
Building Relationships in the School Social Network: Science Teachers and School Library Media Specialists Report Key Dimensions

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This paper reports research results from a 2008 study of the social networks of school library media specialists (SLMS) in north Texas and a 2007/2008 survey of science teacher attitudes towards SLMS in north Texas. Analytic methodologies included: social network analysis, statistical analysis, and qualitative content analysis of interviews. Analyses of the results suggest that two key dimensions may provide a foundation for building relationships in the school social network: credibility and visibility. These dimensions may provide opportunities to strengthen the collaboration efforts between SLMS and science teachers. Future research will include proposals to develop collaboration skills and measure the impact of these efforts on student science achievement. With a national emphasis in the United States on requisite science literacy skills, efforts to strengthen cross disciplinary collaboration skills and opportunities should yield positive results.

Introduction

School library media specialists (SLMS) and science teachers are responsible for positively affecting the development of student science literacy skills. Both positions have complementary standards related to affecting student achievement. Research studies situated in numerous states in the United States (Lance, Hamilton-Pennell, Rodney, Peterson, & Sitter, 2000; Lance, Rodney & Hamilton-Pennell, 2000a, 2000b, 2001, 2002; Lance, Welborn & Hamilton-Pennell, 1997; Smith, 2001) have demonstrated the impact of strong school library media programs on student achievement in reading. A study based on student evaluation of school library media centers (Todd & Kuhlthau, 2004) further supports the positive role of library media centers in affecting overall student achievement.

However, despite substantial efforts to document the positive relationship between school library media specialists (SLMSs) and student achievement, Mardis (2007) contends examine why and how specific types of interactions between school library media specialists and teachers occur in an educational ecosystem" (Correlation Puts Causation in Reach).

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One arena that sets the stage for interactions between these potential education partners is their preservice experience. For both teachers and school library media specialists, preservice education continues to be shaped in response to the changing educational landscape. The challenge for SLMSs continues to be establishing and maintaining themselves as integral partners within the movement to advance the educational enterprise.

The role of the school library media specialist evolved with the introduction of learning and resource technologies. The American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) state: "the school library media specialist's opportunities for cultivating authentic, information-based learning have never been greater, and the responsibilities are also more crucial than ever before" (1998, p. 47). This responsibility extends to collaborating with others as a key theme for building relationships that enable the delivery of information literacy skills to students. In many cases, the skills must also be delivered to the teachers and administrators within the school's learning environment. As we move forward with the AASL (2007) *Standards for the 21st Century Learner*, collaboration will continue to be a prominent theme for advancing student learning and achievement.

The national emphasis on requisite science literacy skills and the opportunity to examine collaboration efforts in this underserved area inspired two pilot studies for research into perceptions that enable a collaborative orientation in the school learning environment. As educators of school library media specialists and science teachers, we were interested in the orientation towards collaboration in both areas. The purpose of our enquiry was to:

- 1) identify the extent to which science teachers knew and cared about school librarian credentials;
- 2) examine the extent to which science teachers and librarians collaborate; and
- 3) identify the extent to which science teachers and school library media specialists consider each other helpful in teaching students.

We report the background, methodology and results relating to science teaching from these pilot studies in the following sections.

Background

Professional positions require the skills and abilities to meet specific requirements for success. Both science teachers and SLMS must meet rigorous standards for professional certification.

Science Teachers

In Texas, all teachers are required to have a bachelor's degree in a content area, along with specific professional development coursework (State Board of Education, n.d.). The coursework required for certification includes educational policy, psychology, reading in the content area, teaching methods, classroom management and student teaching (Teacher Development Center, n.d.). While the preservice and inservice science teachers are expected to be able to use a library and to help their students in research settings (National Committee on Science Education Standards and Assessment & National Research Council, 1996), none of the certification classes include specific methods for collaboration with librarians. This lack of preparation for collaborating with school librarians and realizing the value-added services they provide has

been identified in other studies as one reason librarians are not embraced as collaborative partners in the educational enterprise (Getz, 1996; Hartzell, 1997; Roberson, Applin & Schweinle, 2005; Small, 2002; Wolcott, Lawless & Hobbs, 1999).

School Library Media Specialists

The responsibility to deliver a strong library media program requires the requisite skills. As a result, most states in the United States require that a school library media specialist hold a master's degree, have a minimum of two years teaching experience, complete a school library program of coursework, and pass a state exam for school librarian certification. Within the program of coursework, SLMSs focus on the dimensions of a successful library media program that address student achievement goals, including collaboration with teachers. Because both student and teacher characteristics vary from class to class, school library media specialists must develop and nurture an effective collaboration network to meet learning goals.

Collaboration

AASL and AECT (1998) emphasize collaboration as a key theme in building "partnerships for learning" between the school library media specialist and other members of the learning community. And AASL updated this theme in 2007, stating that "school librarians collaborate with others to provide instruction, learning strategies, and practice in using the essential learning skills needed in the 21st century" (p. 3).

The range of interaction within this process of improving curriculum development could extend from casual and informal exchanges of information that provide opportunities to establish collaborative relationships, through formal interactions related to collection development and ordering materials in support of the curriculum, to a peer relationship of partners designing, teaching and evaluating results together. Loertscher's (2000) taxonomy of the library media specialist reflects this hierarchy of interaction with curriculum development on the high end of contributing to academic achievement (p. 17). Asper's (2002) attention to collaboration focused on those efforts where teachers and SLMSs work together in a range of efforts described as "ladders of collaboration" (p. 10). Other definitions of collaboration focus on the peer relationship with emphasis on the joint efforts expended to meet student needs (Buzzeo, 2002a, 2002b; Callison, 1997). Montiel-Overall (2006) offers four different types of collaborative relationships covering a range from low to high: coordination, cooperation, integrated instruction, and integrated curriculum (p. 30). Among these multiple perspectives on collaboration lie the central beliefs that collaboration is fundamental to a successful school library media program and requires a working relationship to affect the process.

Despite years of emphasis on the value of collaboration, as Small (2002) reflects, "efforts to collaborate are often awkwardly conceived and less than successfully implemented" (p. 10). While some classroom teachers may welcome collaborative efforts, others may be resistant (Hysten, 2004; Thomas, 2002). Lowe (2000) offers the position that "all members of the school community need to understand that the library media specialist is uniquely qualified, valuable, and able to provide essential information literacy instruction and valuable information services" (¶ 11). As library media specialists work toward the realization of this goal, developing a network of collaborative partners within and outside the school environment is important.

Assessing science teachers' predisposition to collaborate with SLMSs and analyzing the elements of existing successful collaboration networks could provide a foundation on which to build relationships and further opportunities to connect the effectiveness of the library media program to its stakeholders.

Methods

To conduct this research, a mixed methods model was used (Gay, Mills & Airasian, 2009). Groups of science teachers and SLMSs were interviewed. Data were triangulated by examining the two sets of interviews and the questionnaires given to the science teachers and SLMS. Quantitative data were examined using Spearman's *rho* to test for correlations among characteristics of teachers and their perceptions of librarians' credentialing and their importance to student learning/achievement.

Science Teachers

The 24 science teacher participants were from a graduate level science education research class. All were pursuing a master's degree in science education. Half of these students were in an asynchronous, online class, while the remainder participated in the face-to-face version of the same research class. Twenty participants were in-service teachers with an average of eight years teaching experience. Twenty-one were females, and the average participant age was 33 years. Most of the participants (75%) were Caucasian; 58% taught in suburban schools; 54% of the schools represented were medium sized (approximately 540 students; Texas Education Authority, n.d.); 41% ($n = 10$) of the participants taught middle school (grades 6 through 8), 25% ($n = 6$) taught high school (grades 9 through 12), 16% ($n = 4$) were not currently teaching, and the remainder were a mix of elementary and combination schools of middle and high school grades.

As a part of this research, a questionnaire was designed to determine what science teachers know about librarians and their responsibilities (see Appendix 1). The *Teacher - Librarian Collaboration Survey* (TLCS) is based on the Information Literacy Competency Standards for Higher Education (ALA, 2000). Once the survey was administered, a group interview was conducted with the face-to-face participants ($n = 12$) to gain additional context for their answers and ascertain their reaction to the questionnaire.

