

TOWARDS A THEORETICAL FRAMEWORK FOR ONLINE PROFESSIONAL DISCUSSIONS

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Abstract

Online interactions are becoming commonplace for a multitude of educational purposes. Each context presents a unique and dynamic mix of variables that combine to shape the practice and the identities of those involved. In this article, sociocultural theories of learning and sociocultural theories of technology are explored as a way to view and to map the complex interactions that can occur. The case of synchronous online moderation meetings are used as an example of the combination of variables that can impact on the development of shared understandings of a practice. Online moderation can involve teachers from geographically diverse areas discussing and negotiating their judgement decisions. These discussions represent an intersection of a national curriculum, standards-referenced assessment, moderation protocols, site-specific practices and understandings, and individual teachers' knowledges and histories. It is suggested that the proposed theoretical combination addresses some of the limitations of each of the theories when investigating such a dynamic context. As higher education moves into increasing use of online modes of communication and a higher level of accountability the relevance of this discussion to higher education is evident.

Key words

Moderation; professional judgement; standards-referenced assessment; teacher identity; sociocultural theories of learning; sociocultural theories of technology; online moderation; professional discussion

Introduction

Internationally online communications are changing the delivery of higher education (HE) services (Centre for Digital Education & Converge, 2012). It is predicted that by 2020 there will be “mass adoption of teleconferencing and distance learning ... and a transition to blended learning environments” (Campus Technology, 2012, p. 2). Concurrently, the HE sector is also experiencing increasing levels of accountability. For example, in Australia the Higher Education Standards Framework (Tertiary Education Quality and Standards Agency (TEQSA), 2011) requires that:

The academic standards intended to be achieved by students and the standards actually achieved by students in the course of study [emphasis added] are benchmarked against similar accredited courses of study offered by other higher education providers. (p. 17, emphases added)

Ongoing research regarding benchmarking of standards across HE institutions addresses multiple ways to conduct moderation of assessments, including online

modes (for example, Krause et al., 2013; Petkovic, 2011; Thompson-Whiteside, 2012). However, the increasing possibilities for using online communications can shift attention from teaching practice to mastering the new technologies. With the introduction of new practices, it is important that the essential elements of a practice and the development of identities within that practice are not overlooked. This article explores a theoretical basis that could be used to examine the development of practice and identity when discussions are conducted online. The example case of online moderation meetings in a context of national standards-referenced curriculum and assessment is drawn on to illustrate the different elements that need to be considered when describing such events.

The introduction of a national standards-referenced curriculum for the foundation to secondary years in Australia amid a political context of increased accountability of teachers has resulted in a variety of processes to ensure a shared understanding of the required standards across the country. Teachers in Australia are provided with online annotated examples of Year level work portfolios at different standards of performance to assist them to understand evidence of a standard. These work samples can aid development of consistent judgements, yet they remain a static representation of a standard and still open to interpretation. The social moderation process that involves teachers gathering together to discuss their judgements of student work provides an opportunity for teachers to negotiate and clarify their understanding of the qualities that represent performance of an achievement standard. If this process were to be conducted online, possibilities to connect teachers from a diverse range of locations in professional dialogue about achievement standards would be opened up. Of particular interest is how these online interactions may support or hinder teachers' understanding of working in the practice of standards-referenced assessment, and their identity within this practice.

Online social moderation of assessment involves teachers from diverse locations and sociocultural contexts meeting synchronously to negotiate their judgement decisions based on criteria and standards of achievement. Social moderation is so named because it is a practice that can only be conducted through interactions with others, where teachers need skills of negotiation, and a trust in the professionalism of others in order to engage effectively. Bringing together diverse communities to discuss their understanding of a standard is both a strength of online moderation and a context that adds complexity to the moderation process.

