Learning to Teach with Mobile Technologies: Pedagogical Implications In and Outside the Classroom

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Abstract

Mobile teaching and learning (M-learning) has been a trending topic in recent years due in part to the increased proliferation of mobile devices in classrooms. Mobile technology can yield both opportunities and threats to the way an educational institution attracts and retains students and runs its business in terms of technological infrastructure, financial impacts, instructor and student training, human resource management, and course deployment. It provides avenues for flexible, personal learning for different groups in the same classroom and enables individual discovery. Real-time exchange rates, interactive management activities, synchronous communication, and global collaboration can also be brought into the classrooms anytime and anywhere. Yet the lack of Internet access in some rural and remote regions, lack of continuity of wireless data transfer between buildings, and the different qualities of mobile signals in different areas are still technical barriers to reach real anytime and anywhere mobile learning. The high costs of mobile data access and different mobile rates in different states and countries also increase the difficulties of adopting efficient mobile learning. Mobile technologies present risks and ethical dilemmas,

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including, but not limited to privacy, data storage and access, copyright, and equitable access. Mitigating risks and capitalizing on opportunities is possible, and when the implications for teaching and learning in and outside the classroom with mobile technologies are considered and addressed, a rich pedagogical experience can emerge.

1 Introduction

In recent years, technology has dramatically changed the way institutions conduct the business of education. A scan of the literature reveals the research field and professional writing outlets are replete with studies and reports involving 21st-century learners and their skills and ways of learning in elementary and high school contexts. The education field is awash with examples of student learning activities that incorporate technology.

With the goal of improving students' educative experiences, teaching practices have been researched and theorized extensively, especially in higher education classrooms of the latter half of the 20th century (Chickering and Gamson 1999). There is an array of educational philosophies underpinning teaching practice, especially within the context of working with adult learners. There are far fewer parallel studies examining 21st-century instructors in those same contexts. Absent are writing and research that weave the business and process of student learning in higher education that involves technology with the required pedagogical approaches needed in classrooms enhanced with mobile technologies. A noted exception was Herrington and Herrington's observation that "the disruptive nature of the integration of new technologies in education often results in practitioners relying upon tried and proven pedagogical approaches, leading to 'one step forward for technology and two steps back for pedagogy'" (as cited in Cochrane 2013, p. 247).

In response, this chapter identifies key concepts of mobile technologies as a disruptive force in higher education. But rather than a technical blueprint for implementation — a challenge because of the rapid evolution of technology itself and the myriad of applicable contexts — this chapter explores the philosophical frameworks that impact instructors' approaches to teaching in higher education contexts. The goal is for readers to conceptualize and perhaps reconceptualize the pedagogical approaches that instructors use with their learners. When pedagogical processes are at the forefront of course design and when instructors engage in reflective practice with the goal of improving teaching, learning that integrates mobile technologies can be student centered, engaging, and empowering for all.

1.1 The Impact of Disruptive Technologies

In the mid-1990s, a time when computers and computing technologies were just establishing a place within educational contexts, Bower and Christensen (1995) realized the potential of emerging, user-friendly computing technologies to both

disrupt and to yield opportunities. They identified an intersection between what consumers required from technology to improve performance and its overall trajectory as a performance-enhancing option in time. For Bower and Christensen (1995), "sustaining technologies tend to maintain a rate of improvement; that is, they give customers something more or better in the attributes they already value." Disruptive technologies, on the other hand, have a flatter trajectory on the dimension of time because of their differences and the high switching costs for users. Included in these costs is the perception that the disruptive technology is no more effective than what is currently in use and familiar to users.

Mobile technologies, in particular, are sustaining and disrupting teaching, learning, and operations. Some argue institutionalized, traditional didactical structures of knowledge transmission have translated into a narrow concept of effective teaching, defined in terms of the cultural artifacts that embody its presence and function and that vary within the social context (Crawford 1996). These artifacts traditionally include lecture halls, desks, podiums, paper, and the physicality of an instructor and students (Friesen 2010). Furthermore, "actions and expectations around new teaching models alienated some staff, particularly those who saw themselves as guardians of the old ways" (Higgins and Northover 2011, p. 131).

In traditional classrooms, "the receptivity and perceived legitimacy of new educational delivery modes is strongly related to the extent to which these instructional technologies reinforce or retain the central elements of the institutionalized and identity-enhancing classroom setting" (Jaffee 1998, p. 28). As Bailey (2002) proposed:

> For a large percentage of current teachers, the adoption of many educational technologies is a two part process involving 1) the reexamining of fundamental educational philosophy and pedagogy on the one hand, and 2) learning how to thoughtfully employ student-empowering applications of technology on the other.