The TLCS contains four open-ended, free response questions to determine teachers' expectations of the librarian and their level of collaboration with the librarian. One question asks participants to select librarian credentials from a list of seven possibilities. The survey also has four sections regarding participants':

- confidence in conducting research,
- perceptions of the importance of the library and librarians,
- perceptions of the necessity of collaboration with a librarian, and
- perceptions of the necessity of librarian-provided instruction to pre-college students.

These sections are measured using a five point Likert scale with a ranking of 1 as least positive to 5 as most positive.

School Library Media Specialists

The five school library media specialist participants were recruited through the alumni student base in the School of Library and Information Sciences school library program of study at the University of North Texas. The research methods included a survey of contacts for curriculum and library program-related work, semi-structured interviews, and the use of social network analysis techniques and software to identify and illustrate the collaboration network of each of five school library media specialists. The *School Library Media Specialist Collaboration Survey* (see Appendix 2) is based on the survey work of Cross and Parker (2004), an instrument that demonstrates reliability and validity through its use in a variety of settings.

The social network analysis approach applies across disciplines and has been used extensively in education, social science and business research, where interest in the patterns of relationships extends to examination of information exchanges at various levels of intensity and frequency. In this pilot study, the intent was to explore the value of applying social network analysis to a new setting, the school library network, and examine the resulting pattern of existing and potential collaboration networks.

Demographic data included information regarding the length of time as a SLMS and the length of time in the SLMS position at the school. For the full set of teachers and administrators at the school, by subject, position and grade level, the survey collected responses to three questions:

- length of time the SLMS has known the person, in years,
- frequency of interaction with each person: daily, once a week, monthly, 2-3 times a month, never, and
- level of collaboration or interaction related to school topics: design course content and teach with, consult on course content, provide course materials, provide books/resources when requested, exchange information informally, never discuss school topics.

The categories for levels of interaction and collaboration were drawn from previous collaboration research (Asper, 2002; Loertscher, 2000; Monteil-Overall, 2006), as follows:

1. design course content, teach and evaluate with
2. consult on course content
3. provide course materials
4. provide books / resources when requested
5. exchange information informally
6. never discuss school topics

The full results of this survey were presented as social networks within the school learning community (Schultz-Jones, 2009). The results related to science teachers were extracted from this full set of collaboration networks for each of the participants and examined for the current study.

The survey was completed by five school library media specialists in two urban centers, Dallas and Fort Worth, and in one suburban center outside of Fort Worth, Texas. One participant was the single SLMS in a K-6 public school, one participant was the single SLMS in a grade 3-5 public school, and three participants hold SLMS positions in a K-12 independent school. A follow-up interview with each participant discussed the results and gathered information on the ways that SLMS collaborate with teachers in various subject areas, the challenges associated with collaboration and the ways that student achievement is measured in the library media program. Each interview was recorded and transcribed for content analysis. Comments relating to science

teachers and the challenges of developing collaborative relationships were extracted for consideration in this study. The context provided by these interviews complemented the analysis of results from the teachers' survey and corresponding interviews.

Limitations

This research was limited to the number of participants in the studies at a specific point in time, and may not extend to a larger constituency. Additionally, the science teachers and SLMSs participating in the studies were not from the same schools. This restricts the research to the perspective of the participant only, without a corresponding perspective from a corresponding member of the school community. This limitation further extends to the school administrators and teachers who were identified as members of the SLMSs' social networks; interaction remains ego-centered in the sense that the networks display the SLMSs' perspective without corresponding input from other members of the school community. While the study results were presented to and discussed with the participants, subsequent follow up on the impact of what was learned through participating in the studies has not been initiated. Nevertheless, the results are supportive of previous research and suggestive of possible avenues for further research and exploration.

Results

The results from the pilot studies demonstrate the limited awareness science teachers have of SLMS credentials, the limited predisposition of science teachers to collaborate with SLMS, the limited amount of science teacher preparation for collaboration with SLMS. They also demonstrated that the collaboration networks of sample SLMSs varied in structure and operational processes.

Science Teachers

Question one on the TLCS asked teachers what credentialing they thought librarians needed to be certified in Texas. Choices included:

- a) two years of teaching experience;
- b) a bachelor's degree in any subject area;
- c) a master's degree in any subject area;
- d) school library program of coursework;
- e) a passing score on the TExES school librarianship certification exam;
- f) all of these;
- g) none of these.

The correct answers were a, c, d, and e.

Table 1 shows the percentages of teachers who chose the correct requirements. Most science teachers were unaware of the requirements for becoming a librarian in Texas.

Table 1. Percentages of teachers choosing the correct credentialing for librarians.

None correct	One correct	Two correct	Three correct	Four correct
29%	42%	8%	13%	8%

Quantitative data analysis using the Spearman *rho* test for correlations (StatSoft, 2007) revealed statistically significant correlations among school size and setting, awareness of librarian credentialing, and age of participants, as well as perceptions of the value of the librarian and assistance with classes. The larger the school, the more likely participants were to think librarians required higher credentials (.753; $\alpha = 0.01$); the suburban participants were more likely to think librarians required higher credentials (.719; $\alpha = 0.01$); the younger the participants, the more likely they were to think that librarians required higher credentials (.616; $\alpha = 0.05$). The more the participants valued the library and staff, the more likely they were to believe that it was probable for librarians to be of teaching assistance (.689; $\alpha = 0.05$).

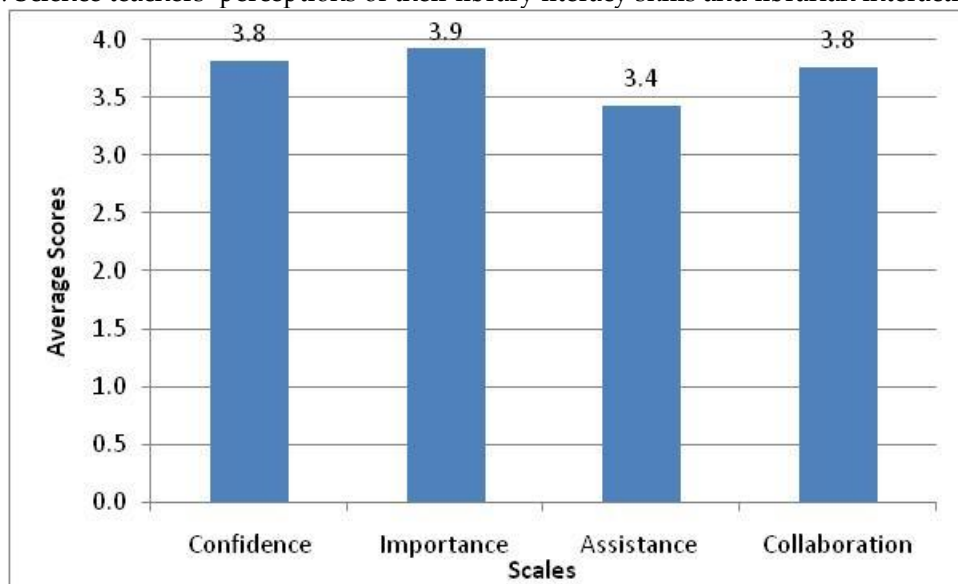
Open-ended questions asked teachers to identify perceptions of what librarians do, and thoughts about collaborating with librarians. These four questions produced emergent categories of responses, with participants possibly providing more than one answer per question. Those categories with the largest number of total responses are listed in Table 2.

Table 2. Participants' responses to open-ended questions through emergent categories (n = 24).