For example, teachers develop shared meaning of a standard within their own school community or cluster of schools which is taken as knowledge of a standard. Bringing together different communities from diverse locations can create tension if what is taken as knowledge of a standard by one group is contested by another. Online moderation adds another complexity when conversations are not conducted in person, if teachers cannot view facial expressions, if there are delays in speech as well as other technological complications.

Theorising the practice of online moderation involves understanding knowledge as a social construction and the role of participants in shaping the practice as well as the

development of identity within the practice. An exploration of the interaction between the different influences on the development of shared meaning and hence comparable judgement decisions as teachers participate in an online moderation meeting could involve questions such as:

- What are the sociocultural processes involved when teachers meet online to moderate judgements about students' work?
- How does teachers' involvement in online moderation meetings support their participation in the practice of standards-referenced assessment?
- What factors support and hinder teachers' developing practice and identity in a standards-referenced assessment system when moderating online?

To answer such questions the theoretical framework needs to provide analytical tools that could be used to explain the social and cultural domains of human interaction and the development of practice and identity through participation in an online social moderation meeting. In the following sections the core elements of sociocultural theories of learning and sociocultural theories of technology are explored. It is suggested that the incorporation of significant aspects of these theories provides a starting position to view and to map the complex interactions that occur in an online moderation meeting. With the increasing use of online communication and increasing requirements for accountability in education it is important to explore different frameworks to understand the various interactions that contribute to the development of practice and the development of an identity within the practice.

Learning as social practice

Sociocultural theories of learning view knowledge as being socially constructed. Such a constructivist paradigm accords importance to the contextual factors in determining what is considered as knowledge and what is worth knowing (MacLennan, 2003). Learning is understood as occurring through interactions with others, and what is known is in relation to this social world and individual personal histories. The development of knowledge is considered a joint construction. While aspects of the world may be perceived similarly, ultimately multiple views of reality exist as each individual brings a unique set of interactions and history to any situation or activity. This view of action presents as an ever-expanding network of influences, quite often in dynamic tension and "always open to further interpretation" (Wertsch, del Rio, & Alvarez, 1995, p. 15).

Lev Vygotsky (1896 – 1934) is often attributed with laying the foundations upon which sociocultural theories of learning are based. Most sociocultural theorists relate back to the cultural historical work of Vygotsky in particular drawing from his theorising on human action and mediation. For Vygotsky (1979), thought was more than just a psychological process. Vygotsky stated that "the social dimension of consciousness is primary in fact and time. The individual dimension of consciousness is derivative and secondary" (p. 30). This reasoning placed thought or cognition in relation to the social event, thus positioning meaning as a co-construction. Sociocultural theorists believe that thoughts do not exist in isolation

but are constructed in a process of interaction. For example, before the online moderation meeting, the teacher has interacted with the assessment task and the standards to develop an understanding of what denotes quality for a particular standard. This understanding is developed through interactions with other historical practices in which the teacher has taken part, and has resulted in a particular reading of the standards. Once exposed in the online moderation meeting, this understanding or these thoughts may be challenged, negotiated or confirmed, as new meaning is constructed as a result of the discussion. Such occurrences are understood by socioculturalists as locating the mind in the interactions as they occur.

Acting within the cultural system, that is, understanding the objects and concepts inherent in the system, only occurs within the constructs of the culture. Vygotsky (1997) believed that cultural tools are the key to understanding actions and activity. Cultural tools encompass the semiotic systems, including language, that are inherent in a culture. These tools are not genetically acquired but rather developed through social interaction in a cultural system. The introduction of new tools into a system, can lead to new perspectives being developed which can cause tension within the cultural context (Wertsch et al., 1995). Conducting moderation online is an example of the introduction of new tools into an established system.