This is still the case in our current educational contexts some 10 years later. For example, the scant research on mobile technologies and learning have focused on students' access to content rather than an engagement *with* the content or the cogeneration *of* content (Cochrane 2013).

2 Mobile Technologies in Higher Education

Mobile teaching and learning (M-learning) has been a hot keyword in education in recent years because of the dramatically increasing penetration rate of mobile devices globally. Mobile devices have experienced very rapid changes from 2000 to 2014, with a reported 1.1 billion people using smart phones and tablets to access mobile Internet technologies (Manyika et al. 2013). While mobile devices are currently used primarily for voice and text message communication, they are also used to send pictures, listen to music, record video, watch television, play games, surf the Internet, check email, manage schedules, browse and create documents, and more. According to Manyika et al. (2013):

> App downloads grew 150 percent in 2012, and … So-called near-field [transactions] (which use unpowered radio frequency chips to easily exchange data between devices) grew 400 percent in 2012 and are expected to increase 20-fold by 2016. Time spent playing video games, emailing, and text messaging on mobile phones grew 200 percent in the past four years. In the United States, an estimated 30 percent of all Web browsing and 40 percent of social media usage are now done on mobile devices. (p. 32)

Because of technology and Moore's Law, students can carry hundreds of electronic books on one electronic device and access academic resources virtually instantaneously. Students and instructors alike can access virtual classroom space with personal mobile devices and a volume of data is available at one's fingertips.

2.1 Opportunities and Threats with Mobile Technologies

Mobile technologies, by their very nature, present both opportunities and threats for administrators and instructors to consider and mitigate, including, but not limited to privacy, equitable access to technology, Internet access, and appropriate use. The pervasiveness of mobile technologies in higher education's classrooms and educational spaces both on and off campus presents an opportunity for instructors to harness the power of these devices for learning.

By recognizing the typical 21st-century student is connected to a network of peers and information, instructional strategies and learning activities both in and outside the classroom can become relevant, engaging, and responsive. Using mobile devices such as clickers and web-based polling are opportunities to engage students in real time by providing responses to questions and to course content. Based on these responses, the instructor can modify teaching in real time. For example, if the majority of students respond with the correct answer to a problem in balancing a chemical equation, the instructor can move on to the next idea. In a large class, the shy student who is reluctant to ask questions or volunteer comments out loud can contribute to the discussion electronically. In a Political Science class, the Internet can be used to stream live images of political uprisings as a conversation starter.

Publishers and software engineers are also recognizing how connected students are to their mobile devices. Many course textbooks are available for purchase as a PDF or e-text version, often at a substantially lower price. At Algonquin College, located in Ontario, Canada, for example, a campus-wide strategy to access only electronic textbooks from publishers or open access sites is expected to translate to student savings of over $2 million dollars by 2016 (K. MacDonald, personal communication, November 26, 2014). In addition, software companies now create mobile versions of software that address smaller screen sizes and bandwidth constraints. From a hardware perspective, if more students bring their own devices to campus (BYOD), the demand for access to institutionally owned computers in student labs decreases. Overall, these opportunities translate to the potential of improving the student experience on campus, and customer satisfaction is crucial for financial success.

The proliferation of mobile devices on and off higher education's campuses does not come without threats. The lack of continuity of wireless data transfers between

buildings and the different qualities of mobile signals in different areas are technical barriers to reach true anytime and anywhere mobile learning. On campuses with a high BYOD rate, investments in student computer labs are wasted. The unpredictability of the number of individuals wanting to access the intranet can cause system slowdowns and crashes. Beside this, the high costs of mobile data access and different mobile rates in different provinces and countries are also increasing the difficulties of adopting efficient mobile learning (Bridges and Traxler 2005). Institutions are at the mercy of data companies setting prices based on supply and demand.

Ethical issues concerning mobile devices are abundant and many of these issues translate to learning via a mobile device. With mobile learning comes the issue of students located in countries other than in North America who wish to participate in classes within the continent. An ethical issue here is the different legal procedures and laws in general. In testing situations, mobile devices, especially wearable technologies can be brought in the exam without being noticed. On a more personal level, with the ever-present mobile phone in campus dorms and other social spaces, the potential for privacy invasion is significant, as is cyberbullying. If an objectionable event goes viral, it is difficult to reverse a negative image of the institution as a whole.