1. What do you expect PK – 12 school librarians to do?				
Categories	Catalog materials	Manage equipment and technology	Retrieve materials	Know about materials
Number of responses	11	9	8	8
2. What type of preparation have you had concerning collaborations with librarians?				
Categories	No preparation in University classes		No preparation from schools	
Number of responses	24		13	
3. How do you collaborate with your librarian?				
Categories	Equipment help		Never collaborated	
Number of responses	6		5	
4. What would prevent you from collaborating with a librarian?				
Categories	Science teachers' lack of time	Librarians' lack of time		Don't know how librarian can help
Number of responses	7	6		5

Teachers were asked to respond to statements related to feelings of confidence for successfully performing specified information tasks with frequency scales ranging from 1 to 5. Teachers appear confident in their ability to use the library and resources; they believe that the library and librarians hold an important place in research literacy; they feel that librarians can be of assistance in certain instances; and that there is a need for collaboration among teachers and librarians (see Figure 1.)

Figure 1. Science teachers' perceptions of their library literacy skills and librarian interactions



Using the Spearman *rho* to test for correlations, demographics were compared to teachers' perceptions of librarian qualifications, teachers' confidence in their research ability, the importance of using libraries for research, the amount of assistance a librarian could be to a researcher, and the amount of collaboration between a librarian and a science teacher that would be useful. The larger the school, the more likely participants were to think librarians required higher credentials (.719); the larger the school participants were in, the more likely they were to think librarians required higher credentials (.753); the younger the participants, the more likely they were to think that librarians required higher credentials (-.616). The more the participants valued the library and staff, the more likely they were to believe that it was likely it was for librarians to be of assistance (.689).

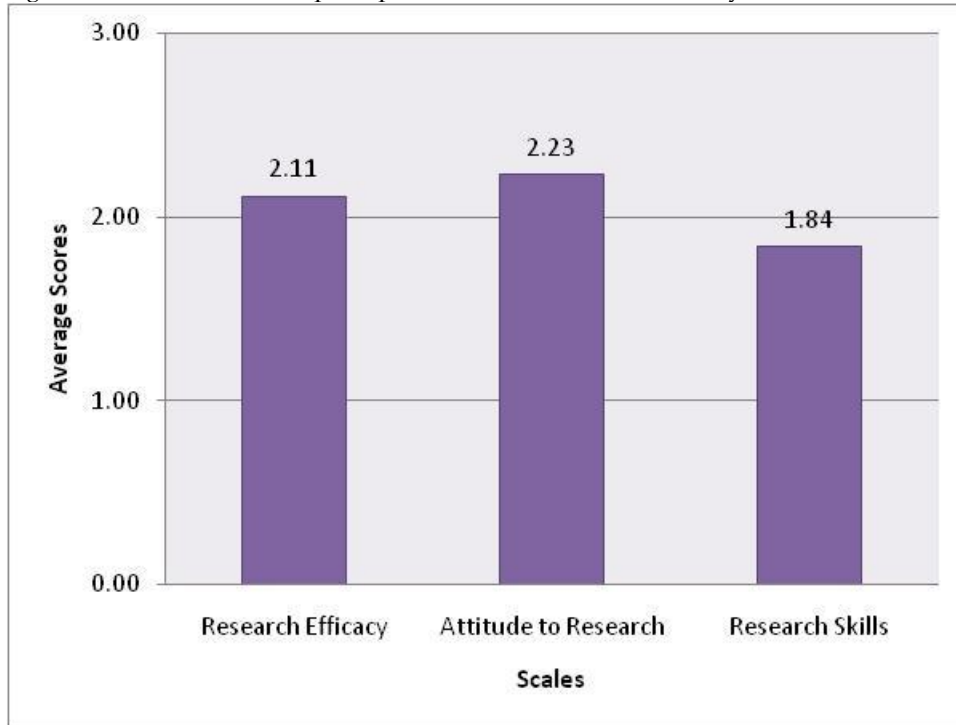
Teachers were asked to rate their research literacy from 1 (least) to 5 (most). They were not positive about their ability to conduct research efficiently, to actually find appropriate research, nor were they positive about research (see Figure 2).

The science teachers' reactions to the TLCS were positive. They commented that the questionnaire was perhaps too extensive (57 questions in total) and wondered if it could be shortened. They stated that the questions were coherent and clear. Teachers also noted that while collaboration with librarians would be welcomed, training on methods for engaging in those collaborations is necessary to make collaboration efficient and effective. Comments included:

- I had no idea the school librarian spent so much time becoming certified.
- I never thought of the position as being more than checking books in and out, and I certainly didn't realize that she was trained as a teacher.
- I've never really seen our school librarian; I don't think I could describe her.
- Our school librarian has been around forever, and I don't think she wants us to interfere with the way she has the library organized.

- Tomorrow I'm going to go to the library and talk to the librarian. I'm curious now about what she does and what she thinks. Who knows, maybe there's something she can help me with.

Figure 2. Science teachers' perceptions of their research literacy



School Library Media Specialists

The results of the pilot study suggest that establishing and maintaining a social network within the school environment is fundamental to the position of a school library media specialist. Each SLMS in the study demonstrated a wide range of interaction within the school learning community.

The range of experience as a SLMS varied from 1 year to 34 years, as listed in Table 3. For SLMS5, the length of time she knew the teachers and administrators in her school corresponded to her length of service in the current position. For the other SLMSs, the length of time they knew the teachers and administrators varied in accordance with the turnover of faculty and staff in those schools. Since the school size varied, the number of possible contacts varies, as listed in Table 4.

Table 3. Length of service as a school library media specialist.

SLMS1	SLMS2	SLMS3	SLMS4	SLMS5
3 years	5 years	30 years	34 years	1 year

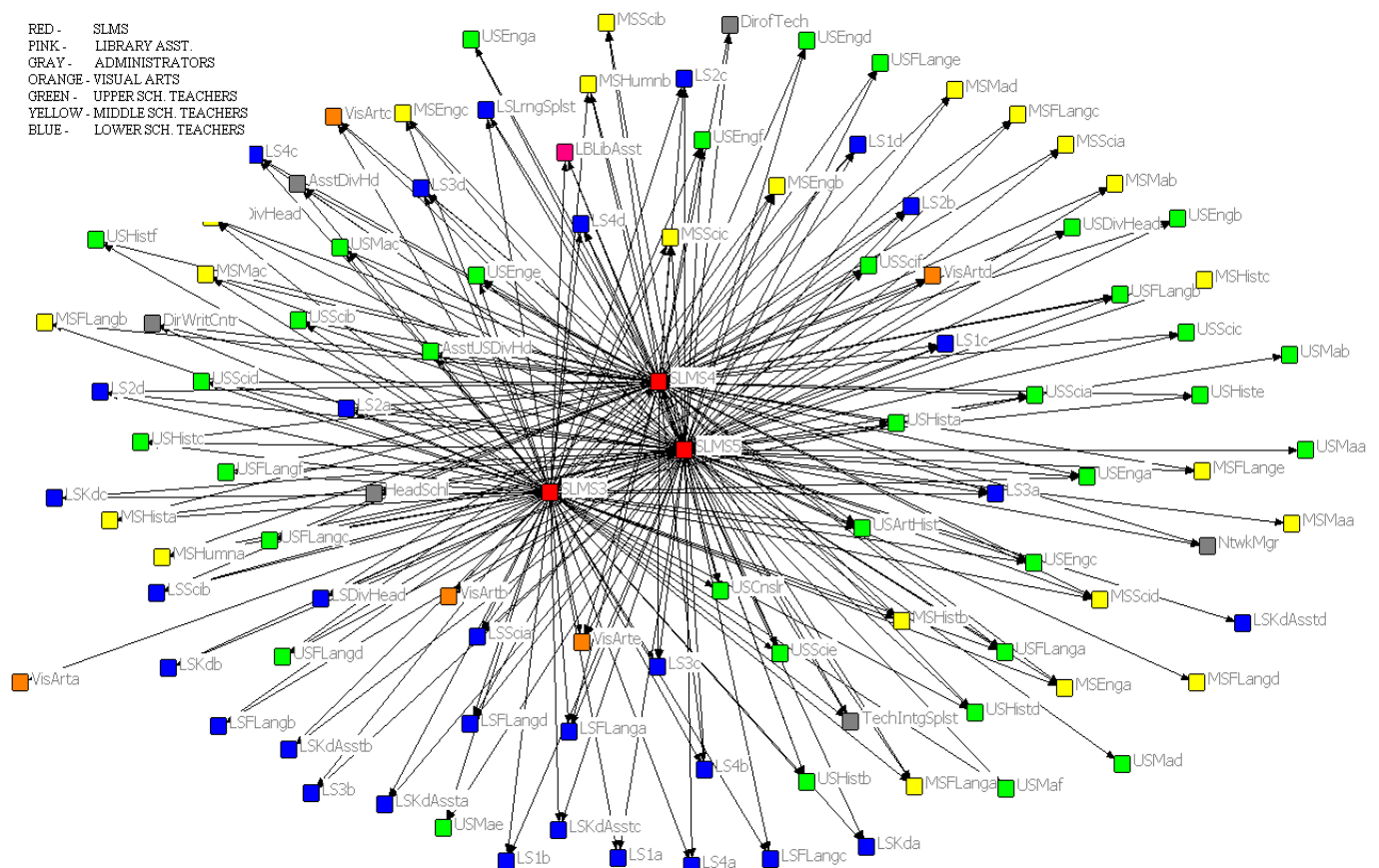
Table 4. Number of possible contacts in the school environment, including teachers and administrators.

