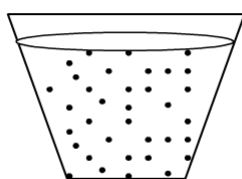
The process by which H_2O diffuses across a membrane is called _____.

Part II. Look at the solutions illustrated below and fill in the blanks.

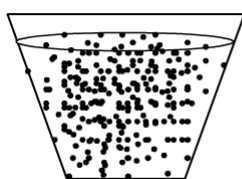
1. **Solution B** is _____ to **solution A**. This is because **solution B** has a greater concentration of _____ in it than does **solution A**. **Solution C** has no solutes dissolved in it, therefore it is _____ to both **Solutions A** and **B**.

2. As the relative concentration of **solutes** in two solutions increases, of necessity the relative concentration of **water** in the same two solutions _____. **Solution A** has a lower concentration of _____ than does **Solution C**; **Solution A** is also **hypertonic** to **Solution C**.

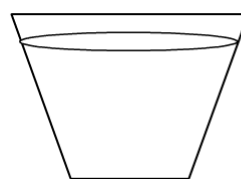
3. If you wanted to make **Solution A** **isotonic** to **Solution B**, you could add **water** to Solution _____ or you could add **solute** to Solution _____. If you took all three solutions, put them into a large container and mixed them thoroughly, then redistributed the solution among the three containers, **Solution A** would be _____ to **Solution B**. **Solution A** would also be _____ to **Solution C**, and **Solution C** would be _____ to **Solution B**.



A



B



C

7-6 Rational Exponents

TI Calculator Hints

- Cube Root:

$$\sqrt[3]{8}$$

MATH 4 8 ENTER

- 4th & higher roots:

$$\sqrt[4]{81}$$

4 MATH 5 81 ENTER

- Rational exponent:

$$64^{\frac{1}{6}}$$

6 4 ^ (1 / 6) ENTER

Write a rule for converting radicals to rational exponents.

Write a rule for converting rational exponents to radicals.

GUIDED PRACTICE:

Write each expression in radical form.

INDEPENDENT PRACTICE:

GUIDED PRACTICE:

Write each radical using rational exponents.

Complete each computation on the calculator. Round to the nearest tenth.

1. $\sqrt{4} =$

a. $4^{\frac{1}{2}} =$

2. $\sqrt[3]{8} =$

b. $8^{\frac{1}{3}} =$

3. $\sqrt[4]{16} =$

c. $16^{\frac{1}{4}} =$

4. $(\sqrt{3})^3 =$

d. $3^{\frac{3}{2}} =$

5. $(\sqrt[3]{3})^2 =$

e. $3^{\frac{2}{3}} =$

6. $\sqrt[3]{4^5} =$

f. $4^{\frac{5}{3}} =$

$$\sqrt[y]{a^x} = \underline{\hspace{2cm}} \quad a^{\frac{x}{y}} = \underline{\hspace{2cm}}$$

1. $3^{\frac{1}{4}}$

2. $2^{\frac{2}{3}}$

3. $x^{\frac{1}{2}}$

4. $y^{\frac{3}{5}}$

5. $5^{\frac{1}{3}}$

6. $m^{\frac{4}{7}}$

1. $\sqrt{13}$

2. $\sqrt[3]{2x^6}$

3. $\sqrt[4]{3x^2y^3}$

4. $7\sqrt{5x^8y}$

INDEPENDENT PRACTICE:

5. $\sqrt[4]{15^3}$

6. $\sqrt[3]{6xy^2}$

GUIDED PRACTICE:

Evaluate each expression.

1. $25^{\frac{1}{2}}$

2. $64^{\frac{5}{6}}$

3. $16^{-\frac{1}{4}}$

4. $27^{\frac{2}{3}} \cdot 81^{-\frac{1}{2}}$

INDEPENDENT PRACTICE:

5. $16^{\frac{3}{2}}$

6. $\left(\frac{125}{216}\right)^{\frac{2}{3}}$

GUIDED PRACTICE:

Simplify each expression.

Remember the laws of exponents:

$$a^m \cdot a^n =$$

$$(a^m)^n =$$

$$\frac{a^m}{a^n} =$$

Simplified rational expressions:

- Have no negative exponents
- Have no fractional exponents or radicals in the denominator!