As with many new technologies, the biggest concern for users and also the most significant ethical dilemma is the security of sensitive information. Institutions of higher education collect a great deal of personal information about their students via their mobile technologies. Using an unsecure Wi-Fi threatens to expose this sensitive information to anyone who may have the capability to gain access to the technology used to store and analyze information. With data becoming more mobile, the threat of security breaches increases (Kraglund-Gauthier and Young 2014). The privacy laws in the United States, for example, are different than the ones in Canada and the institutions providing the course via mobile learning could be accessing information of students that is legal for them to do in Canada, but not legal in other locations across the globe. Students participating in a class from another country may not be aware of the ability and right of their institution of choice to access and use their personal data for any purposes they wish to use it for (Bridges and Traxler 2005). With challenges such as these creating wariness and mistrust, it is little wonder that mobile technologies have yet to be firmly established as legitimate and powerful tools of teaching and learning. Higher education stakeholders need to anticipate these threats and put into place privacy policies and rules regarding data storage and appropriate use.

2.2 Key Considerations for the Integration of Mobile Technologies

Specific departments within the institution have different functions and different technology needs; therefore, a variety of software programs and hardware must be purchased. Technology is a significant expense, and decisions for implementation

must be proactively made that align with the institution's overall academic and operational goals. The needs of instructors in one department need to be considered in relation to the needs of other departments, and key decision-makers will need to balance the distribution of *desired* technology with *essential* technology. These programs and technologies must also be chosen based on how long they will serve the institution's needs and in consideration of hardware refresh rates and necessary software upgrades. Decision-makers must ensure that any investment made will be sustainable and that the selected technology is not anticipated to become obsolete too soon. As well, the potential impact of the technology must be assessed from various perspectives.

Mobile technology provides avenues for flexible, personal learning for different groups in the same classroom and enables individual discovery (Kukulska-Hulme and Traxler 2005). Additionally, mobile and data services offer potential for new methods of teaching and learning; for example, the emerging field of wearable technology has the potential to take learning anywhere. Real-time exchange rates, interactive management activities, synchronous communication, and global collaboration can also be brought into the classrooms at any time and from anywhere. With mobile technologies, students have access to a wealth of knowledge via their connections to campus libraries and to businesses that have a web presence.

Mobile technology and applications cannot be successful in isolation. An engaging instructor and effective curriculum design with inspiring content are vital for a successful mobile learning program. When "problems are often seen as an indicator of incompetence and failure" (Osterman and Kottkamp 1993, p. 21), specific competencies in creating and displaying content requires a comprehensive understanding of different types of hardware and software as well as new developed technologies the telecommunication industry. Well-designed course content can include not just readings and discussions but also incorporate the interactive communicative functions on mobile devices (Oblinger and Oblinger 2005). Functioning effectively in the media-rich classrooms of the 21st century requires a skillful and appropriate application of technology that is linked strongly to the curriculum.

When designing an effective learning activity that incorporates mobile technologies, instructors must consider the different characteristics of mobile devices and of mobile learners themselves. Individuals' past experiences, prior knowledge, and personal views and opinions tend to impact on the types of activities required for learning (Vygotsky 1978) and "their interpretations of the purposes or goals of an activity" (Crawford 1996, p. 44). Students use mobile phone in smaller time slots, such as waiting for friends or on a bus. A well-designed activity should make use of these smaller time slots. The smaller screen size and limited input options are key considerations. Mobile access has its limitation on the size of content. Videos can be valuable resources for learning but may be cumbersome and inefficient on mobile devices, and it may be difficult to read subtitles. Yet, similar to traditional learning environments, interactive functions and social communication are also effective ways to engage students and increase long-term memory. Discussion between students and communication with instructors helps students to understand

the materials and to apply their knowledge in real cases. Constructive feedback from students also helps improve instruction.

3 Pedagogical Paradigms Impacting Teaching and Learning

Although difficult to define because of the individualized nature of teaching and learning, the term *pedagogy* is often used in reference to the instruction of children and encompasses the art and science of teaching. Adding to this, Loughran (2006) argued that *pedagogical practice* includes more than the transmission of information, but also includes the "relationship between teaching and learning and how together they lead to growth in knowledge and understanding through meaningful practice" (p. 2). In contrast, a more inclusive definition not bounded by age incorporates the term *pedagogic setting* to "denote any identifiable group ... for whom teaching and learning are an explicit and overarching goal" (Leach and Moon 2008, p. 10).