SLMS1	SLMS2	SLMS3	SLMS4	SLMS5
16 contacts	25 contacts	110 contacts	110 contacts	110 contacts

Despite the number of possible contacts, all SLMSs exhibited a range of interactions with the teachers and administrators in their schools. The social network for each library media specialist was mapped using the social network analysis software program, UCINET and its associated illustration package, NetDraw. These tools enable visual and statistical analysis of the various roles and positions with the networks. Each participant was coded for anonymity, and the identities of the teachers and administrators with whom they connect and collaborate with were similarly coded. For example, in the K-12 independent school, teachers within the upper school grades (10 – 12) are coded with the prefix US, teachers within the middle school grades (7 – 9) are coded with the prefix MS, and teachers within the lower school grades (K – 6) are coded with the prefix LS.

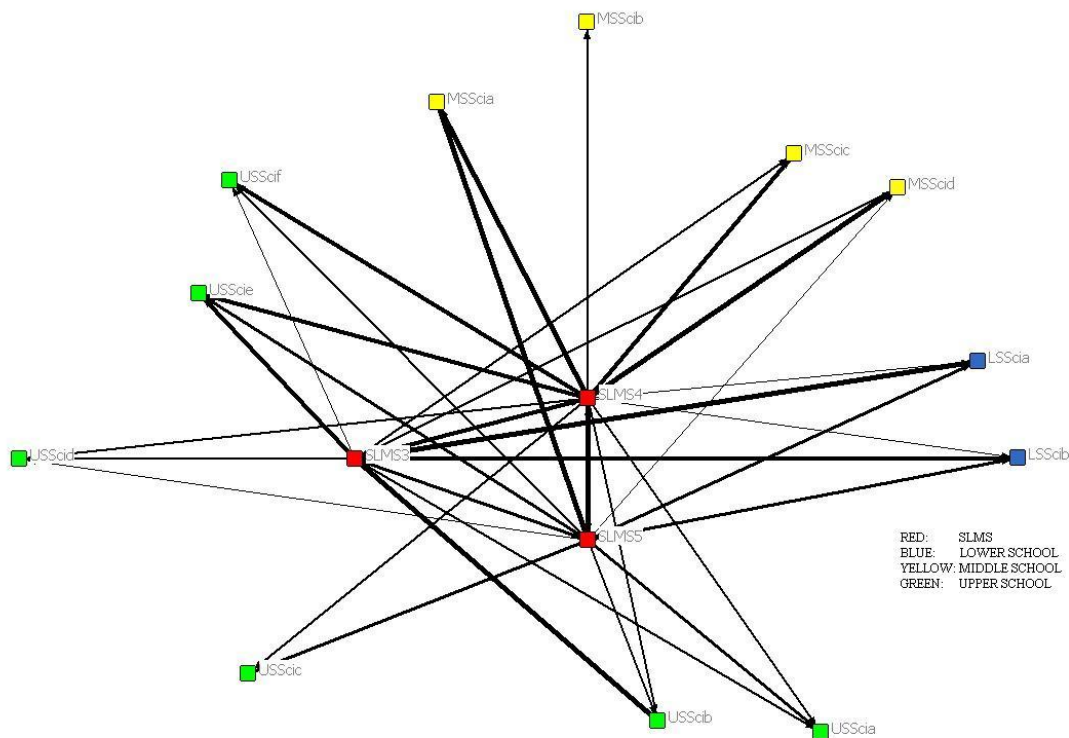
The results of this analysis and the associated network diagrams indicate a high degree of interaction across the school learning community. For example, Figure 3 illustrates the social network of the three SLMSs in the K-12 independent school, as identified from their perspectives.

Figure 3. Social network of school library media specialists in the K-12 school.



From these networks of interaction within the school learning community, the levels of involvement with science teachers were selected for additional analysis. Figure 4 illustrates the network of interactions between the three SLMSs and the science teachers at all grade levels within the K-12 independent school. Positions with the highest level of interaction are closest to the center. None of the SLMSs design course content, teach and evaluate results with any of the science teachers. This result was consistent across all subjects.

Figure 4. Interaction levels of SLMSs with science teachers in K-12 school.



Individually, the SLMSs demonstrate various levels of interaction. For SLMS3 (see Figure 5), her interaction network includes all grade levels. Her highest level of collaboration, consulting on course content, occurs with both an Upper School and Lower School science teacher. She has no interaction related to school topics with three teachers: Upper School science teacher C (USScic), Middle School science teacher A (MSScia), and Middle School science teacher B (MSScib). Since no interaction occurs with these three teachers, they are not connected in her network and are situated as disconnected outliers to the network.

The amount of interaction within the school community occurs at different levels of frequency. Figure 6 illustrates the varying levels of interaction frequency between the three SLMSs and the science teachers at all grade levels. The lines are weighted to indicate heavier lines for higher interaction frequency.

Figure 5. Interaction levels of SLMS3 with science teachers in the K-12 school.

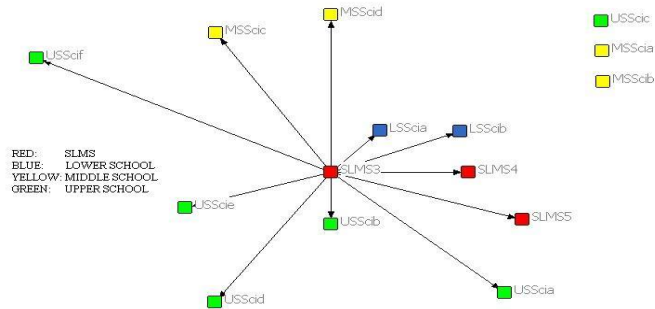
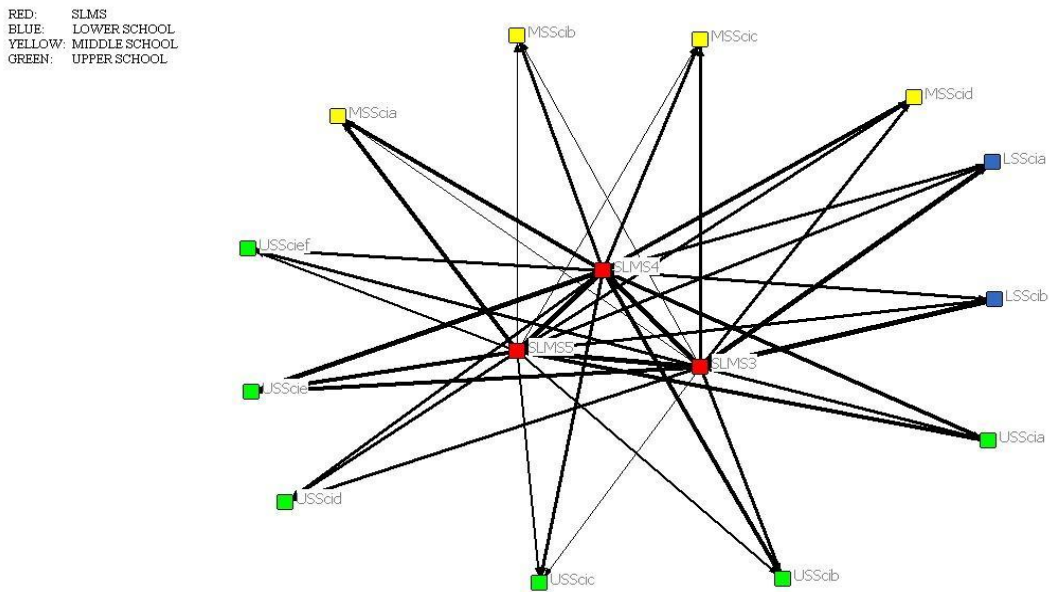