From a sociocultural perspective, learning to act within a cultural system is considered situated, and the learner is viewed as a cognitive apprentice who gains experience within a community of practice (Lave & Wenger, 1991). Lave and Wenger (1991) and Wenger (1998) have provided a framework for exploring learning as co-participation in social and cultural contexts. Learning is understood as “an integral part of generative social practice in the lived-in world” (Lave & Wenger, 1991, p. 35). Lave and Wenger’s (1991) and Wenger’s (1998) work is being defined as sociocultural as learning is theorised as an act of social practice. Within this framework, the skill to perform in a particular context is acquired through increasingly sophisticated opportunities to engage in the activities and knowledge of a practice. Knowing is situated in the social context, so that at any given time, knowledge that is considered worthwhile may be held by some within the community. Over time changes can occur to what knowledge is valued and to those who possess such knowledge. The roles of ‘newcomers’ and ‘old-timers’ may change dependent on the social practice in which participants are involved, and with what is being valued in the community. Online moderation may involve new skills of using technology and communicating in this context. Teachers who are confident working in this space may be afforded a status that they would not have received within historical face-to-face moderation practices. Participation in a practice can change both the participant and the practice.

Drawing from contemporary examples of different cultural traditions of apprenticeship, Lave and Wenger (1991) examined how different contexts promoted or inhibited the learning of newcomers. They demonstrated that learning is not always an outcome of apprenticeship nor does learning occur simply through engagement in the practices of a community. The authors included cases where learning was inhibited and apprentices were precluded access to the learning

resources of a community. Their framework helps to explain how one may come to belong in a social world, how perspectives may change through participation, and how identity and practice may develop through participation in a practice without overlooking factors that may inhibit this learning. This perspective may be a useful starting point to examine the development of shared practices while not losing sight of changes within the individual and their identity formation within the practice.

Limitations to a concept of learning through a community of practice have identified the multiple understandings involved in the use of the term community and the vagueness in which the term is used (Amin & Roberts, 2008; Cox, 2005; Doherty, 2004). Critics have called for explicit declaration of the intended meaning of the term or the adoption of specific terminology. In particular, the terms community and practice have been questioned with regard to the common association of these terms with unity, homogeneity, and consistency. While acknowledging these criticisms, Lave and Wenger's (1991) framework is useful in understanding social interactions as a learning context. For example, while two different moderation meetings may appear to be conducted in a similar manner with similar outcomes at a surface level, the practice as experienced by the teachers may be very different. Focussing on the systemic level, moderation is a form of accountability which encompasses relations of power. Teachers are accountable for their assessments and for the consistency and fairness of the judgements they make of students' work. This can cause some teachers to participate in the process of social moderation in a manner where the goal is to complete a procedure and meet departmental requirements. However, for other teachers accountability means engagement in processes of negotiation and debate, to professionally develop their capabilities as assessors who share common understandings of assessment criteria and standards. The teachers have responded to the moderation event in differing ways yet, at the systemic level, have achieved a similar result, which is the consensus of judgements. The concept of identity and the perception of empowerment affect how practices are interpreted, how they develop, and how they may be sustained. The relationship between practice and identity may be evident as teachers' differing understandings of assessment and their different assessment identities are exposed and as they develop as a result of their interactions with the various elements involved in the moderation practice.

Exploring notions of participation and the positioning of technologies

Teachers engaging in moderating students' work are involved in processes such as negotiation, clarification, and explanation. Wenger (1998) described the act of negotiating meaning as involving processes of participation and reification. Further, he describes participation as a complex process that involves acting in the social enterprises of a community on individual and social levels. Participation involves acknowledging and responding to engagement with others, so that there is some form of mutual recognition. Participation may be collaborative but it may also be competitive or involve conflict; it can also involve reflection or individual activities. Through participation identity is shaped and practices can change. Participation in a community of practice involves inculcating an identity and may be evident in

positioning within the community of practice, which is connected to the attribution of power and the embodiment of a sense of power.

