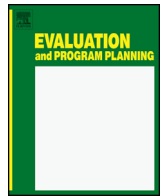




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And then the internet happened: Thoughts on the future of concept mapping

Daniel McLinden, Ed.D., Associate Professor

Division of General & Community Pediatrics, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue (ML 3026), Cincinnati, OH, 45229-3039, United States

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ABSTRACT

Over 25 years ago, in the late twentieth century, concept mapping emerged as a mixed method approach to inquiry that enables a group of people to conceptualize their thinking about a specific topic. Since then, the application of concept mapping has spread widely and an easy prediction for the future is that this trend is likely to continue; a more important and greater challenge is to think about the ways in which concept mapping may and should evolve. Discussed here are thoughts about the future of concept mapping including some predictions of likely directions and suggestions for new possibilities. Thoughts on the future are grounded in concept mapping applications that have emerged and gained ground in recent years; these include exploring wicked problems in communities and integrating concept mapping with other methods of inquiry. Thoughts on the future are also grounded in the social and cultural milieu in which we find ourselves at this time. The influence of social media and internet technologies has led to the emergence peer production and crowdsourcing as approaches to co-create information, knowledge, products and services. These tactics may create fertile ground for the further spread of concept mapping. This same collaborative milieu has produced the open software movement which in turn, offers opportunities to enhancing the methodology of concept mapping.

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In the latter part of the 20th century concept mapping was introduced (Trochim & Linton, 1986; Trochim, 1989c) and what started as a few projects and several articles has since expanded to a body of work cited in numerous publications (Trochim, This issue) and implemented in multiple dissertations (Donnelly, This issue). Not accounted for are all of the applied planning and evaluation projects that have relied on concept mapping methodology and are not shared in the literature. I know, from my own work and that of colleagues, that concept mapping has been a key aspect of many projects in corporate, not for profit and government settings but the details were confined to the project and never shared with the evaluation community. I suspect this occurs more often than not and if these projects could be counted the number of planning and evaluation projects that implemented concept mapping is likely to be substantially increase beyond what is currently known. Clearly, implementation of the concept mapping methodology has increased and this trend will likely continue, which is, of course, an easy prediction about the future. More challenging would be to predict how concept mapping might evolve in the future. But rather than try to predict the future, a task

fraught with risk and certain error, a more useful and safer approach is to start in the recent past and explore the maturation of concept mapping as a means of pointing toward future possibilities. I decided to look at trends that I noticed as I looked back on the start of the new millennium and used these observations as guideposts for some thoughts about the future of concept mapping methodology beginning with the growth of the internet, social media, and related technologies as a framework.

1. Here comes the crowd

Once you open the possibility that people are not only using the web as a platform to produce their own individual content, but also to pool their efforts, knowledge, and resources . . . the possibilities for what they can create are astounding (Benkler, 2002, p. 145).

At the time of the special issue of Evaluation & Program Planning in 1989, concept mapping was a nascent application. At the same time, the Internet was also in its early stage, “Tim Berners-Lee, the inventor of the Web, first started working on its development at CERN, the high-energy physics laboratory in

E-mail address: daniel.mclinden@cchmc.org (D. McLinden).

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Switzerland, in 1989 (Hall, De Roure, & Shadbolt, 2009, p. 993) and since then the web has grown to over four billion pages (de Kunder, 2016). That growth is interesting but more pertinent is that connecting people through the web has, as the quote by Benkler suggests, enabled new behaviors to emerge. A culture of cooperation and collaboration has emerged that has been enabled by internet technologies. Collaborative behavior of this sort has been most noticeable in technology development; examples include the development of the Linux operating system and the Firefox browser (Benkler, 2007; Brabham, 2008). Development of the Linux operating system relied on the internet to connect individuals who volunteered the contribution of their expertise; the result was many people with diverse expertise contributing to a complex whole (Moody, 2002). This culture of collaborative problem solving is not limited to software and is emerging in "... every domain of information and cultural production (Benkler, 2007, p. 5)." For example, the creation of content for Wikipedia, an information resource, is largely based on unpaid volunteers whose work to create content is comparable in terms of quality though more prolific than approaches that rely on corporate control and paid experts (Giles, 2005). Terminology has emerged to describe this behavior and Benkler (2007) describes "... the rise of effective, large-scale cooperative efforts ... (p. 5)" as peer-production. Rheingold (2002) used the term "smart mobs" to describe individuals using Internet and mobile technologies to form virtual communities. Not mobs in the usual sense but people with a common interest who use technology to find and connect with each other, form the smart mob, share information, collaborate, and take action. Surowiecki (2004) described the intelligence of groups and cites multiple instances in which the wisdom of crowds, that is, many individuals contributing their unique and individual perspective, can produce a better solution than experts. Recognizing the potential benefit of this phenomenon, organizations have implemented processes to take advantage of the wisdom of crowds through "crowdsourcing" – a term coined by Howe (2006, 2008) which describes a "... web-based business model that harnesses the creative solutions of a distributed network of individuals ... " (Brabham, 2008, p. 76). And in other instances, the crowd is a network of experts, what Page (2008) calls a "wise crowd," collaborating on a complex challenge. Increasingly this is an approach that is finding its way into scientific research (See, for example, Franzoni & Sauermann, 2014; Nielsen, 2012; Wuchty, Jones, & Uzzi, 2007) and is appropriate for addressing challenges in public health (Brabham, Ribisl, Kirchner, & Bernhardt, 2014).