In this chapter, pedagogy carries a broad, inclusive meaning that encompasses teaching and learning in higher education, one borrowed from the Center of Instructional Development and Educational Research (CIDER 2009). According to CIDER, "pedagogy represents the creation of environments designed for learning." In refining the concept of pedagogy even more specifically in terms of student-centered activities that incorporate mobile technologies, "Scholarly learner-centered pedagogy represents the conscious creation of environments designed to foster learning through a focus on learner autonomy, social engagement, and cognitive processing, based on principles of teaching and learning developed through theoretical and empirical research" (CIDER 2009). Such structured and analytical ways of thinking about beliefs and practice adds foundational intentionality to teaching (Dewey 1959).

3.1 Philosophical Underpinnings of Teaching

A developed educational philosophy of practice serves as "a tool to promote teachers' ongoing personal development" (Beatty et al. 2009, p. 100) and informs the process by which instructors approach the inclusion of mobile technologies into their design of student learning activities.

A behaviorist philosophy of education serves to characterize instructors who concentrate on teaching skills that enable learners to function within society and who tend to focus on behavioral modification through positive and negative reinforcement (Elias and Merriam 1984; Merriam 2001). The behaviorist instructor is often authoritative and directive, and their teaching tends to be sequential in nature, with students having little to no involvement in determining learning outcomes or delivery methods (Elias and Merriam 1984). One can find behaviorists leading traditional elementary and secondary classrooms and delivering lectures in higher education classrooms and in skills labs.

A progressive instructor acts as a guide to learning and is someone who creates opportunities for individuals to gain practical knowledge and skills that can be transferred to and from real-life experiences (Zinn 1999). Progressive instructors design learning experiences that enable students to reflect on experiences, evaluate the experiences, and, thus, gain a heightened awareness of the learning derived from those experiences (Lindeman 1926/1961). By making a connection between the material at hand and past material and experience, a student can bring a critical awareness to the new knowledge and experience.

When individuals are participants in their learning, they are less passive and are better prepared to play an active role in society (Dewey 1959). In educational settings designed by humanistic instructors, discussion is encouraged, student input and self-direction are welcomed, and personal insight is sought. The instructor's intent is to create opportunities for learners to delve into their own constructs of teaching and learning, perhaps challenging systemic and societal norms. Mutual trust and respect — a sense of community, as it were — is required.

Constructivist instructors assert that students build and interpret reality based on how they perceive their experiences. In this learning paradigm, instructors consciously create opportunities for learners to engage actively with the course materials and with each other. Direct lecture is minimized and the instructor functions as a facilitator, guiding students through interactive activities that build on their prior knowledge and understanding (Bangert 2004). In an early review of the effectiveness and efficiency of networked Internet communications technology in education commissioned by the Canadian Council of Ministers of Education and Industry Canada, "effectiveness of the technology seemed correlated with the extent of interactivity that the technology afforded the learners" (Ungerleider and Burns 2003, p. 30).

By understanding philosophical underpinnings of teaching, an instructor can frame thinking and pedagogical intent. In doing so, instructors have the awareness and potential to make learning more meaningful for their students. Yet, in the drive to address the learning needs of 21st-century learners by incorporating mobile technologies, it is important to "not lose sight of what matters in terms of quality pedagogy and learning experiences" (Kirkpatrick 2011, p. 24).

3.2 Effective Instruction in Higher Education

After collaborating with key scholars in the fields of higher education policy, administration, and economics, Chickering and Gamson (1999) released the document *Seven Principles for Good Practice in Higher Education* in 1987. They contended that the effective teaching of face-to-face post-secondary courses can be linked to the instructor who:

- Encourages student-faculty contact
- Encourages cooperation among students
- Encourages active learning
- Gives prompt feedback

- Emphasizes time on task
- Communicates high expectations
- Respects diverse talents and ways of learning (p. 76)

From a pedagogical standpoint almost two decades later, including these seven points into the design, delivery, and assessment of course outcomes is a prudent decision — one that has transferability to learning environments that include the application of mobile technologies.