In conjunction with participation, Wenger (1998) uses the term reification to describe engagement in a community of practice. Reification is a process and the product of projection in the negotiation of meaning where ideas or abstractions take on a sense of objectivity. An experience of meaning is reified in the objects or actions that act as a recipient of projected reality. For instance, a teacher's judgement on a piece of student's work is a complex web of systemic and school policies and practices, personal ideologies, expectations or biases, and knowledge of the student, of the task, of the performance context that are objectified in a mark or a grade. The final grade is representative of the various elements that contributed to its formation.

Through reification, negotiated meanings can also take on an existence of their own so that what once may have been one individual's understanding of a process has now moved beyond the individual to be part of the shared knowledge of a community. For example, a grade of C is no longer one teacher's understanding of what the signifier 'C' represents, or an understanding of a particular quality of response to an assessment item, but is rather the shared knowledge of the community. 'C' in terms of an assessment grade has meaning within the community as a part of a grading system, and as a part of a standard of performance within that system. Reifying ideas into practices can be both productive and unproductive. Translating policy into effective assessment processes and strategies can promote student learning. In contrast, meanings extrapolated from an ineffective assessment instrument may be an inaccurate representation of student learning and thus will have little chance of materialising as improved student learning. In higher education, an understanding of criteria that leads to the identification of the surface features of an assessment task rather than, for example, the development of argument may be unproductive in developing the expected graduate attributes in students.

Participation and reification form a duality, separate yet complementary. Together they are used by Wenger (1998) to describe the interplay between abstractions, objects and community members where through each other, meaning is established. Reification used alongside participation shows how abstractions can take on a concrete form as meanings are developed and identities are formed within a community of practice. For example, policy gains meaning through those who engage with it, and enact it, yet the policy also shapes the actions of its readers. In the case of social moderation, if moderation practices are enacted without procedures and processes, if this enactment is conducted without framing guidelines, then there is little consistency and continuity of practice that may be sustained over time. If the defining processes of social moderation, such as negotiation and consensus of standards are not promoted, then the common understandings that bind a community of practice will fail to be established. On the other hand, if moderation consists of rigid practices that adhere to strict, constraining guidelines, or if the process is enacted in such a manner that it becomes a mechanistic performance of superficial agreement then negotiation as interaction has not occurred and again

meaning is not generated. Routine performances of actions can mask a shallow level of engagement within a practice. In each of these examples, if participation or reification is deficient in some sense, then the generation of shared meaning becomes problematic.

In the duality of participation and reification as described by Wenger (1998), participation is understood to involve people while reification involves objects and abstractions. However, their duality implies that “people and things cannot be defined independently of each other” (Wenger, 1998, p. 70). Wenger’s work has been criticised as overlooking the effects of this relationship (Cox, 2005), that is, the connections that are formed, and the interplay of power between all abstractions and objects. In particular, within the context of online social moderation, the importance of the relationships between all elements involved in the process of online moderation is left understated in a concept of participation and reification.

Wenger’s (1998) interpretation of participation focuses on mutual recognition that involves shaping participants’ experience of meaning through negotiation, and then acting with purposeful responsibility for the meanings generated. Computers cannot perform such social actions, and so Wenger (1998) considers that computers do not participate in a practice but rather perform a role in that practice. Understanding the computer as a cultural tool (Vygotsky, 1997), and a mediational means (Wertsch, 1995) defines a role in a practice, but, it is proposed, does not limit the computer to this role. Another way of considering the role of cultural tools in a practice is to examine notions of articulation and assemblage as conceptualised by Slack and Wise (2005). Whereas, the dual process of participation and reification focuses on the negotiation of meaning within a community of practice, Slack and Wise’s (2005) use of articulation and assemblage focuses on how elements (for example, objects, ideas, practices) fit together and how meanings are understood within the cultural context. Through notions of technological agency and the concepts of articulation and assemblage, work undertaken within organisational parameters can be understood through the various relationships that are formed and the connections that are identified.

