Applying Connectivist Principles to Training for Technical Writers

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INTRODUCTION

This paper describes the application of connectivist principles to training for technical writers at SMSP Corporation. The paper begins with a description of the training need. It then discusses the theory of connectivism, including representative theorists, factors that influence learning, the role of the instructor, the strengths and weaknesses of the theory, and academic references. The paper concludes by explaining how the principles can be applied to training, describing the target audience, and discussing real-world constraints related to implementing the proposed training.

REAL-WORLD SITUATION: TRAINING FOR TECHNICAL WRITERS

In this paper, a fictitious company, SMSP Corporation, is used to symbolize a typical web-based software manufacturer with a typical need: Its suite of software products is growing, and it must hire and train new technical writers to document those products on short order. New writers need to learn the standards and procedures used by the Information Development team, as well as the features of the products they are documenting, to be effective technical communicators.

Currently, new writers read the existing product documentation, begin using a test system, and listen to WebEx training sessions conducted by seasoned trainers to become fluent with the SMSP product line. In addition, new writers work closely with experienced writers, trainers, and engineers, who guide them through the process of accessing and using test systems and understanding documentation conventions related to the product. This process takes a great deal of time and effort, and the results can be inconsistent, depending on the diligence and persistence of the new writer and the content

of the training sessions he or she listens to (some sessions might be more comprehensive than others). Further, team productivity decreases when experienced writers, trainers, and engineers need to split their time between their own project responsibilities and the task of orienting new writers. SMSP Corporation needs to train technical writers in a way that is consistent, repeatable, and scalable and that will not require extensive involvement from experienced team members.

THE THEORY OF CONNECTIVISM

In "Connectivism: A Learning Theory for the Digital Age," George Siemens introduced the theory of connectivism as an alternative to the established theories of behaviorism, cognitivism, and constructivism (Siemens, 2004). Rather than attempt to revise existing theories, Siemens proposed an alternative theory because, "the underlying conditions [had] altered so significantly that further modification [to existing theories was] no longer sensible" (Siemens, 2004). According to Siemens, those underlying conditions included:

- The pace at which knowledge becomes obsolete. According to Gonzales, as quoted by Siemens, "half of what is known today was not known 10 years ago" and "the amount of knowledge in the world is doubling every 18 months according to the American Society of Training and Documentation (ASTD)" (Siemens, 2004).
- The idea that, "technology performs many of the cognitive operations previously performed by learners (information storage and retrieval)" (Siemens, 2004).

- "Know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)" and "the pipe is more important than the content within the pipe" (Siemens, 2004).

Connectivism attempts to explain how the rapidly changing information landscape impacts learning. In essence, learners need to continually process new information, evaluate that information to determine its relevance, and make decisions based on that information. They also need to be able to identify new information, and understand how that information affects previous decisions (Siemens, 2004). In addition, Siemens idenfities the following principles of the connectivist theory as follows:

- "Learning and knowledge rests in diversity of opinions"
- "Learning is a process of connecting specialized nodes or information sources"
- "Learning may reside in non-human appliances"
- "Capacity to know more is more critical than what is currently known"
- "Nurturing and maintaining connections is needed to facilitate continual learning"
- "Ability to see connections between fields, ideas, and concepts is a core skill"
- "Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities"
- "Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision"

(Siemens, 2004).

Representative Theorists

George Siemens: Author of the seminal work on connectivism, "Connectivism: A learning theory for the digital age" and other articles on connectivism. Siemens is affiliated with the Technology Enhanced Knowledge Research Institute, Athabasca Univeristy, in Edmonton, Alberta (elearnspace, 2010).

Stephen Downes: Affiliated with the National Research Council of Canada, Downes specializes in the fields of online learning, new media, pedagogy, and philosophy and has written extensively on the theory of connectivism (Downes, 2009).