Leach and Moon (2008) went so far as to attest that "Good teachers are intellectually curious about pedagogy" (p. 1). In consideration of the challenge in defining instructor effectiveness, Danielson's (2007) four broad domains of teaching responsibility are appropriate considerations within the context of mobile technologies in higher education because of the delineation of components: (a) planning and preparation, (b) the classroom environment, (c) instruction, and (d) professional responsibilities. Instructor effectiveness in terms of Domain 1: Planning and Preparation is derived from knowledge about six components, including among others, knowledge of content and pedagogy, resources, and instruction. Components of the "classroom environment" that may reveal teaching excellence include how the created environment enables interactions between facilitators and students that are respectful and understanding and are premised on a culture for learning. Other components of this domain involve classroom management of time, groups, tasks, and resources. Danielson's third domain is "instruction," which is comprised of five subcategories involving the ways in which instructors communicate with students about learning expectations and course content, engage students, use different assessment strategies, and be flexible and responsive to changing needs and situations. Regardless of definition, these dimensions are not mutually exclusive, but rather are interlocking elements that, when combined, comprise a holistic concept of an effective instructor (Danielson 2007; Strong et al. 2011) who incorporates mobile technologies effectively in ways that support student learning.

3.3 Reflective Thinking and Practice

One common thread throughout much of the literature about teaching is the importance of taking the time to examine the beliefs unpinning personal teaching practice, thus revealing personal philosophies of teaching and learning (Darkenwald and Merriam 1982). Schön (1983) differentiated between technological knowledge and "professional artistry" (p. vii) and urged instructors to use reflective practice to inform and develop their philosophies of teaching. Theorists have also acknowledged there is more than one framework from which to construct these personal philosophies (see, e.g., Brookfield 1990; Merriam and Caffarella 1999; Zinn 1999). Others, including Biggs (2002) and Flannery and Wislock (1991), have argued that a firm understanding of personal philosophies of teaching may enable instructors to make informed decisions on teaching methods and evaluations of student learning and reflections on practice.

"Reflective thinking is the process of making informed and logical decisions on educational matters, then assessing the consequences of those decisions" (Taggart and Wilson 2005, p. 1). Reflective thinking is also a hierarchical construct, moving from the technical, to the contextual, to the dialectical, with each level building atop the other. The foundation of Taggart and Wilson's (2005) reflective thinking pyramid is technical in nature, built from past experiences and the instructor's ability to set learning objectives and to design activities in which learners are able to meet outcomes while using mobile technologies. It is at the technical level that instructors need to begin to identify teaching practices that help students achieve course objectives. A key component of this level is the honest assessment of the instructor's own skills and knowledge of not only the mobile technology, but also learner-centered pedagogical processes. The instructor can advance to the contextual level by considering "underlying assumptions and predispositions of classroom practice as well as strategies used" (Taggart and Wilson 2005, p. 4). At the dialectical level of reflective thinking, the instructor considers the moral and ethical issues shaping instructional planning and practice. A dialectical level of thinking requires reflective practice, inviting peer review, and sets the stage for instructors to collaborate, to share strategies, and, thus, to improve practice.

Reflective practice in teaching can be depicted concretely in terms of an ongoing cycle of thought and action (Mentor et al. 2011; Schön 1983, 1987). According to Mentor et al. (2011), this cycle begins with reflection and, from this, moves into planning and enacting changes. Then, the reflective instructor takes results from the process and analyzes them in terms of desired outcomes. The cycle begins again with reflection on the evaluation of the results. Through this conscious cycle, the reflective instructor engages in a conversation with practice itself, and:

> In this reflective conversation, the practitioner's efforts to solve the reframed problem yields new discoveries which call for new reflection-in-action. The process spirals through stages of appreciation, action, and re-appreciation. The unique and uncertain situation comes to be understood through the attempt to change it, and changed though the attempt to understand it. (Schön 1983, p. 132)

Mentor et al. (2011) began with reflection; yet, some educators intentionally — and some, unintentionally — begin with incorporating mobile technologies, an action that is preceded by little reflection or inquiry into process, with evaluation and change then following a conscious reflection on that action.

Linking back to Taggart and Wilson's (2005) reflective thinking pyramid, "Self-reflection to interpret and inform practice and establish congruency between theory and practice would be indicative of functioning at a contextual level" (p. 4). Regardless of where that cycle begins, the process is a way in which instructors can develop an awareness of self and others in terms of teaching performance, its outcomes, and potential opportunities for further professional learning (Osterman and Kottkamp 1993). A growing self-awareness may lead to the recognition that teaching practices need to change because of changing circumstances — of content, of students, of delivery methods, or of institutional and societal pressures.