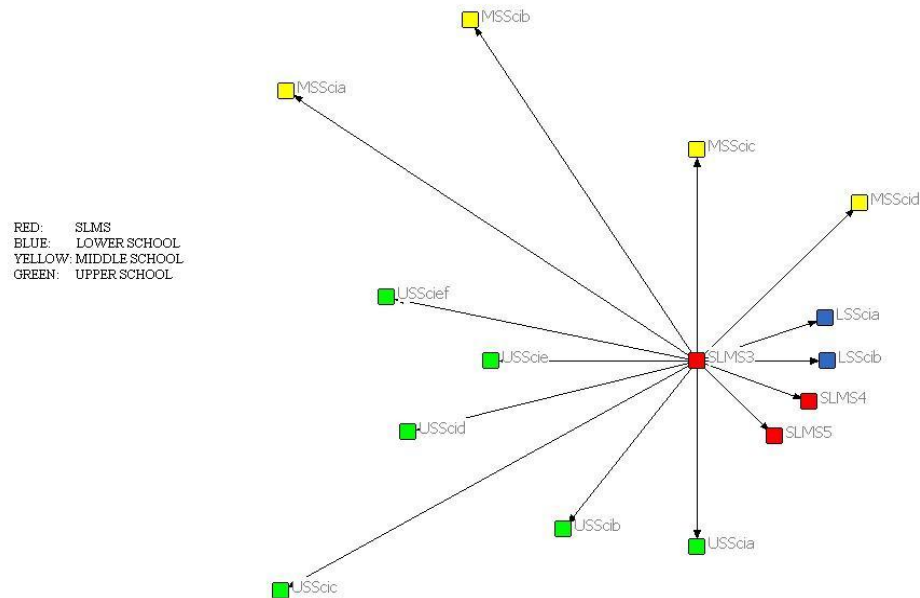
Figure 6. Interaction frequency of SLMSs with science teachers in K-12 school.



For SLMS3, Figure 5, her interaction frequency varies among the science teachers and grades. The teachers she interacts with most often are positioned closest to her in the network diagram.

The frequency of interaction captures social discourse that may be unrelated to school subjects, and with this focus, all science teachers have a level of interaction frequency.

Figure 7. Interaction frequency of SLMS 3 with science teachers in K-12 school.



Comments on the frequency of interactions with science teachers include:

- My biggest challenge is the math/science teacher. I've tried many times to show her things in the library and get her to come in and do research but I get the distinct impression that she thinks the library has no value to her.
- My goal this year was actually to go to their grade level meetings. I didn't get to go to their grade level meetings last year because I was too busy cataloging books – it takes a lot to administer a library. But now that we've moved to a central cataloging system in the district, there's going to be more time for the kids and the teachers.
- Science is usually what I have to hit second for trying to collaborate but they're the first ones that come in here and want to put their projects up around the library.
- She [4th grade teacher] is overwhelmed with continually working and providing learning materials in the classroom so she welcomes advice. And she often comes to me and asks questions, whether it's something in the library arena or not. But she'll come and say, "Well, what do you think about such-and-such?" And I give her advice. I was a 4th grade teacher, so those are my favorite teachers anyway. I kind of align myself.

The most frequent levels of interaction included providing books/resources when requested and exchanging information informally. Comments on considering the levels of collaboration include:

- I just ordered a whole set of graphic novels on topics related to the scientific method and I'm struggling with how to encourage the science teacher to promote them because I'm afraid she's going to say "these are just comic books". Clearly they aren't and the format is great for engaging kids. But I need to engage the science teacher first!
- I'm building on my eighteen years of classroom teaching when I bring lessons into the library and I find that some of the teachers appreciate the templates I have for incorporating information literacy, but they want to take the templates and not use the library again. Or, they want to bring the students to the library and leave them so they don't realize that I'm doing things that align with the curriculum.
- When I first started, the first year, I did what I knew how to do, which was bring lessons into the library that were based on sequencing, main idea, all the TAKS related objectives that I knew, having been in the classroom for eighteen years. I would talk to teachers, but I pretty much just was in my own world. And then the next year, I started thinking, "Oh, I've got to collaborate," and so, I did it a little bit, but not as much. Last year I did – my third year I did much more and made some in roads.
- No, the science teacher wasn't reluctant to try collaborating, she just didn't know what to do. So we really had to look at what made sense, given we each have different perspectives, but we worked it all out. But I don't know if we are reaching our potential.
- The science and math teachers are just afraid to try – what do we do? How do we try? What are we going to do? So I'll go, "Hey, we've got all this stuff in. Let's try a lesson with you teaching this part of it." Then they're up for it!
- Our Grade 5 science teacher didn't feel that the last person [school librarian] was approachable who'd been here for 15 years, nor did my principal. My principal was actually afraid of her. And so, I think, again, you have to get support from everyone.

Discussion

Consideration of all comments and reactions to the research by the research participants suggest that two key areas may play a part in building a foundation for establishing collaborative relationships: credibility and visibility.

Credibility

Communications researchers identify certain qualities as being associated with the credibility (ethos) or believability of an information source. McCroskey (1966) identified two factors that contribute to establishing source credibility: authoritativeness and character. Authoritativeness was related to being a reliable source of information, an authority on a topic, and qualified to speak on a topic. Character referred to trustworthiness, respect for the person, and a reputable background. Berlo, Lemert and Mertz (1969) furthered the discussion of credibility by identifying three dimensions, with associated scales, for evaluating the credibility of a source:

1. safety – safe versus unsafe, just versus unjust, kind versus cruel, friendly versus unfriendly, honest versus dishonest;
2. qualification – trained versus untrained, experienced versus inexperienced, skilled versus unskilled, qualified versus unqualified and informed versus uninformed;
3. dynamism – aggressive versus meek, emphatic versus hesitant, bold versus timid, active versus passive and energetic versus tired. (p. 574)

Kouzes and Posner (2003) considered trustworthiness, expertise and dynamism as an updated set of criteria for credibility of a source when they examined the importance of credibility to leadership. Discussions with the participants in the pilot studies echoed the inclusion of credentials as a contributor to confidence in credible sources.

The reactions of the science teachers to the credentials required to be a school library media specialist suggests that an opportunity to build credibility may have roots in attaining a level of academic achievement. Since the requirement for a master's degree for school librarians is relatively recent (effective 2002 in Texas), the likelihood that a majority of teachers would be aware of this credential was low. Learning that a SLMS position now required a significant level of education and training seemed to suggest a reason to cast the position of school librarian in a more serious light. This may also reinforce the importance of continuing professional development to stay connected to emerging concepts and technologies, furthering the reputation of the school librarian as a credible resource. The consideration of credibility seemed further enhanced when the science teachers learned that teaching experience is also a requirement for school librarian certification.

However, research demonstrates that credibility develops over time through shared experiences and is maintained by meeting expectations. While credentials emerged as possible criteria for initial credibility, they suggest a starting point rather than a guarantee of complete confidence in an information source. Maintaining a credible presence as a valuable partner in the school learning environment would depend on continually demonstrating reliability and developing shared expectations of the role the school librarian could play at the various collaboration levels. The school library media specialists indicated a level of comfort with approaching and working with teachers from the same grade schools they taught in before becoming a school librarian. The opportunity to discuss common experiences may be an opening worth pursuing to encourage discussions of challenges both teachers and librarians can relate to.