David Cormier: Manager, Web Communications and Innovations, University of Prince Edward Island. Cormier has been credited with coining the term, MOOC (massive open online course) while Skype-chatting with Siemens (Cormier). He collaborated on CCK08 (Connectivism and Connective Knowledge, 2008) an education-related MOOC, with Siemens and Downes (McAuley, Stewart, & Cormier).

Key Factors that Influence Learning

To understand the key factors that influence learning, it is important to agree about what learning is and what it is not. In the connectivist view, learning is more than rote memorization or even the transference of information from instructors to students or from short-term memory to long-term memory. Rather, learning, "is a process of immersion in an environment, discovery and communication—a process of pattern recognition rather than hypothesis and theory-formation" (Downes, 2012, p. 11).

According to connectivism, "knowledge is distributed across a network of connections, and therefore…learning consists of the ability to construct and traverse

those networks" (Downes, 2012, p. 85). Further, learning "is distributive, that is, not located in any given place (and therefore not 'transferred' or 'transacted' per se) but rather consists of the network of connections formed from experience and interactions with a knowing community" (Downes, 2006).

Students and instructors are considered to be "nodes" in the connectivist network, and connections among nodes are key to learning. Several factors affect the strength of connections among nodes, including motivation (goals), emotions (feelings), exposure (repetition), and patterning (recognizing patterns in information) (Siemens, 2005).

Connectivism takes the stance that, "Learning is the creation and removal of connections between the entities, or the adjustment of the strengths of those connections" and learning theories describe, "how…connections are created or adjusted" (Downes, 2012, p. 9).

Other factors that influence learning include, "the ability to seek out current information and the ability to filter secondary and extraneous information" (Kop & Hill). Learners not only need to be able to find information in the network, but they need to evaluate and sort that information, and make qualitative decisions about the information they find.

Of particular importance to this paper, which focuses on learning in the corporate environment, connectivism attempts to address learning-related issues faced by corporations as they manage information and attempt to foster collaboration and information sharing among employees. Many organizations are encumbered with information silos, where people and content are segregated by organizational structures. To promote learning, corporations need to break down silos and facilitate connections

among information in their databases and among the people in their organizations. Behaviorism, cognitivism, and constructivism do not explicitly address the needs of corporate learners or the means of transferring knowledge within organizations (Siemens, 2004).

The Role of the Instructor in the Learning Process

In traditional classrooms, instructors are viewed as authority figures and information sources. Instructors design and control learning activities, and students look to instructors to validate conclusions. In connectivist environments, instructors are more likely to be facilitators, guides, and models. Students engage in social and technological networks in which participants, "direct their own learning [and] find their own information…away from the formal setting" (Kop & Hill). Moreover, technology, such as Skype, "brings anyone, from anywhere, into a classroom…. The largely unitary voice of the traditional teacher is fragmented by the limitless conversation opportunities available in networks" (Connectivism blog, 2010).

In addition, instructors take on the responsibility of amplifying content (in the sense of re-tweets that amplify posts on Twitter), curating content (arranging subject matter so that students will encounter it in meaningful ways), and filtering content (removing distractions from the content stream). Further, instructors need to maintain, a "persistent presence in the learning network…and to model critical thinking and cognitive attributes that reflect the needs of a discipline" (Connectivism blog, 2010).

Strategies Used to Exemplify this Theory

According to connectivism, learning relies on connections among nodes in networks. As a result, connectivist strategies must strengthen networks to maximize learning (Kop & Hill). Strategies that could be considered to be connectivist include the creation of in informal eLearning forums, such as MOOCs, online education, and blended learning programs, and using blogs, instant messaging, online meeting tools, and social media to transmit and receive information.

For informal eLearning strategies to be successful, they must provide interaction (enable the learner to discuss the subject or resource with others), usability (employ intuitive interface controls and navigational elements), and relevance (information that addresses the learner's immediate need) (Downes, 2012, p. 47).