Societal pressures can influence thoughts and actions (Osterman and Kottkamp 1993). In the traditional structures of higher education, the Socratic method of knowledge transmission is deeply rooted in common practice. Ironically, Osterman and Kottkamp questioned why instructors who seek to improve their performance are challenged to identify the specific thoughts and actions which prevent teaching success. This is particularly troublesome in light of the recommendation that in order to improve practice and to move from the contextual level to the dialectical level of reflection, instructors need make time for collegial discussions and seek feedback from peers (Taggart and Wilson 2005). An examination of actual practice brings meaning to an instructor's underlying philosophy of teaching. If "teaching can be defined as a constant stream of professional decisions made before, during, and after interaction with the student; decisions that, when implemented, increase the probability of learning" (Hunter 2004, p. 3), it follows, therefore, that instructors' personal philosophies of teaching and learning are influenced by interacting factors, including their:

> Unique history of experience and awareness, the more generally recognized characteristics of the era, the culture, the ethos of the school environment, the role definitions of *teachers* and *students* [emphasis in original], the ways in which activity... is defined, and the interactions between people in the immediate social context. (Crawford 1996, p. 45)

By employing a rigorous strategy of reflective thinking to their course planning activities, instructors can identify how the current social contexts of 21st-century teaching and learning that incorporate mobile technologies impact course design and delivery. When faced with potential changes to habitual thoughts and actions, it can be argued that only through reflection can instructors identify that to which they are resistant and why. This is certainly the case with learning to teach with mobile technologies.

4 Future Directions

As higher education's classrooms fill with 21st-century learners who are accustomed to learning with mobile devices, it is imperative that all stakeholders work to resolve the tension emerging from the mismatch of technological tools and platforms, instructional pedagogy, and the teaching and learning context of instructors and students. "Change is ubiquitous and relentless, forcing itself on us at every turn" (Fullan 1993, p. vii). It is imperative that stakeholders in higher education acknowledge and address the need for a focus on the art and craft of teaching — regardless of tools used — rather than a concentration on the technical mediums of content delivery and learning activities. Instructors with a vested interest in improving student learning "have to ride each new wave of technological innovation in an attempt to divert it from its more natural course of techno-hype, and drive it towards the quality agenda" (Laurillard 2005, p. 71). The issue is separating the hype from the demonstrable "best" practices.

Instructors need to shift their own thinking about pedagogical processes to address the dynamic and shifting nature of teaching and learning in a classroom

milieu infused with students' personal mobile devices. In order to thrive in the 21st century, all levels within institutions of higher education need to accept and leverage mobile technologies to transform the way instructors engage with their students and how they provide innovative educational experiences and deliver content. Results from previous research (Kraglund-Gauthier 2014) indicated that the more experience participants have with technology, the more confidence they have in their own abilities to use that technology. Yet gaining more experience carries with it a commitment of time — a finite commodity for any instructor; furthermore, developing content matter knowledge tends to be prioritized over developing content delivery methods.

Instructors who focus on constructivist pedagogical activities can efficiently maximize on students' engagement and motivation, and, in turn, their students will feel a sense of connection with instructors and classmates (Lalonde 2011). How instructors engage their students is due, in part, to the creation of spaces that are conducive to exploration and experimentation with mobile technologies that move beyond mobile technologies as "purely social tools for informal use into powerful tools for enabling student-generated content and collaboration within student-generated learning contexts" (Cochrane 2013, p. 255). It is through active reflection and engagement that an instructor can identify and attain high standards of teaching and develop expert knowledge that leads to self-efficacy and self-actualization for themselves and their students (Bandura 1993; Taggart and Wilson 2005). "The stronger the perceived self-efficacy, the higher the goal challenges people set for themselves and the firmer is their commitment to them" (Bandura 1993, p. 118). With self-efficacy and commitment established, the integration of mobile technologies is sustained.

Clearly, it is incumbent on the instructor to think critically about the process of learning and the quality of desired learning outputs when making decisions on what mobile technologies to incorporate into a course's learning activities. "The adoption of an innovative technology brings into question the fundamental pedagogical beliefs, the technology is marginalized or rejected until it can either be incorporated into the educator's existent *pedagogical* model, or until the model itself evolves" (Bailey 2002). Pedagogical processes, reflective thinking, and the frameworks of Bloom's (1984) *Taxonomy of Educational Objectives* and Taggart and Wilson's (2005) reflective thinking pyramid serve as guiding principles for designing learning activities, not only for students, but also for instructors' own acquisition of knowledge and applicable skills in teaching with mobile technologies. Reflection on practice has the potential to inform the types of goals instructors set for themselves when learning to incorporate mobile technologies and can reveal changes in perspective in the values, beliefs, and actions that form one's pedagogical identity and shape practices.