The transition to higher standards and higher expectations also extends to science teachers. Ingersoll (1999) highlighted the dilemma of under-qualified and out-of-field teaching across the U. S. education system. For science teaching he reported that "about one fifth of all secondary school teachers do not have at least a minor in one of the sciences or in science education" (p. 27). The impact on teacher efficacy for science teachers without the necessary qualifications or confidence in their expertise and skill in teaching science could diminish receptivity to engaging the assistance of a SLMS as a colleague. They may be hesitant to welcome working with someone who may become aware of their inadequacies. The science teachers in our pilot study were students in a graduate level science education research class, and all were pursuing a master's degree in science education. Their receptivity to SLMSs with

comparable education levels may reflect a sense of collegiality that may not be present where science teachers perceive a personal lack of expertise and skill.

Developing a strategy or strategies for encouraging teachers to allow a SLMS to contribute to a lesson plan or recommend resources is always a challenge. Each teacher and each teaching situation is different, requiring thoughtful consideration of how to be persuasive that one is a credible resource. Shelby (1986) acknowledged that the message source has been recognized as an important factor in persuasion. Alongside the two key variables of expertness and trustworthiness that influence source credibility, she acknowledged that “the problem for persuaders becomes how to increase receiver perception of these message sender variables” (p. 13). She invoked social judgment theory when she observed that despite the credibility of the information source, “a message falling within a receiver’s latitude of rejection, for example, will fail to be persuasive” (p. 18).

Every effort to generate an interaction that goes beyond informal exchanges may not be successful. However, as Abilock (2003) exhorts, “Take the opportunity to describe a new development you’ve read about to your school’s science teacher. Collaborations can begin with just this kind of casual conversation” (p. 8). Despite the possibility of rejection, looking for common ground and being positioned as a credible source may elevate the opportunity for contributing to the advancement of student science achievement. And positioning oneself within the social network of the school community as a well connected and reliable resource may increase opportunities to make substantive contributions to student achievement.

Visibility

Visibility relates to creating a recognition and awareness of the availability and willingness of the school library media specialist to collaborate with others, along with the services and resources that support the curriculum. This dimension of self-promotion is founded on the principle of cultivating a network of contacts who understand that the school library media specialist adds value to the learning environment. An important first step in developing that network of collaborative partners may be informal interaction. The higher the frequency of interaction, the higher the potential for developing relationships and providing services that demonstrate value added.

Being visible, however, means more than holding a highly interactive position in the school learning community. The three K-12 SLMSs in the social network analysis pilot study demonstrated a high degree of interactivity within the network of teachers and administrators. Among the science teachers, interaction on an informal and low collaboration level was clearly evident. High end collaboration, however, was a goal not yet attained.

To be meaningful in the school learning community, the contribution of the school library media specialist must be more than socially visible. Todd (2008) highlights the distinction in his presentation of insights from his investigation of the partnerships formed in the IMLS-Kent State University’s Institute for Library and Information Literacy Education (ILILE) program from 2002-2005. Key insight number five centered on planning with a mutuality of intent. Some teachers expressed collaboration as a natural extension of the social dynamic of teaching, and some library media specialists viewed collaboration as an opportunity to market the school library and increase personal status in the school. Todd emphasizes that

“instructional collaborations first and foremost are about learning and student achievement, not about boosting the role of the library media specialist” (p. 58). Maintaining focus as an educational partner means being prepared to provide substantive support for the science program.

According to Mardis (2007), “the school media center's ability to support the science program with adequate resources depends on the strength of communication between the school library media specialist and the science teacher” (p. 175). When one of the science teachers in our study commented, “I’ve never really seen our school librarian; I don’t think I could describe her,” she reflects on a lack of visual evidence that the position actively exists. This may be a result of her reluctance to leave the security of her science classroom, or it may be a result of a SLMS who hesitates to leave the security of the school library. Beginning that conversation is an important first step, and that means being visible and finding a way to initiate contact. Being knowledgeable about the mutually reinforcing roles of science literacy and information literacy and the instructional role the SLMS can add to the science curriculum is a way of being ready to engage science teachers in discussions that may increase the chances of being accepted and welcomed into the science classroom. As Mardis and Payo (2007) observe, “opening the door to such dialogue and for greater access to resources is an essential strategic step, taking time and effort before such endeavors even begin to flourish” (p. 10). Two encouraging notes from the group of science teachers in this study was their awareness that librarians can be of assistance in certain instances and their receptiveness to the idea of collaboration among teachers and librarians.

Taking that first strategic step to engage with an educational partner is challenging. These pilot studies reflect those challenges and offer some clues to the communication needs that may become strategies to overcome reluctance to participate in a professional association that contributes to student achievement.

Future Research

The pilot studies accomplished the goal of developing instruments to gather perceptions on what might enable and describe a collaborative orientation in the school learning environment. Going forward, the TLCS must be validated to determine its reliability with both teachers and librarians. This validation could support the construction of modules for teaching communication and collaboration techniques to teachers and librarians. Further exploration of the dimensions of credibility and visibility is proposed and will be included in open ended interview questions and additional Likert scale survey questions. Future administrations of the TLCS are planned, both within teacher education courses and the school library media specialist program of study.

The construction of collaboration networks in the school learning community will be broadened by using the School Library Media Specialist Collaboration Survey to collect the perceptions of teachers and administrators. A recent study involving the completion of collaboration surveys by science teachers, administrators and school library media specialists in grades 3 through 6 in a north Texas school district will contribute to furthering an understanding of the value of the methodology. The survey results with associated network

diagrams will be used to encourage the discussion of ways collaborative efforts could be strengthened among the science teachers and SLMSs.

Our emphasis on the role of the school library media specialist as it relates to student achievement in science will extend to further examination of the relationship between information literacy and scientific literacy. The role of the SLMS is complementary to the role of the science teacher as efforts to improve the quality of scientific literacy continue to receive national and international attention. As Mardis (2006) states, "examination of the professional principles and guidelines for the two roles indicates that a strong potential for productive, mutually reinforcing activity exists" (p. 176). How this activity translates into specific factors that contribute to student achievement will be explored in future research.

Research is currently underway to measure the impact of the teacher and librarian collaboration on student outcomes. This will be achieved, in part, by evaluating the science classroom learning environment, since previous research has shown that the learning environment is directly correlated to achievement, and extend evaluation of the learning environment to the school library. Achievement will be measured through standardized testing: in Texas this occurs at grades 5, 8 and with a science exit, and measured against specific learning objectives within the school curriculum. Information from this research will inform further study of these interactions.

Conclusions

The purpose of these pilot studies was to examine what teachers knew and cared about school librarian credentialing, the extent to which science teachers and librarians collaborated, and whether or not science teachers found librarians helpful in teaching students. The mixed methods model used for these studies enabled data triangulation that provided valuable perspectives on the perceptions of science teachers and school library media specialists.

Despite years of effort to raise the profile of SLMSs, the value added is not universally known within the teaching profession. From this preliminary research, it is apparent that science teachers still do not know the extent to which librarians can assist them and their students in learning the processes of science, although they do demonstrate a degree of receptiveness. It is also obvious that neither group has much experience in collaboration practices. These pilot studies indicate that collaborative efforts could be enhanced between SLMS and science teachers in a number of ways. Building and nurturing relationships with educational partners to establish long lasting connections could begin with a measure of credibility and an awareness that the collaborative partnership is available and focused on achieving common educational goals.

References

- Abilock, D. (2003). Collaborating with science teachers. *Knowledge Quest*, 31(3), 8-9.
- American Association for School Librarians & Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning*. Chicago, IL: American Library Association.