1. $x^{\frac{1}{4}} \cdot x^{\frac{3}{4}}$

2. $y^{\frac{5}{6}} \cdot y^{\frac{2}{3}}$

3. $\left(x^{-\frac{1}{4}}\right)^{-\frac{2}{5}}$

4. $\frac{a^{\frac{3}{4}}}{a^{\frac{1}{4}}}$

5. $b^{-\frac{4}{7}}$

6. $\left(y^{\frac{-1}{3}}\right)^{\frac{-4}{5}}$



Date:	Monday, September 10-Friday, September 14, 2012
Subject:	Reading Comprehension
TEKS:	1.E Read texts by moving from top to bottom of the page and tracking words from left to right with return sweep 1.F Identify the information that different parts of the book provide (e.g., title, author, illustrator, table of contents) 1.I Monitor accuracy of decoding 12 Read independently for sustained periods of time 5 Read grade level text with fluency and comprehension 9.B Describe the plot (problem and solution) and retell a story's beginning, middle, and end
ELPS:	3D speak using content-area vocabulary
Objectives:	SWBAT: -identify the problem and solution
Vocabulary:	Problem, solution, solve, retell
Assessment:	By the end of the week, students should be able to answer the following questions: What is the problem in this story? What is the solution? As an extension, students should be able to explain an alternate way to solve the problem.
Materials:	Read aloud text, shared reading text [possible text for read aloud; <i>Hooray for Wodney Wat</i> by Helen Lester [readers' theater text of Hooray for Wodney Wat] —this text can be projected on the smart board] [other potential read aloud texts: <i>Lilly's Purple Plastic Purse</i> by Kevin Henkes, <i>Wemberly Worried</i> by Kevin Henkes, <i>Chester's Way</i> by Kevin Henkes, <i>The Little Mouse, the Red Ripe Strawberry, and the Big, Hungry Bear</i> by Don and Audrey Wood, <i>The Three Little Pigs</i>] [suggested text for shared reading: "Bumping Up and Down"—Raffi: video , lyrics], problem/solution cards for matching

Opening/Anticipatory Set:
- Behavior expectations: criss-cross, hands in lap, eyes on speaker "Read, baby, read" chant <i>Activate background knowledge daily. The following examples may be utilized to engage students in learning about problem and solution.</i> Monday: Pose a problem to the class (e.g., "Friends, today I brought a [cookie]. It wouldn't be very fair for just one of us to have the [cookie]. Hmmm...what can we do to make it fair? (solicit student answers: cut the [cookie] into 24 pieces, let everyone have a turn playing with the [ball], pass it around, vote on who gets to have it, etc.) Pick one method to solve the problem (e.g., cut the cookie into 24 pieces, pass around the ball so everyone can bounce it once, etc.) Tell students that whether or not they knew it, they were just problem solvers. We had a problem as a class (something was wrong) and we needed to find a solution (a way to solve, or fix, that problem).



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- **Tuesday:** Pick a problem that you have been having as a team (e.g., playing too rough at recess, talking during lessons, unkind words). Discuss this problem with the team and solicit ideas for solutions. Guide students in making the text-to-self connection that just like them, characters in stories face problems that they need to solve.
- **Wednesday:** Problem and solution match [on one side of the board post problems, on the other post solutions—students will match which problem and solution go together] [see attached]
- **Thursday:** Students generate a list of problems and solutions they have either experienced personally or have identified in texts.
- **Friday:** Problem and solution charades: pick a student (or students) from the magic cup to act out a problem. Students will identify the problem and give suggestions of how it can be solved; actors will then act out solving the problem [these problems should be similar to our PEACEfest problems—e.g., not protecting materials/learning time/teammates]

Introduction to New Material: (key points, 3-5)

Key Points (3-5):

- **What:** The problem is something that is wrong in the story.
- **What:** The solution is how the problem is solved.
- **How:** Good readers identify the problem and solution in the story by paying attention to clues in the text and pictures.
- **How:** The text can explain to us what is wrong and how the problem is solved; the pictures can show us how the characters are reacting and what is going on in the story.
- **Why:** By identifying the problem and solution, good readers are able to retell the story they have read.

Method:

- **Daily:** Tell students that just like us, the characters in the books we read face problems. As good readers, we can identify the problem and the solution. Identifying the problem and solution shows that we are able to understand what we read and will help us retell the story to someone else.
- **Daily:** [If your read aloud is contained in your literacy block, model reading a text and, using textual and pictorial clues, identify the problem and solution. If your read aloud takes place during a separate part of your day, make sure to model and review these terms and strategies before and during reading.]

Guided Practice:

- Before reading, tell students that now we are going to practice identifying the problem and solution team and family style.
- **Monday:** students listen while the teacher reads the text; turn and talk with a neighbor about what they think the problem is in the story
- **Tuesday:** team echo reads (teacher reads a line, students read a line); turn and talk with a



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neighbor about the problem and the solution.

- **Wednesday:** team choral reads (everyone reads all together as teacher/helper points/tracks the text); turn and talk with a neighbor—what is the problem in this text? Can you think of a different way to solve the problem?
- **Thursday:** team echo reads the text; students will be asked to write/illustrate the problem in the text
- **Friday:** team choral reads the text; write a repetitive part of the text on a sentence strip, scramble it up and have students piece it back together

Checking For Understanding: (What questions need to be answered from students as evidence for understanding of the material?)

What does the word problem mean?	What is the solution?	What clues can you use to help you identify the problem and solution?
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Closing:

Review: The problem is something that went wrong in the story; the solution is how the problem is solved, or fixed.

Tell students: *We will be practicing identifying problems and solutions in the books and other texts we read all throughout the week.*

Workstations

This week's workstations' objectives:

- Library, Big Books & Listening: 9.A—I can identify the problem and solution; Students will be asked to identify the problems and solutions in the books they read/listen to (jotted on post its, recorded on t-charts, etc.)
- Writing---students can pick a problem and write their solution or develop their own problem and solution; a problem can be posed (e.g., The bathrooms have become very dirty. How can we solve that problem?)