Slack and Wise (2005) used the concept of technological agency to understand the computer through the social and cultural context of which it is a part. This context has given a certain meaning to how the computer is perceived and used, the power attributed to it in this role, and the contribution it makes to forming and shaping identity within a practice. Culture, in this framework, is taken to mean the practice of everyday life bounded by the historical traditions that have given meaning to these practices. Culture is understood as a “whole way of life” in which technology is included as part of the artefacts involved in the processes that occur (Slack & Wise, 2005, p. 4). Culture and technology are not considered as two separate entities that impact on each other. To view technology within a concept of culture, or technological culture, redirects questions away from the relationship between technology and culture, to the issues involving the technology as integral to the culture in which it exists. Technology can only be understood through recourse to the culture in which it is embedded. Technology can be interpreted in multiple ways and take on quite different meanings dependent on the social and cultural context.

This perception of technology focuses analysis on the many connections between the multiple factors that are at play within dynamic and changing contexts. The concept of technological culture adds a technological lens from which to investigate online moderation within a sociocultural perspective of learning.

Understanding technology as more than an object but also as an agent, shaping while being shaped by the culture within which it exists, requires a re-examination and redefinition of the terms agent and agency. When agency is used to describe the nature of the connections within a technological culture, the definition of agency differs from commonly held notions of human involvement, requiring acts of intention, and as something that is possessed. Slack and Wise (2005) define agency as a process or a relationship that involves participants but do not limit this participation to humans alone. Agency refers to “the ability to bend space, to make something happen” (Slack & Wise, 2005, p. 131). This redefinition of agency broadens the concept to include technologies as participants that can be involved in relations of agency.

This stance appears at first to be in stark contrast to the position of agency posited by Wenger (1998). However, Slack and Wise (2005) do not attribute the computer with abilities to respond to engagement. That is not their argument. What appears to be a radical definition of agency, on closer inspection, has been qualified to include technologies while not attributing to those technologies human qualities and ways of interacting, or any sense of intention. When technologies are viewed as agents in everyday life investigations are opened up to consider the part played by the technology in transforming or contributing to an outcome. For example, teachers involved in online moderation may receive a weak connection and keep dropping out of the meeting reducing their contributions and providing a negative impression of meeting in such an environment; or the dynamics of turn-taking may cause frustration and inhibit the natural flow of the conversation. Such factors relating to technology play a part in shaping the conversation that will take place, and so the learning that will occur. The relationship of the technology with learning cannot be negated in the dynamics of a context such as online moderation.

Slack and Wise’s (2005) conceptual framework for understanding technological culture drew on the work of sociologists Michael Callon (1999), Bruno Latour (2005) and John Law (1992) who, amongst others, developed Actor-Network theory. Actor-Network theory (ANT) is a way of describing and tracing the interactions or connections that flow between actors, and how these form a network of interconnected relationships. ANT views a situation from the proximal, concerned with detail, the view from within. Actors in a system can be any element, human or non-human, and are defined by their relationship with other actors in the system. As Law (1992) has stated “an actor is a patterned network of heterogeneous relations, or an effect produced by such a network...an actor is also, always, a network” (p. 4). Networks are concepts that enable descriptions of the flows of translations between human and non-human actors that continually impose on each other to affect the stability of the network. ANT is concerned with the processes that occur in a system and answers the how questions; how some interactions overcome resistance and

become stable. By investigating these relationships ANT is a way of discovering how power, knowledge or organisation is generated (Latour, 2005; Law, 1992).