Mastering the techniques of teaching with mobile technologies may not be an intuitive, simple process; furthermore, instructors "need to see learning to teach as an ongoing process with more challenging than easy answers" (Weimer 2010, p. 157) and to accept mobile technology's disruption of existing instructor-centered

power relations. As in any professional industry, the higher education instructor's skill in wielding the tools of the trade is one that improves over time with practice, developed and sustained through research and theory.

5 Cross-References

- ▶ Adoption of Mobile Technology in Higher Education: Introduction
- ▶ Accessibility Challenges in Mobile Learning
- ▶ Characteristics of Mobile Teaching and Learning
- ▶ Design of Mobile Teaching and Learning in Higher Education: Introduction
- ▶ Development of Mobile Application for Higher Education: Introduction
- ▶ Gatekeepers to Millennial Careers: Adoption of Technology in Education by Teachers
- ▶ Mobile Learning and Engagement: Designing Effective Mobile Lessons
- ▶ Mobile Learning: Critical Pedagogy to Education for All
- ▶ Mobile Technologies for Teaching and Learning
- ▶ Transformation of Traditional Face-to-Face Teaching to Mobile Teaching and Learning: Pedagogical Perspectives

References

Bailey, M. 2002. Learning, technology and educational transformation: Transforming pedagogical practice. http://education.ed.pacificu.edu/bcis/workshop/pedagogy.html. Retrieved 3 Dec 2014.

Bandura, A. 1993. Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist* 28(2): 117–148.

Bangert, A.W. 2004. The seven principles of good practice: A framework for evaluating online teaching. *The Internet and Higher Education* 7: 217–232. doi:10.1016/j.iheduc.2004.06.003.

Beatty, J.E., J.S.A. Leigh, and K.L. Dean. 2009. Philosophy rediscovered: Exploring the connections between teaching philosophies, educational philosophies, and philosophy. *Journal of Management Education* 33(1): 99–114. doi:10.1177/1052562907310557.

Biggs, J. 2002. *Teaching for quality learning at university*. Buckingham: The Society for Research into Higher Education.

Bloom, B.S. 1984. *Taxonomy of educational objectives*. Boston: Allyn and Bacon.

Bower, J.L., and C.M. Christensen. 1995. Disruptive technologies: Catching the wave. *Harvard Business Review* 73(1): 43–53.

Bridges, N., and J. Traxler. 2005. Mobile learning: The ethical and legal challenges. In *Mobile learning anytime everywhere*, ed. J. Attewell and C. Savill-Smiths, 203–207. London: Learning and Skills Development Agency.

Brookfield, S. 1990. *The skilful teacher: On technique, trust, and responsiveness in the classroom*. San Francisco: Jossey-Bass.

Center for Instructional Development and Educational Research. 2009. *Pedagogy*. http://www.cider.vt.edu/pedagogy.html. Retrieved 13 Feb 2012.

Chickering, A.W., and Z. Gamson. 1999. Development and adaptations of the seven principles for good practice in undergraduate education. In *Teaching and learning on the edge of the millennium: Building on what we have learned*, ed. M. D. Svinicki New Directions for Teaching and Learning, no. 80. San Francisco: Jossey-Bass.

Cochrane, T. 2013. M-learning as a catalyst for pedagogical change. In *Handbook of mobile learning*, ed. Z.L. Berge and L.Y. Muilenburg, 247–258. New York: Routledge.

Crawford, K. 1996. Vygotskian approaches in human development in the information era. *Educational Studies in Mathematics* 31: 43–62.

Danielson, C. 2007. *Enhancing professional practice: A framework for teaching*, 2nd ed. Alexandria: ASTD.

Darkenwald, G.G., and S.B. Merriam. 1982. *Adult education: Foundations of practice*. New York: Harper & Row.

Dewey, J. 1959. *Dewey on education*. New York: Teachers College, Columbia University.

Elias, J.L., and S. Merriam. 1984. *Philosophical foundations of adult education*, 2nd ed. Malabar: Kreiger.

Flannery, D., and R. Wislock. 1991. Why we do what we do: Our working philosophy of adult education. *Adult Learning* 2(8): 7–8.

Friesen, N. 2010. *The place of the classroom and the space of the screen: Relational pedagogy and Internet technology*. New York: Peter Lang.

Fullan, M.G. 1993. *Change forces: Probing the depth of educational reform*. Philadelphia: Falmer Press.

Higgins, A., and M. Northover. 2011. Implementing an online system: Voices of experience. In *Flexible pedagogy, flexible practice: Notes from the trenches of distance education*, ed. E. Burge, C. Gibson, and T. Gibson, 127–138. Athabasca: Athabasca University Press.

