

Proposed Theory of Developing Synergistic Knowledge

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Abstract: Through a review of literature informing constructivist approaches, distributed learning and indigenous knowledge, I propose a new theory of Developing Synergistic Knowledge and suggest possible implications for instruction and design in distributed learning environments. This theoretical piece forms the basis for future qualitative and quantitative work in understanding developing synergistic knowledge.

1. Objective

I wish to propose a theory where knowledge constructed in distributed learning environments functioning as socially engaged and cognitively diverse learning communities can result in knowledge that is greater than the sum of knowledge exchanged within the community. I refer to this as synergistic knowledge. I propose that synergistic knowledge forms at the interface of cognitively dissonant dialogue in socially situated communities of learners. What do we know about the nature of knowledge that is constructed in socially situated learning communities? What do we know about socially negotiated knowledge? Is it possible that the knowledge constructed in learning communities can be greater than the sum of the information exchanged in the community?

2. Perspective

The theory of *Developing Synergistic Knowledge* formed from the ontological perspective that learning is a socially situated endeavor. Learning involves drawing on ones prior knowledge and cognitive dissonance with what is known, what others know and what the learner knows. Learning is transformative and not simply a transmission of knowledge. Learning is *messy* and requires reflection of personal worldview and open consideration of other worldviews. Understanding adds to learning in that learning becomes transferable to new problems never encountered before. It is through understanding that we can move flexibly through new and similar domains. It is within this context that I developed and propose the theory of developing synergistic knowledge.

3. Methods

This theory draws from the literature on synergistic knowledge as presented in studies surrounding Indigenous and Western ways of knowing, as well as studies analyzing knowledge construction through communication in threaded discussions. I pull from the constructivist canon

as well as literature informing about indigenous knowledge. The proposed theory of developing synergistic knowledge evolved from the review of this literature.

4. Evidence

Learning environments should be situated in the context of a community of learners (CoL) or practitioners (Lave & Wenger, 2003). Lave and Wenger (2003) tell us that communities of practice are inclusive of individuals with diverse abilities, expertise and experiences where newcomers enter the community and move toward full participation. Newcomers adopt characteristics of the CoL including values, goals, community beliefs and structure of discourse (Jonassen, 1999). “Learning to become a legitimate participant in a community involves learning how to talk (and be silent) in a manner of full participants” (Lave & Wenger, 2003, p. 105). Learning within these communities occurs in teams rather than isolation (Jonassen, 1999). Learning represents a transformation of the individual and “implies becoming a different person with respect to the possibilities” (Lave & Wenger, 2003, p. 53). Polin adds that members will take on new responsibilities and roles within the community as they acquire new capabilities (Polin, 2004). This socialcultural model of knowledge and learning “creates flexible knowledge structures that facilitate the problem solving in new situations” (Grabinger, 2004, p. 55).

Learning communities work within the epistemic stance of constructivist learning environments where the learner is at the center of the learning experience. (Jonassen, 1999). These community centered environments include learner centered environments, knowledge centered environments and assessment centered environments (Bransford, Vrown, & Cocking, 2003). Learning communities allow for knowledge construction built on a learner’s prior knowledge, ideas and concepts leading them to deeper understanding that is demonstrated through both formative and summative assessments (Bransford, Vrown, & Cocking, 2003; Bransford, Vye, Bateman, Brophy, & Roselli, 2004).

A major learning tool of constructivist communities of learning is dialogue (Lave & Wenger, 2003). This is facilitated in distributed learning environments through the use of technology (Bransford, Vrown, & Cocking, 2003). A key component for the formation of learning communities engaging in meaningful dialogue leading to deep understanding are the elements of affective trust and cognitive trust (Barker & Camarata, 1998). Without trust, communities would not effectively engage in “generative dialogue [where] people let go of their positions and views” (Isaacs, 1999, p. 40). This is similar to Lave and Wenger’s thoughts about learning to talk within the practice (Polin, 2004). Polin uses as an example the OMAET program at Pepperdine University. Here, dialogue is primarily text based in both synchronous and asynchronous modalities. While individual growth is supported through these exchanges, the community goal is to advance the collective wisdom of the group (Bielaczyc & Collins, 1999). This is best facilitate when there is a diversity of opinions and expertise (Lave & Wenger, 2003; Sunstein, 2006; Surowiecki, 2004). “Studies of mock juries [show] that the presence of a minority viewpoint, all by itself, makes a groups decisions more nuanced and its decision-making process more rigorous (Surowiecki, 2004, p. 183) Wherever there are diverse opinions, there is the chance for conflict and cognitive dissonance.

How this conflict is resolved is very important to the learning process. It is through resolution of this cognitive dissonance that deeper understanding is developed (Bransford, Vrown, & Cocking, 2003). It is also at this confluence of differing perspectives and worldviews where synergistic knowledge lives.

There is little in the literature directly related to the formation of synergistic knowledge. One area of study that draws on the concept of synergistic knowledge is Indigenous knowledge systems. Specifically, comparisons of Indigenous ways of knowing compared to Western ways of knowing (Cochran et al., 2008; Le Grange, 2007; Yunkaporta, 2007). Indigenous knowledge differs from Western knowledge in that Western knowledge is divided into domains or disciplines (Cochran et al., 2008) where Indigenous knowledge is holistic, communal, circular, and synergistic. In this context, synergistic knowledge has its roots in the creation of new knowledge when opposites interact (Yunkaporta, 2007). Yunkaporta (2007) goes on to say that “Aboriginal Synergistic Knowledge can be used to overcome the Western binary oppositional logic that demands adherence to one absolute and rejection of its opposite. Aboriginal rationality instead allows conflicting ideas to coexist simultaneously” (n.p.).