Slack and Wise (2005) have adopted the fundamental position of ANT but have suggested alternatives to overcome some of the problems that have become apparent as the theory has developed, such as the tendency to separate agent from structure instead of viewing the interconnectedness and instability of agency and structure. What Latour (2005) described as an actor-network, Slack and Wise (2005) prefer the phrase a map of articulations to depict the “constant movements, transformations, and circulations” (p. 122) that occur and the “unequal distribution of power and agency within networks” (p. 123). Articulation used within this theory refers to connections which are also contingent (that is, connections could be made in multiple ways or even not at all), and are prone to change over time. Articulations can consist of objects, ideas, words, practices or organisations. For example, an assessment grade given to a piece of student work may articulate: the teacher, the student, the student’s work, the assessment policy being used, the teachers’ understanding of the defining qualities of a standard, the teachers’ beliefs about learning, the teachers’ knowledge of the student, the physical environment in which the teacher was marking, the teachers’ attitude toward the value of this particular assessment piece, and so on. Computers then consist of the articulations of bits of machinery and electronics, but they are more than that. Computers are also articulations, for example, of the development of knowledge, the increasingly sophisticated ways of working and communicating, the desire for increased efficiency in work, the belief that greater accessibility to quantities of data will increase productivity, the practices involved in working with computers, the past experiences of working with computers, and the concept of a connected community.

A particular articulation of “practices, representations, experiences, and affects” in time and space is referred to as an “assemblage” (Slack & Wise, 2005, p. 129). Under certain conditions, some assemblages will form that have greater “tenacity and effectivity” (Slack & Wise, 2005, p. 130). This concept was described by the philosophers Deleuze and Guattari (1987) as comprising two segments. The first is content which consists of the material aspect and the ‘intermingling’ between bodies, which may refer to, for example, humans, governments, economies, and knowledge. The second is expression which includes actions and statements. With regard to technology, Deleuze and Guattari (1987) state that it is a mistake to consider tools in isolation, “tools exist only in relation to the interminglings they make possible or that make them possible” (p. 90). Assemblages refer to a particular configuration of articulations within a defined territory and possessing a certain amount of power (Slack & Wise, 2005). For example, in an online moderation meeting, besides the relations between teachers, the assessment task, the marking guide, the students, and the technology, consideration needs to be given to the idea of making dependable and comparable judgements of student work, and the articulation of this idea to others such as pedagogic practices, designing assessment tasks, professional development in new assessment practices, the value of standards-referenced assessment, and the value of teacher as assessor and judge of student work. To think of online moderation as an assemblage involves consideration of

many other connected practices, beliefs, ideas and attitudes which is more than just the relationship between the technology and culture.

Agency, now understood in the context of assemblage, “is possible or not possible depending on the particular assemblage” (Slack & Wise, 2005, p. 131). Agency is not possessed or exercised; agency is attributed to people or artefacts by the cultural context of which they are a part. What is important here is that culture is understood as the “movement and flow of relationships” (Slack & Wise, 2005, p. 128) which is a way to consider “how practices change, how values and beliefs shift, how power is distributed, [and] how responsibility is transfigured” (Slack & Wise, 2005, p. 123). The focus of study is no longer on the objects (for instance, the teachers, the tasks, the guidelines, the standards, the computers or the policy) but on the interplay between these elements, the mapping of articulations and the result of this particular assemblage.

The concepts of participation and reification (Wenger, 1998), and articulation and assemblage (Slack & Wise, 2005), have both been proposed as ways to identify and to understand the complex relationships between the concrete and the abstract as defined in a sociocultural context. Both concepts offer a way of understanding how abstractions and inanimate objects are attributed with shaping actions. At the intersection of Slack and Wise’s (2005) and Wenger’s (1998) theories, a community of practice may be understood as a mapping of particular articulations that constitute an assemblage. This includes a mapping of the wider social and cultural contexts, of which participants are also a part, that can have effect within a particular community of practice. Participants are part of, or considered as members of, many networks (Latour, 2005) or articulations (Slack & Wise, 2005) beyond the immediate community of practice (Lave & Wenger, 1991). The issue of identity is integral in a technological assemblage and relates to how a person responds to and uses the technology, and how an identity is imposed by the technologies that are used. For any teacher involved in an online moderation meeting, some links to elements may be stronger than others. For example, a Year 9 Mathematics teacher who has been teaching this discipline for many years may have stronger links to the historic practices of testing Mathematics objectively through question and response rather than the subjectivity of mathematical tasks. The opportunity for the online meeting to support learning (in the practice of standards-referenced assessment), is dependent on the elements that articulate, or come together in the meeting.