Strengths of the Theory

Connectivism embraces new technology and explains how technology affects the way humans learn, and those are its greatest strengths. Proponents of connectivist theory contend that connectivism is "a learning theory for the digital age," and that the connectivist learning model "acknowledges the tectonic shifts in society where learning is no longer an internal, individualistic activity" (Siemens, 2004). Further, connectivism takes into account new tools and new ways of working in the "digital age," which "provides insight into learning skills and tasks needed for learners to flourish in a digital era" (Siemens, 2004). These characteristics distinguish connectivism from other learning theories, and they make it relevant to learning in the twenty-first century.

Moreover, connectivism explains that learning occurs, and is not diminished, when information and content reside in networks and databases. But this emphasis on network-based learning does not devalue the individual or the knowledge an individual possesses. For example, Siemens contends that connectivism starts with the individual and his or her network of information. This network, "feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to [the] individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed" (Siemens, 2004).

Weaknesses of the Theory

Critics of connectivism argue that it is not a true learning theory because it relates more closely to curriculum and pedagogy than to describing or explaining the phenomena that occur when learning takes place (Verhagan). Siemens counters this argument by stating that connectivism *is* a learning theory because it meets the criteria identified by Clark Hull and described by Gredler (Gredler, p. 8). These criteria include, "(a) clear assumptions and beliefs about the object of the theory, (b) key terms are clearly defined, (c) development of principles from assumptions, and (d) explanation of underlying psychological dynamics of events related to learning" (Siemens, 2006). To support these claims, Siemens presents the principles of connectivism: "connections are key to network learning," "patterning is one of the most significant elements of learning," and "meaning in a network is created through the formation of connections and encoding nodes" although "the presence of a new node…does not ensure learning" (Siemens, 2005).

However, connectivism continues to be, "perceived as relevant by its practitioners but as lacking in rigour by its critics" (Bell, p. 98). Critics claim that the principles of connectivism are not sufficiently "connected" to real-world examples to explain, "how the theory could function in practice" (Verhagan).

Further, some critics conclude that although education might be experiencing a paradigm shift with the advent of new tools and technology, connectivism should not be "treated as a separate learning theory in…its own right." Some critics do, however, credit constructivism with playing "an important role in the development and emergence of new pedagogies, where control is shifting from the tutor to an increasingly more autonomous learner" (Kop & Hill).

Academic References

Connectivism is a relatively new learning theory, and academic references are more limited than they are for tried and tested theories such as behaviorism, cognitivism, or constructivism. Further, connectivism lacks "empirical research literature to lend it support" (Kop & Hill) although frameworks are being proposed to study the application and effectiveness of the theory, "in a variety of educational contexts" (Boitshwarelo, p. 161).

George Siemens created a blog on connectivism (www.connectivism.ca) and in 2011, an issue of the *International Review of Research in Open and Distance Learning* was devoted to connectivism (Siemens, 2011).

Stephen Downes has also written extensively on the subject of constructivism (Downes, 2012).

APPLICATION OF CONNECTIVISM

Connectivist principles can be applied to training for technical writers through the use of eLearning modules, an online information portal, and instant messaging tools as illustrated in the following table.

Connectivist principle (from Siemens, 2004)	Learning strategies
1. "Learning is a process of connecting specialized nodes or information sources." 2. "Nurturing and maintaining connections is needed to facilitate continual learning." 3. "[The] ability to see connections between fields, ideas, and concepts is a core skill."	• Create an online information portal for SMSP writers (SMSP Writer Portal) that provides links to information sources and reference materials, such as eLearning modules, project plans, feature specifications, and subject matter experts. All writers will have read and write access to information in the portal for the purpose of collaboration. A lead writer will act as facilitator or moderator when necessary.
• "Learning may reside in non-human appliances."	• Create eLearning modules to introduce new writers to SMSP and explain documentation conventions. Provide access to modules from the SMSP Writer Portal.
• "Learning and knowledge rests in diversity of opinions."	• Use the SMSP Writer Portal as a discussion forum to encourage writers to raise questions and discuss issues related to documenting SMSP.
• "Capacity to know more is more critical than what is currently known[.]"	• Foster self-directed learning and exploration through self-paced eLearning modules.
1. "Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities." 2. "Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong	1. Enable and encourage writers to verify information on the SMSP Writer Portal and update that information if it is out of date. 2. Use instant messaging systems to enable writers to quickly connect with others to verify information.