- American Association for School Librarians. (2007). *Standards for the 21st-century learner*. Available at: <http://www.ala.org/ala/mgrps/divs/aasl/guidelinesandstandards/learningstandards/standards.cfm>
- American Library Association. (2000). *Information literacy competency standards for higher education*. Chicago, IL: The Association of College and Research Libraries.
- Asper, V. (2002). Ladders of collaboration. *Library Talk*, 15(2), 10-12.
- Berlo, D. K., Lemert, J. B. & Mertz, R. J. (1969). Dimensions for evaluating the acceptability of message sources. *Public Opinion Quarterly*, 33, 563-576.
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *Ucinet for Windows: Software for social network analysis*. Harvard, MA: Analytic Technologies. Available at: <http://www.analytictech.com/>.
- Buzzeo, T. (2002a). *Collaborating to meet standards: Teacher/librarian partnerships for k-6*. Worthington, OH: Linworth.
- Buzzeo, T. (2002b). *Collaborating to meet standards: Teacher/librarian partnerships for 7-12*. Worthington, OH: Linworth.
- Callison, D. (1997). Expanding collaboration for literacy promotion in public and school libraries. *Journal of Youth Services*, 11, 37-48.
- Cross, R., & Parker, A. (2004). *The hidden power of social networks: Understanding how work really gets done in organizations*. Boston: Harvard Business School Press.
- Gay, L. R., Mills, G.E., & Airasian, P. (2009). *Educational research* (9th ed.). Upper Saddle River, NJ: Pearson.
- Getz, I. (1996). Attitudes of preservice and inservice teachers toward working with school librarians. *School Libraries*, 2(1), 59-70.
- Hartzell, G. N. (1997). The invisible school librarian: Why other educators are blind to your value. *School Library Journal*, 43(11), 24-29.
- Hylen, J. (2004). The top ten reasons a library media specialist is a teacher's best friend. *Clearing House*, 77(5), 219-221.
- Ingersoll, R. M. (1999). The problem of underqualified teachers in American secondary schools. *Educational Researcher* 28(2), 26-37.
- Kouzes, J. M. & Posner, B. Z. (2003). *Credibility*. San Francisco: Jossey-Bass.
- Lance K. C., Rodney, M. J., & Hamilton-Pennell, C. (2000a). *How school librarians help kids achieve standards: The second Colorado study*. Denver, CO: Colorado State Library, Colorado Board of Education.
- Lance K. C., Rodney, M. J., & Hamilton-Pennell, C. (2000b). *Measuring up to standards: The impact of library programs & information literacy in Pennsylvania schools*. Harrisburg, PA: Pennsylvania Department of Education.
- Lance K. C., Rodney, M. J., & Hamilton-Pennell, C. (2001). *Good schools have good librarians: Oregon school librarians collaborate to improve student achievement*. Portland, OR: Oregon Educational Media Association.
- Lance K. C., Rodney, M. J., & Hamilton-Pennell, C. (2002). *How school libraries improve outcomes for children: The New Mexico study*. Santa Fe, NM: New Mexico State Library.
- Lance K. C., Welborn, L., & Hamilton-Pennell, C. (1997). *The impact of school media centers on academic achievement*. Castle Rock, CO: Hi Willow Research.
- Lance, K. C., Hamilton-Pennell, C., Rodney, M. J., Peterson, L., & Sitter, C. (2000). *Information empowered: The school librarian as an agent of academic achievement in Alaska schools*. Juneau, AK: Alaska State Library.
- Loertscher, D. V. (2000). *Taxonomies of the school library media program*. San Jose, CA: Hi Willow Research & Publishing.
- Lowe, C. A. (2000). The role of the school library media specialist in the 21st century. *ERIC Digest*. Retrieved September 20, 2008 from <http://www.ericdigests.org/2001-3/21st.htm>.

- Mardis, M. (2007). School libraries and science achievement: A view from Michigan's middle schools. *School Library Media Research*, 10. Available at: http://www.ala.org/ala/mgrps/divs/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume10/mardis_schoollibrariesandscience.cfm
- Mardis, M. (2006). Science teacher and school library media specialist roles: Mutually reinforcing perspectives as defined by national guidelines. *Educational Media and Technology Yearbook*, 31, 169-178.
- Mardis, M., & Payo, R. (2007). Making the school library *sticky*: Digital libraries build teacher-librarians' strategic implementation content knowledge in science. *Teacher Librarian*, 34(5), 8-14.
- McCroskey, J. C. (1966). Scales for the measurement of ethos. *Speech Monographs*, 33, 65-72.
- Montiel-Overall, P. (2006). Teacher and teacher-librarian collaboration: Moving toward integration. *Teacher Librarian*, 34(2), 28-33.
- National Committee on Science Education Standards and Assessment (NCSESA), & National Research Council (NRC). (1996). *National science education standards*. Washington, DC: National Academy Press.
- Roberson, T., Applin, M. & Schweinle, W. (2005). School libraries' impact upon student achievement and school professionals' attitudes that influence use of library programs. *Research for Educational Reform*, 10(1), 45-52.
- Schultz-Jones, B. (2009). School library media specialists connect: Collaboration in the school social network. *Knowledge Quest* 37(4), 20-25.
- Small, R. (2002). Collaboration: Where does it begin? *Teacher Librarian* 29(5), 8-11.
- State Board for Educator Certification. (n.d.). *How to become a teacher in Texas*. Available at: <http://www.sbec.state.tx.us/SBECOnline/certinfo/becometeacher.asp?width=1280&height=768>.
- StatSoft, Inc. (2007). *Electronic statistics textbook*. Tulsa, OK: StatSoft. Available at: <http://www.statsoft.com/textbook/stathome.html>.
- Teacher Development Center (n.d.). *Certification areas*. Dallas, TX: University of Texas at Dallas. Available at: <http://www.utdallas.edu/teach/>.
- Texas Education Agency. (n.d.). *Policy report: School size and class size in Texas public schools*. Austin, TX: Texas Education Agency.
- Todd, R. J. (2008). Collaboration: From myth to reality: Let's get down to business. Just do it! *School Library Media Activities Monthly*, 24(7), 54-58.
- Todd, R. J. & Kuhlthau, C. C. (2004). *Student learning through Ohio school libraries*. Columbus, OH: Ohio Educational Library Media Association. Available at: <http://www.oelma.org/studentlearning/>.
- Wolcott, L. L., Lawless, K. A., & Hobbs, D. (1999). *Assessing pre-service teachers' beliefs about the role of the library media specialist*. ERIC Clearinghouse on Information & Technology (ED437065).

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Appendix 1. Teacher – Librarian Collaboration Survey

This voluntary survey contains statements about libraries and librarians. There are no ‘right’ or ‘wrong’ answers. We want to know how you feel about each statement. Please use a pencil or pen and completely fill in the circle that shows your choice.

- First, read the statement. Don’t worry if some of the statements sound the same.
- Next, think about how you feel right now and mark the best choice.
- Then read the next statement and so on for each statement on the back of this page.

For example, if you disagree with a statement, mark your paper like:

5 4 3 1

Some statement about libraries or librarians . . .

If you change your mind, just erase your first mark and fill in another circle.

THIS IS COMPLETELY ANONYMOUS

For our information, please give us:

Today’s date is MMDDYY _____	Your age is <input type="radio"/> 19 – 25 <input type="radio"/> 26 – 30 <input type="radio"/> 31 – 35 <input type="radio"/> 36 – 40 <input type="radio"/> 41 – 45 <input type="radio"/> 46 – 50 <input type="radio"/> 51 – 55 <input type="radio"/> 56 – 60 <input type="radio"/> 60+	If currently teaching Years Teaching is <input type="radio"/> Not teaching <input type="radio"/> 1 <input type="radio"/> 2 – 5 <input type="radio"/> 6 – 10 <input type="radio"/> 11 – 15 <input type="radio"/> 16 and up	Current Grade Level is <input type="radio"/> Elementary School <input type="radio"/> Middle School <input type="radio"/> High School <input type="radio"/> Post Secondary <input type="radio"/> Elementary & Middle Schools <input type="radio"/> Not teaching
Your gender is <input type="radio"/> Female <input type="radio"/> Male	Teaching Position is <input type="radio"/> Preservice <input type="radio"/> Inservice	School Size is <input type="radio"/> Small <input type="radio"/> Medium <input type="radio"/> Large	School Setting is <input type="radio"/> Urban <input type="radio"/> Suburban <input type="radio"/> Rural
Your ethnicity is <input type="radio"/> African American <input type="radio"/> Asian <input type="radio"/> Hispanic or Latino <input type="radio"/> Pacific Islander <input type="radio"/> White <input type="radio"/> Other			

1. What do you think are the Texas requirements for school library certification? (tick all that apply)
 - 2 years of teaching experience
 - Bachelor’s degree in any subject area
 - Master’s degree in any subject area
 - School library program of coursework
 - Passing score on TExES school librarianship exam
 - All listed
 - None of these
 2. What do you expect PK – 12 school librarians to do?
-
3. What type of **preparation have you had** concerning collaborations with librarians?
-
4. How do you collaborate with your librarian? I have never collaborated with a librarian.
-

Please respond to the following statements according to your feelings of confidence for successfully performing the specified task. Range is (left) very little confidence to (right) quite a lot of confidence.