Hunter, R. 2004. *Madeline Hunter's mastery teaching: Increasing instructional effectiveness in elementary and secondary schools*. Updated, Rev. ed. Thousand Oaks: Corwin Press.

Jaffee, D. 1998. Institutionalized resistance to asynchronous learning networks. *Journal of Asynchronous Learning Networks* 2(2): 21–32.

Kirkpatrick, D. 2011. Flexibility in the twenty-first century: The challenge of Web 2.0. In *Flexible pedagogy, flexible practice: Notes from the trenches of distance education*, ed. E. Burge, C. Campbell Gibson, and T. Gibson, 19–28. Edmonton: Athabasca University Press.

Kraglund-Gauthier, W.L. 2014. Chapter 7. An instructional designer's tale: The ghost in the machine, supporting the virtual post-secondary educator. In *Teaching online: Stories from within*, ed. T.G. Ryan and D.C. Young, 75–88. Champaign: Common Ground.

Kraglund-Gauthier, W.L., and D.C. Young. 2014. Chapter one. Hiding behind a password: Are online classes as private as we think? In *Legal issues in global contexts: Perspectives on technical communications in an international age*, ed. K. St. Amant and M. Courant Rife, 7–26. Amityville: Baywood.

Kukulska-Hulme, A., and J. Traxler. 2005. *Mobile learning: A handbook for educators and trainers*. New York: Routledge.

Lalonde, C. 2011. Courses that deliver: Reflecting on constructivist critical pedagogical approaches to teaching online and on-site foundations courses. *International Journal of Teaching and Learning in Higher Education* 23(3): 408–423.

Laurillard, D. 2005. e-Learning in higher education. In *Changing higher education: The development of teaching and learning*, ed. P. Ashwin, 71–84. London: Routledge.

Leach, J., and B. Moon. 2008. *The power of pedagogy*. Thousand Oaks: Sage.

Lindeman, E. 1926/1961. *The meaning of adult education*. Montreal: Harvest House.

Loughran, J. 2006. *Developing a pedagogy of teacher education: Understanding teaching and learning about teaching*. New York: Routledge.

Manyika, J., M. Chui, J. Bughin, R. Dobbs, P. Bisson, and A. Marrs. 2013. *Disruptive technologies: Advances that will transform life, business, and the global economy*. McKinsey Global Institute. http://www.mckinsey.com/insights/business_technology/disruptive_technologies. Retrieved 27 Nov 2014.

Mentor, I., D. Elliot, M. Hulme, J. Lewin, and K. Lowden. 2011. *A guide to practitioner research in education*. Thousand Oaks: Sage.

Merriam, S. (ed.). 2001. *The new update on adult learning theory*, New directions for adult and continuing education, no. 89. San Francisco: Jossey-Bass.

Merriam, S., and R.S. Caffarella. 1999. *Learning in adulthood: A comprehensive guide*, 2nd ed. San Francisco: Jossey-Bass.

Oblinger, D., and L.J. Oblinger. 2005. *Educating the net generation*. Louisville: EDUCAUSE.

Osterman, K.F., and R.B. Kottkamp. 1993. *Reflective practice for educators: Improving schooling through professional development*. Newbury Park: Corwin Press.

Schön, D.A. 1983. *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Schön, D.A. 1987. *Educating the reflective practitioner*. San Francisco: Jossey-Bass.

Strong, M., J. Gargani, and Ö. Hacifazlioğlu. 2011. Do we know a successful teacher when we see one? Experiments in the identification of effective teachers. *Journal of Teacher Education* 62 (4): 367–382. doi:10.1177/0022487110390221.

Taggart, G.L., and A.P. Wilson. 2005. *Promoting reflective thinking in teachers: 50 action strategies*, 2nd ed. Newbury Park: Corwin Press.

Ungerleider, C., and T. Burns. 2003. *A systematic review of the effectiveness and efficiency of networked ICT in education. A state of the field report to the Council of Ministers of Education, Canada and Industry Canada*. http://www.cckm.ca/pdf/SystematicReview2003.en.pdf. Retrieved 12 Nov 2014.

Vygotsky, L.S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Weimer, M.E. 2010. Chapter 7: New faculty: Beliefs that prevent and promote growth. In *Inspired college teaching: A career-long resource for professional growth*, 149–172. San Francisco: Jossey-Bass.

Zinn, L.M. 1999. *Philosophy of adult education inventory [Brochure]*. Boulder: Lifelong Learning Options.