



The role of inter-professional collaboration to support science learning: An exploratory study of the perceptions and experiences of science teachers, public librarians, and school librarians

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ABSTRACT

This cross-disciplinary, cross-institutional exploratory study looks at school librarians', public librarians', and high school science teachers' perceptions of and experiences with inter-professional collaboration to support science learning. The research explores the perceptions and experiences of professional librarians and science teachers regarding 1) inter-professional collaboration, including barriers to collaboration; 2) the relevance of 21st century skills to the teaching of science; and, 3) collaborations that can support and foster the teaching and learning of 21st century skills in the content area of science. Results from focus groups conducted with science teachers, public librarians, and school librarians revealed great potential for, but also significant challenges to, inter-professional collaboration.

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1. Introduction

Multiple frameworks in librarianship and education point to the need to develop information and research skills that prepare students to participate in 21st century contexts. These skills are wide ranging and include critical thinking and problem-solving, creativity and innovation, communication and collaboration, visual literacy, scientific and numerical literacy, information literacy, media literacy, information and communication technology (ICT) literacy, and health literacy, to name but a few (Institute of Museum and Library Services, 2009). Along with this emphasis on standards, there has been an increasing focus on STEM (science, technology, engineering, and mathematics) education at all levels, as a way of empowering students to be prepared for careers in science and technology. The project described here is an exploratory study focusing on the degree to which high school science teachers, high school librarians, and public librarians can collaborate more effectively, to facilitate the development of 21st century skills in high school science students in order to help them become more adept critical thinkers, problem solvers, and fully engaged participants in their communities, the workforce, and society as a whole. This research was undertaken as part of a planning grant intended to gain first-hand knowledge about day-to-day collaboration efforts among

librarians and high school science teachers. The goal of the study was not data saturation or generalizability, but rather the collection of preliminary data that would allow for the design a larger scale project in a subsequent phase.

2. Problem statement

Given that STEM teachers are the content experts in their disciplines while librarians are the content experts in information, media, and technology skills, it would seem that teacher and librarian collaboration would be an effective means to promote the development of 21st century skills within the context of STEM courses. However, evidence that such collaboration is occurring is spotty at best, and no model of teacher and librarian collaboration has been widely adopted, either in library and information studies or in education. Gathering data on the perceptions and experiences of science teachers and school and public librarians with collaboration and 21st century skills instruction is an important step toward developing a model that can be adopted widely. Much can be learned by exploring the perceptions and experiences of teachers and librarians, including those who have experienced successful collaboration, those who have experienced unsuccessful collaborations, and those who, for whatever reason, have not engaged in collaborations. Focusing only on successful collaborations would likely produce skewed results and lead to a simplistic view of the myriad factors that affect attitudes toward inter-professional collaboration.

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3. Literature review

In *Standards for 21st Century Learners*, the American Association of School Librarians (2007) states, “Multiple literacies, including digital, visual, textual, and technological, have now joined information literacy as crucial skills for this century” (p. 3). Nearly twenty years ago, the New London Group (1996) argued for a “pedagogy of multiliteracies,” which they explicitly linked to empowering all students to learn “in ways that allow them to participate fully in public, community, and economic life” (p. 60). Since then, numerous sets of standards have been put forth by various stakeholder groups to try to ensure that all students acquire the skills needed to be successful in both their public and private lives. In addition to AASL’s *Standards for 21st Century Learners* (American Association of School Librarians, 2007), the Association of College and Research Libraries has defined a number of literacy standards, including the *Information Literacy Competency Standards for Higher Education* (Association of College and Research Libraries, 2000) and the more recent *Framework for Information Literacy for Higher Education* (Association of College and Research Libraries, 2015); the Partnership for 21st Century Skills has created the *Framework for 21st Century Learning* (Partnership for 21st Century Skills, 2009); the National Governors Association Center for Best Practices along with the Council of Chief State School Officers have developed the *Common Core State Standards* (National Governors Association Center for Best Practices, 2012); and Achieve has coordinated a state-led effort to develop the *Next Generation Science Standards* (NGSS Lead States, 2013), based on the National Research Council of the National Academy of Sciences’ *A Framework for K-12 Science Education* (National Academy of Sciences, 2012).