I feel confident...	Confidence Level				
	Very Little	Little	Some	High	Very High
5. ...in my understanding of the structure of information within the field of science education research.	①	②	③	④	⑤
6. ...in my ability to identify and use key science education research tools to locate relevant information.	①	②	③	④	⑤
7. ...that I can plan effective search strategies and modify search strategies as needed.	①	②	③	④	⑤
8. ...that I will recognize and make appropriate use of library services in the research process I use.	①	②	③	④	⑤
9. ...that I understand the technical and ethical issues involved in writing research in science education.	①	②	③	④	⑤
10. ...that I can locate information about the field of science education research itself.	①	②	③	④	⑤
11. ...that I understand that some information sources are more authoritative than others.	①	②	③	④	⑤
12. ...that I demonstrate critical thinking in the research process I use.	①	②	③	④	⑤

Please respond to the following statements according to your feelings of importance of the specified item. Range is (left) very little importance to (right) quite a lot of importance.

As for...	Importance Level				
	Very Little	Little	Some	High	Very High
13. ...me, understanding why information is collected in a central place is important.	①	②	③	④	⑤
14. ...me, knowing how information materials are loaned and shared is important.	①	②	③	④	⑤
15. ...me, understanding the kinds of personnel who staff a library is important.	①	②	③	④	⑤
16. ...me, knowing how library staff assist my students with their information needs is important.	①	②	③	④	⑤
17. ...me, knowing how the library staff collaborate with me to support my teaching is important.	①	②	③	④	⑤
18. ...my students, an awareness of different library resources and tools is important.	①	②	③	④	⑤

Please respond to the following statements according to your feelings of the necessity for collaborating with a librarian to successfully perform a specified task. Range is (left) very little assistance to (right) quite a lot of assistance.

Collaboration with a librarian would be helpful in ...	Assistance Level				
	Very Little	Little	Some	High	Very High
19. ...defining and articulating the need for research in science education.	①	②	③	④	⑤
20. ...identifying a variety of types and formats of potential sources for information.	①	②	③	④	⑤
21. ...weighing the costs and benefits of acquiring the needed information.	①	②	③	④	⑤
22. ...reevaluating the nature and extent of the information needed.	①	②	③	④	⑤
23. ...selecting the most appropriate investigative methods or information retrieval systems for accessing information.	①	②	③	④	⑤
24. ...constructing and implementing effectively-designed search strategies.	①	②	③	④	⑤
25. ...retrieving information online or in person using a variety of methods.	①	②	③	④	⑤
26. ...extracting, recording, and managing the information and its sources.	①	②	③	④	⑤
27. ...summarizing the main ideas to be extracted from the information gathered.	①	②	③	④	⑤
Collaboration with a librarian would be helpful in ...	Very Little	Little	Some	High	Very High
28. ...articulating and applying initial criteria for evaluating both the information and its sources.	①	②	③	④	⑤
29. ...synthesizing main ideas to construct new concepts.	①	②	③	④	⑤
30. ...comparing new with prior knowledge to determine the value added, contradictions, or other unique characteristics.	①	②	③	④	⑤
31. ...determining whether the new knowledge has an impact on my value system and taking steps to reconcile differences.	①	②	③	④	⑤
32. ...understanding and interpreting information through discourse with individuals, subject-area experts, and/or practitioners.	①	②	③	④	⑤
33. ...understanding many of the ethical, legal, and socio-economic issues surrounding research in science education.	①	②	③	④	⑤
34. ...following laws, regulations, policies, and etiquette related to the access and use of information resources.	①	②	③	④	⑤

35. ...acknowledging the use of information sources in communicating research in science education.	①	②	③	④	⑤
36. ...applying new and prior information to the planning and creation of a particular product or performance.	①	②	③	④	⑤
37. ...revising the development process for the product or performance for a specific purpose.	①	②	③	④	⑤
38. ...communicating the product or performance effectively to others for a specific purpose.	①	②	③	④	⑤
39. ...assisting students to assess the learning process.	①	②	③	④	⑤
40. ...evaluating the outcome of the collaborative process on student achievement.	①	②	③	④	⑤

41. What would prevent you from collaborating with a librarian?

Please respond to the following statements according to your agreement with the specified item. Range is (left) Strongly Agree to (right) Strongly Disagree.

Librarians	Collaboration				Strongly Disagree
	Strongly Agree	Agree	Neutral	Disagree	
42. . . . provide information resources appropriate to students' information needs and learning tasks.	①	②	③	④	⑤
43. . . . match the information needs and interests of individual users with appropriate library resources.	①	②	③	④	⑤
44. . . . develop a collection of information resources that supports instruction and individual interests.	①	②	③	④	⑤
45. . . . provide leadership in using technology for teaching and learning.	①	②	③	④	⑤
46. . . . facilitate teaching of the school's curriculum.	①	②	③	④	⑤
47. . . . participate in developing school curriculum.	①	②	③	④	⑤
48. . . . identify needs of the school community.	①	②	③	④	⑤
49. . . . teach students how to be independent learners.	①	②	③	④	⑤
50. . . . plan instructional activities in collaboration with teachers.	①	②	③	④	⑤
51. . . . create instructional materials for teaching and learning	①	②	③	④	⑤
52. . . . guide teachers in the effective design of	①	②	③	④	⑤

instruction					
53. . . support the concept of the intellectual freedom of information	①	②	③	④	⑤
54. . . foster collaborative inquiry as well as individual inquiry.	①	②	③	④	⑤
55. . . help students develop life-long learning skills.	①	②	③	④	⑤
56. . . help students develop critical thinking skills.	①	②	③	④	⑤

What would you change about this survey? Were there questions that did not make sense? If so, which ones and how would you change them?

Appendix 2. School Library Media Specialist Collaboration Survey

Thank you for agreeing to participate in this research study. All answers are confidential and your identity will not be disclosed. Please provide the following information about yourself:

Name:	Current Job Title:
No. of Libraries responsible for:	Gender: ___ Male ___ Female
School / District:	Location:
Length of Service as a SLMS: ___yrs. ___mos.	Length of Service/current position: ___yrs. ___mos.

Please identify **the teachers, administrators and staff** in your school. Then read the questions below and provide answers in the corresponding colored column.

Name of Position (ex. Biology teacher, principal)	Question 1	Question 2	Question 3	Question 4
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				

20.				
21.				
22.				

For each person you identified, please answer the following four questions.

Q1. Please identify the grade level that each person teaches or is associated with

Q2. How long have you known each person?
 1 = < 1 year 2 = 1-3 years 3 = 3-5 years 4 = 5-10 years 5 = 10+ years

Q3. How often do you interact with each person? (have at least one conversation with the person)
 1 = daily 2 = once a week 3 = monthly 4 = 2 – 3 times a month 5 = never

Q4. Please identify your level of collaboration with each person.
 1 = design course content, teach and evaluate with 2 = consult on course content 3 = provide course materials
 4 = provide books / resources when requested 5 = exchange information informally 6 = never discuss school

If you collaborate with teachers, administrators, or staff outside your school, please identify them below and answer the same questions.

Name	Question 1	Question 2	Question 3	Question 4
1.				
2.				
3.				
4.				