Connectivist principle (from Siemens, 2004)	Learning strategies
tomorrow due to alterations in the information climate affecting the decision."	

TARGET AUDIENCE

The target audience of this training is experienced technical writers who are new to SMSP Corporation. These writers have proven technical writing skills, but they have little or no experience with the SMSP product suite. Further, these writers are often geographically dispersed, which limits face-to-face interactions with other writers, trainers, and engineers.

The connectivist learning theory is appropriate for technical writers because technical writers are:

- Skilled at gleaning information from various digital sources and networks
- Expert at describing or connecting concepts and transmitting information
- Experienced communicators inclined to make connections with others
- Autonomous learners motivated to adopt emerging technology

In addition, technical writers are tasked with writing, revising, and maintaining user guides, help systems, and other technical documentation and maintaining a high level of technical accuracy, which can be a challenge in the moving-target world of technology. This activity aligns well with connectivist principles, such as, "Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities" (Siemens, 2004).

In addition, technical writers could be considered the embodiment of connectivist learning theory: They are "the pipe [that is] more important than the content within the pipe" (Siemens, 2004). In other words, technical writers use their research and

communication skills to find relevant information and transmit that information to other nodes in the network, often without actually internalizing the information or transferring it from their own short-term memory to long-term memory.

CONSTRAINTS AND LIMITATIONS

The proposed training for technical writers recommends the creation of eLearning modules for self-paced training and the use of an online portal and instant messaging tools to foster communication among writers and subject matter experts (the network). The resources required to create these artifacts, which include Adobe Captivate eLearning software, Atlassian Confluence software for online collaboration, and instant messaging tools, such as Microsoft Lync and Atlassian HipChat, are available at SMSP Corporation and can be used for technical writer training without restriction. In addition, SMSP management has agreed to support the proposed training as a pilot activity, with the understanding that the training will not be allowed to impact the delivery of documentation required for upcoming product releases.

However, the success of the project depends largely on the willingness of technical writers to use the eLearning modules, review reference materials, and contribute content to the portal. There is a risk that writers might not participate in activities—an inherent risk that applies to all eLearning systems that are open and self-organizing, as opposed to learning products and systems that are controlled or mandated by policy. For SMSP Corporation, however, the risk is low. Writers and subject matter experts already use instant messaging tools and Confluence software for information

sharing. The proposed training solution simply provides organization and guidelines for the use of these tools, and introduces the use of eLearning modules.

CONCLUSION

Connectivism is a relatively new learning theory that attempts to describe how technology impacts learning and to recommend ways to foster and enhance learning in the digital age. Connectivist learning environments include MOOCs, online education, and blended learning courses, and the use of instant messaging software, online meeting tools, and social media to transmit and receive information. Educators continue to debate the merits of connectivism as a learning theory, and critics argue that connectivism is more closely related to a pedagogy or curriculum than an actual learning theory.

Regardless of whether connectivism is officially enshrined as a learning theory, however, its principles can be applied to the training of technical writers at SMSP Corporation. Those principles include the premise that information and content reside in networks and databases, and that the task for learners is navigating the networks and accessing the information when and where it is needed, rather than memorizing details. This premise is appropriate for the target audience, technical writers, because technical writers are tasked with finding, evaluating, and transmitting information when they create technical documentation. As a result, this paper recommends the creation of an online learning portal for technical writers based on connectivist principles. The portal will provide links to information sources and reference materials, such as eLearning modules, project plans, feature specifications, and subject matter experts, and it will enhance the connections and strengthen the ties among technical writers at SMSP Corporation.

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