In a study of online social moderation, a theory of technological culture broadens the way cultural artefacts may be viewed. Technological culture provides a way to consider the complex connections and relations within the social and cultural contexts associated with online moderation meetings. A theory of articulation and assemblage provides one way to view the connections between the teachers, and cultural artefacts within the local and global, social and cultural contexts. The technology is afforded agency but only in the sense that it contributes to forming identity within a practice, and the shaping of the practice. This conceptual position also affords a means to account for the distribution of power within the context, and the different attributions and perceptions of power by the participants. Issues of

identity are related to issues and perceptions of power, and the relationships that are formed within a technological assemblage. The metaphor of a network of articulations and assemblages can be used to illustrate the complexity of these relationships, the tenuous nature of these connections and the “messiness” of the intermingling.

Developing shared understandings amongst complex intermingling

A theory of technological culture may help to understand the tenuous and variable nature of connections between elements including the technology, highlighting the need to look beyond the surface view of an event to understand what is happening and the implications of the relationship. For example, the inability to view other participants in the online moderation may inhibit participation for some teachers, in particular, those teachers who narrate themselves as good communicators, who use facial and body cues to guide their responses. In contrast, the inability to be viewed in the online moderation may release some teachers from the constraints of their title (for example, as Head of Curriculum), enabling them a greater level of participation in the negotiation process. While the inability to view other participants may be seen as a hindrance by some teachers, it may be considered to be a strength by others. In other words, if viewing other participants is understood as an element that articulates with other elements as part of the practice of online moderation, then to understand the relationship of this element with learning it is necessary to consider the other elements that work to strengthen or weaken this connection. By understanding the relationship between the different elements that connect in an online moderation meeting, it is possible to start structuring various supports that teachers can choose to access according to their needs.

To view the technology as a tool for communication in the online moderation process can overlook the relationship between the technology and identity formation within the practice and thus how the technology may enable or constrain the judgement-making and consensus processes, and the learning within a standards-referenced community of practice. For example, the difficulty teachers may experience communicating in the online moderation meeting could be connected to the technical features of the computer; however a deeper analysis may connect to elements such as an identity as one competent with technology, an identity as a type of communicator, or knowledge of standards-referenced assessment practices. Teachers’ self-identified enthusiasm to be involved in the process and their willingness to problem solve when mishaps occurred, are examples of connections that may work to overcome teachers’ lack of competence with the technology. The tools that are a part of the online meeting may act as mediation devices that encourage a focus on the qualities that illustrate a standard and so lead to development of a shared understanding of a standard.

Conclusion

With the increasing occurrence of online meetings amid higher levels of accountability across all levels of education, including higher education, it is important to understand how traditionally face-to-face educational contexts are

being enacted. The concept of communities of practice (Lave & Wenger, 1991; Wenger, 1998) is one way to investigate and analyse the connections that make up an assemblage by considering participation and the formation of identity within practice. It provides an avenue to investigate how learning occurs, how meaning is established and how practice may develop.

A view of technology as integral to the culture in which it exists opens possibilities to consider the mutually shaping relationship between the human, technological and other (non-human) elements. When culture is understood as being made up of multitudinous and intermingled connections, technologies are positioned as a part of these connections within this context. This point is important to stress; that technology is understood through the social and cultural context in which it exists, while also contributing to the shaping of this social and cultural context.

Together these sociocultural theories of learning and technology offer a way to analyse identity formation and the development of shared meanings as they are influenced by and influence the “flow of relationships” (Slack & Wise, 2005, p. 128) which make up the social and cultural technological context. As technological communications continue to evolve, it is important that our conceptual frameworks also evolve to encompass rather than simply acknowledge the effect of the technology on these processes and the complex relationship of the technology in developing the culture and the practice.

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