2. Concept mapping and the wisdom of crowds

One thing a person cannot do, no matter how rigorous his analysis or heroic his imagination, is to draw up a list of things that would never occur to him. Attributed to Thomas Schelling, Economist and Nobel Laureate

The wisdom of the crowd phenomenon pre-dates the Internet and does not require technology but has emerged in the public consciousness because Internet and social media eases access to people who can form a crowd. However, it is not just a crowd that is necessary, Surowiecki (2004) named three elements that must be present to take advantage of the wisdom of a crowd: (1) diverse points of view, (2) independence of each point of view from the influence of others, and (3) a mechanism for aggregating the many individual points of view into a collective. These three elements ensure that diverse viewpoints emerge; these diverse views coexist and are integrated. These three elements also seemed to me to be an apt description of concept mapping and I considered concept mapping within this framework. Concerning (1) diverse

points of view, Trochim (1989c) noted that, "... conceptualization is best when it includes a wide variety of relevant people (p. 2)." The concept of (2) independence is evident in two data collections tasks: (a) in ideation generation, typically done through brainstorming, a task in which participants respond to the focus prompt; and (b) in card sorting, a task in which individuals complete an unstructured (card) sort of the ideas generated in the prior task. Trochim (1989c) wrote about the importance of independent thinking in the method; in idea generation, "... there should be no criticism or discussion regarding the legitimacy of statements which are generated ... also allow each participant to submit several statements anonymously on paper so that confidentiality will be preserved" (pp. 4–5) and in card sorting individuals should sort the cards "in a way that makes sense to you" (p. 5). Regarding the need for (3) a mechanism for aggregating individual input, Trochim (1989c) wrote, "... conduct a two-dimensional nonmetric multidimensional scaling" (p. 7)" and "... hierarchical cluster analysis ... to group individual statements on the map into clusters of statements which presumably reflect similar concepts" (p. 8). Concept mapping was at its inception illustrating properties that have emerged in this millennium. Trochim and the other authors in 1989 may have been ahead of their time in implementing a method to capitalize on the wisdom-of-crowds phenomenon. As collaborative approaches to problem solving, product development and a host of other challenges become more accepted and seem more the norm, the value of concept mapping will become more apparent and stakeholders will be more likely to recognize and understand that value. That understanding between individuals who implement concept mapping and stakeholders facing complex challenges will continue to increase the number of and diversity of projects for which concept mapping is an appropriate intervention. And, in fact, this millennium has seen the emergence of concept mapping as a method for understanding serious challenges in communities, designing solutions and engaging members of those communities in the discovery of the elements of the challenges and the design of interventions; the wisdom of "wise" crowds in collaboration has relevance to the emergence of concept mapping as a method for community engagement and participatory research.

3. Concept mapping in communities: wise crowds and wicked problems

... it becomes morally objectionable for the planner to treat a wicked problem as though it were a tame one, or to tame a wicked problem prematurely, or to refuse to recognize the inherent wickedness of social problems (Rittel & Webber, 1973, pp. 160-161).

Rittel and Webber (1973) coined the term "wicked problem" to distinguish between tame or benign problems where it is clear "... whether or not the problems have been solved ... and wicked problems which are, in contrast, vicious ... or tricky ... (p. 160)" and for which there is a moral obligation on the part of those charged with intervening to recognize and work with the wicked nature of the problem. In commenting on the nature of evaluation in the face of a wicked problem, Mertens (2015) urged adoption of mixed methods as an appropriate methodological framework to address wicked problems. A particular strength of mixed methods is the opportunity for methods of inquiry to include the voice and experience of community members. Concept mapping is, by definition, a mixed method approach consisting of both qualitative and quantitative components and seems well-suited to wicked problems for that methodological reason. But more importantly, concept mapping is a participatory method that is well-suited to tapping into the experience and expertise of the

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