In a study looking at Indigenous learners in a Western science-learning environment, Le Grange (2007) found that the environment was usually hostile to Indigenous knowledge structures. This resulted in collateral learning of which there are four types:

1. Parallel collateral learning-where multiple views can be maintained without experiencing conceptual conflict.
2. Simultaneous collateral learning-where the learner simultaneously learns about a concept from two different worldviews and can assess similarities and differences between the different worldviews.
3. Dependent collateral learning-where one worldview presents challenges for another worldview leading to the current belief being tentatively altered by construction of new knowledge.
4. Secured collateral learning-where the “Indigenous learner has to resolve the mental conflict created by Western science” (p. 583).

The learning process is strengthened through the resolution of cognitive dissonance creating a “convergence toward commonality” (Le Grange, 2007).

Like communities of learners, trust is also fundamental in systems where diverse ways of knowing engage in cognitive interactions (Hassel, 2004). In a study looking at diverse ways of knowing in cross-cultural paradigms, it was reported that trust was an issue. “At the outset, participants within each program reported significant mistrust of large, land-grant research universities in part because prior experiences informed them that their knowledge tended to be discounted or ignored if it did not fit within a scientific model” (Hassel, 2004). Hassel reported that programmatic success depended on building personal relationships through trust and creating a “spirit of open inquiry”.

The development of epistemic fluency within a practicing learning community can help build trust and understanding. “Epistemic fluency allows one to recognize, appreciate and understand the subtlety and complexity of a belief system that one has not encountered before” (Goodyear, 2007, p. 358). Epistemic fluency is the ability to represent a variety of epistemic games- “approved methods of constructing new knowledge in a culture” (p. 358). Goodyear (2007) goes on to say that “active engagement in the collaborative construction of knowledge is a core quality and a necessary pre-requirement for the development of epistemic fluency” (p. 363).

In a study looking at interactions and cognition in asynchronous computer conferencing, four classifications of discussions were studied with each leading to “the construction of different kind(s) of knowledge, representing different degrees of openness to the ideas of others” (Schrire, 2004, p. 480). Interaction patterns for each threaded discussion were analyzed. The patterns included: (1) instructor-centered, (2) synergistic, (3) developing synergism, (4) scattered, and (5) student centered. Distributed interaction similar to synergistic interaction relates to the collaborative learning process and that higher-order thinking was “associated with synergistic interaction more than with other types of interaction....Synergistic threads were found to differ significantly from instructor-centered threads on a classification differencing between exploration on one hand and integration and resolution on the other ($X^2 [1, n=48]=5.49, p < 0.05$)” (493). Schrire (2004, p. 493) concludes that these findings “fit social constructivist theories where thought is considered to be a socially mediated and dialogical process”.

5. Results

This body of literature combines traditional constructivist perspectives from western ways of knowing with more holistic views found in indigenous cultures. It is through this interaction that I propose this theory.

Statement of Theory

Knowledge is constructed in distributed learning environments that function as socially engaged and cognitively diverse learning communities that can result in knowledge that is greater than the sum of knowledge exchanged within the community. Synergistic knowledge forms at the interface of cognitively dissonant dialogue in socially situated communities of learners.

6. Significance and Implications

Working with synergistic knowledge as a theory for design, distributed learning environments should seek to maximize the level of open non-destructive dialogue within the community. This dialogue needs to be learner generated and learner centered. Tools such as synchronous chat and asynchronous threaded discussions would be fundamental to the development of synergistic knowledge. While voice chat tools might also be useful, they are not designed to easily maintain searchable records of the conversations that are important for increasing cognitive contact with dissonant ideas.

Course designers and instructors should design the course from the constructivist perspective. Early in the course, efforts should be made to establish community norms that govern all exchanges. The goal would be to develop epistemic fluency as a community and as individuals. This development of trust will then foster the freedom to risk and share ideas through engaged dialogue. I wish to differentiate between discussions and dialogue. The purpose of discussions is to reach a decision while dialogue explores the nature of choice (Isaacs, 1999). I extend this distinction further by stating that dialogue explores the nature of choice through deep understanding of dissonant perspectives.

Many courses have discussion boards. These boards should become *centers of dialogue*. Many times, questions or prompts are posted by instructors or by students at the request of instructors. The responses to these are often directed back to the instructor with little call for engagement. Students often cite materials assigned in class as part of their posts. This does not qualify as dialogue as defined above. Dialogue must be more organic rising out of the interests and ideas of the learners as they are introduced to the *big ideas* within the domain of study.

From a pedagogical perspective, the instructor should refrain from offering responses to posts that carry the characteristic of fact or quality. Rather, each instructor response given should be to stimulate increased engagement between the learners within the community rather than between the learners and the instructor. The instructor can help the learners connect with other members of the community by being familiar with the epistemic stances of each of the learners. They can suggest the posts of other learners and encourage them to take on new perspectives.

Trust is important to any community where synergistic knowledge can develop, so to is responsibility. The community should take on a sense of responsibility for the learning of the group. This means that everyone in the community should be aware of projects and ideas held by community members. It is my belief that as trust within the community increases, so will responsibility. This will lead to deeper dialogue and greater reflection that ultimately creates an environment where synergistic knowledge can develop. Finally, qualitative and quantitative work needs to be done to better understand the nature of developing synergistic knowledge.

Resources

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