Research has shown that having a librarian in a school does have a positive impact on helping students develop such skills (Lance & Russell, 2004; Scholastic, 2008; Todd 2008). Todd (2008) notes that successful collaboration increases instructional effectiveness and develops students’ information skills. Research has also articulated connections between curricular mandates and librarians’ standards (Subramaniam et al., 2013). Moreover, research has shown that collaboration between STEM teachers and school librarians can be successful, when support and training for such collaborations are provided (Harada, 2001; Mardis & Hoffman, 2007; McGriff, 2012; Montiel-Overall, 2008; Montiel-Overall & Grimes, 2013; O’Sullivan & Dallas, 2010; Schmidt, Kowalski, & Nevins, 2010; Schultz-Jones, 2010). While descriptions of successful collaborations in STEM areas can be found in the literature (Harada, 2001; McGriff 2012; Montiel-Overall, 2008; Schmidt, Kowalski, & Nevins 2010; Schultz-Jones 2010; O’Sullivan & Dallas 2010), research has also shown that significant challenges exist to establishing and maintaining successful collaborative partnerships (Hartzell, 1997; Lance, 2010; Mardis, 2005; Miller & Shontz, 1993; Williams, 1996). This situation has been further aggravated by budget cuts and a subsequent reduction in the number of school librarians. According to *The State of America’s Libraries: A Report from the American Library Association 2013* (American Library Association [ALA], 2013), the number of school librarians decreased each year from 2006 to 2011, more than any other school staff positions. And while public libraries seem to have “weathered the storm of the Great Recession” (ALA, 2013, p. 7), they too have experienced budget cuts that have in some cases left them short staffed. The *Report for 2014* (ALA, 2014) makes essentially the same points. It seems likely that public libraries have had to fill the void left by reductions in the number of school librarians. It may also be the case that more successful collaboration between teachers and librarians, both school and public, would make librarians seem less “dispensable” when budgets are tight.

A possible trend toward collaboration between teachers and public librarians seems to be evident, particularly with emphasis on STEM. A national conference focused on the role of the public library in informal

learning was held in August 2015,¹ and recent literature points to successful collaborations (Anderton, 2012; Zickhur & Rainie, 2014), and to the significant potential to enhance those collaborations (Beck, 2013; Dusenbery, 2014; Garmer, 2014).

Schrage (1995) suggests that collaboration is really about shared creation or shared discovery. He notes that professionals in a range of disciplines are being encouraged to collaborate more than ever, because of the complexities of the challenges facing us (developing 21st century skills in the STEM context is certainly a challenge). These demand cross-disciplinary attention and the creative attention of multiple rather than single minds. The heart of collaboration is a need to produce something, or solve a problem within a set of constraints. Those constraints can include expertise (so multiple kinds of expertise are required), time, money, competition, and assumptions about what is possible or desirable. Schrage believes that true collaboration occurs when creative and thoughtful people come together to share their complementary skills and to create a shared meaning or understanding. Collaborations are dynamic and they are very personal; successful collaborations require effort to come to a shared understanding. They also require competence on the part of all the collaborators (that competence can rest on different strengths, of course), a shared and mutually understood goal, mutual respect, tolerance and trust, continuous communication, and clear lines of responsibility (but not rigid boundaries). Collaborators should recognize that decisions do not have to be consensual (constructive disagreement can stimulate new thinking but sometimes collaborators need to defer to the “expert” in the group), that physical presence (though useful) is not necessary, and that the selective use of outsiders for complementary insights and information can be very useful at different points in the collaborative process.

Ongoing inter-professional collaboration requires several key ingredients for success. Across a range of inter-professional collaborations, one of the keys is mutual respect and shared vision, based on clear understanding of the roles, ethics, and language of all collaborators (Quealy-Berge & Caldwell, 2004). Literature focused on the academic librarian-faculty relationship also reveals similar findings (Creaser & Spezi, 2014; Julien & Given, 2003). A commitment to collaboration and mutual trust, arising from a recognition of the value of the relationship, shared values, and communication, leads to successful collaborations (Phelps & Campbell, 2012). Bronstein (2003), writing in the context of social work, confirms the importance of all of these elements for promoting inter-professional collaborations. Within the context of teacher and school librarian working relationships, Montiel-Overall (2005) proposes four models: model A is *coordination* of events, activities, and resources; model B is characterized by *cooperation/partnerships*; model C involves teachers and librarians working together to provide *integrated instruction*; and model D involves teachers and librarians working together to achieve *integrated curriculum*. Each of these models reflects increasing levels of true collaboration from low with model A to high with model D.

4. Research questions

This exploratory study posed the following research questions:

1. What are the perceptions and experiences of public and school librarians and high school science teachers regarding inter-professional collaboration, including barriers to collaboration?
2. What are the perceptions and experiences of public and school librarians and high school science teachers regarding the relevance of 21st century skills to the teaching of science?
3. What are the perceptions and experiences of public and school librarians and high school science teachers regarding collaborations

¹ <http://www.lpi.usra.edu/education/stemlibraryconference/>.

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