Chapter 11
Doctoral Learning and Cognitive Apprenticeship: Technology Tools for Emerging Scholars

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ABSTRACT
This chapter discusses the role of cloud technology tools in helping build mentoring relationships in online doctoral programs, drawing on examples and experiences observed in the author’s 15 years as a PhD dissertation chair. Ideas of cognitive apprenticeship and learning communities together provide a framework for identifying methods and skills that are helpful in the development of emerging scholars. The author describes the steps of modeling, coaching, scaffolding, articulation, reflection, and exploration in the context of helping doctoral learners through to completion. Practical implications of using cloud technologies such as web conferencing, folder and file sharing, scheduling tools, and learning management systems are discussed through examples. The author also considers online strategies for fostering of one on one mentoring relationships for doctoral research and writing, as well as establishing and maintaining communities of doctoral peer groups.

INTRODUCTION
This chapter discusses how cloud technologies provide tools to help build the mentoring relationships that are needed for doctoral students to become scholars in their own right. I draw on observed examples and experiences to discuss a model of cognitive apprenticeship as first described by Collins, Brown, and Newman (1986) and Collins, Brown, and Holm (1991). This model is helpful for understanding the required relationships and commitments in online doctoral learning, especially between mentors and doctoral students. When these relationships are formed early in the process of dissertation research, progress in the degree program can be encouraged, and is more likely to culminate in timely completion (Kumar, Johnson, & Hardemon, 2013). As noted by Lyons, Scroggins, and Rule (1990), “It is clear that doctoral students who had experienced a close working relationship with a faculty member had a fuller education.
than their counterparts who did not” (p. 284). Technology can foster these relationships, particularly for doctoral students who study at a distance, including those enrolled in online programs. I discuss my own experiences of using technology in online programs spanning over 15 years, as well as the entry of helpful cloud tools for conferencing, folder and file sharing, scheduling, and community building.

As occurs with any innovation, the availability and growth in online doctoral programs has not come without its challenges. For individual students, the challenges include a geographically dispersed community of learners and a mentor who is accessible only from a distance. Learning at a distance can be a lonely and isolating experience (Erichsen & Bolliger, 2011), especially for doctoral students who may become disengaged when the demands of careers and families keep them from interacting regularly in a community of scholars. Doctoral learners in online programs also work with dissertation chairs and committee members whom they may have never met in person. With no regularly scheduled seminars or classes, both student and mentor need to find other ways to engage proactively for progress to occur. The idea of cognitive apprenticeship provides a useful framework with which to discuss cloud technology tools that facilitate the mentoring of doctoral students in an online program.

Elements of cognitive apprenticeship are modeling, coaching, scaffolding, articulation, reflection, and exploring (transfer of learning) (Austin, 2009). Embedded within these methods of cognitive apprenticeship are also the building of trusting relationships and the importance of writing feedback. The benefits of cognitive apprenticeship necessarily extend beyond graduation for new scholars. Ideally, they will be able to conduct research without the close mentoring that was provided during the dissertation process.

Online Doctoral Programs

The growth in enrollments in online degree programs in the last 10 or 15 years is well documented (Allen & Seaman, 2015), and doctoral programs have been part of that growth. With access to online learning, individuals may no longer see the need to relocate, change employment status, or even postpone plans for family to pursue graduate studies. In addition, many private online universities have relatively open enrollment and admission criteria, which further increase accessibility. As some have pointed out, doctoral learning is no longer just for an elite group (Johnson, 2014), as it has become available to a wider spectrum of people across the world (Engels-Schwarzpaul, & Peters, 2013; Metcalf, 2006). Others (deMeyer, 2013; Preston, 2014; Radda, Cross, & Holbeck, 2012) have advocated for a shift away from “traditional” PhD programs to those that are more applied, and more amenable to students who are already working in their fields and could attend professional doctoral programs at a distance. Nerad (2012) has mentioned the increasing globalization of the PhD, which points to the need for tools that nurture important academic relationships across language, cultural, and geographical boundaries. My PhD students have lived in various regions of the United States, as well as in Africa, South America, and Europe. When one of my students conducted her final oral defense, she and her committee members called in from four different continents. The number of doctoral learners in the USA alone may be approaching 400,000 (Walker, Golde, Jones, Bueschel & Hutchings, 2008), which necessitates the use of all available technology to help them achieve their goals. Cloud technologies have emerged to facilitate the needed cognitive apprenticeships within geographically dispersed learning communities.

Cloud technologies were in their infancy when I began teaching online in 2000. While online learning technology was initially transformative in its capacity to connect learners in different parts of the country and world, most learning management systems (LMS) were also rudimentary and text-based. For many
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