1 Proceedings of the 48th Annual Conference of the International Association of School Librarianship and the 23rd International Forum on Research in School Librarianship
Dubrovnik, Croatia
October 21-25, 2019

Data Literacy: School Librarians as Data Coaches

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Keywords: *data literacy, school librarians, data coaches, school librarian leadership*

Abstract
School library educators at two university locations in North Texas collaborated on a research initiative to address the perceived need for data literacy preparation at the pre-service level. The research initiative explored the potential for school librarians to provide data literacy leadership through the systematic development of competencies in the master's-level pre-service professional preparation program. Participants from various school levels operated as a focus group in the fall of 2018 to identify competencies necessary for library professionals to develop as part of a pre-service training program. The answers to the nine key questions are presented as participant data related to data-informed decision-making in schools.

Introduction
A sizable gap exists between the available data to make informed decisions in schools and communities and the necessary expertise of professionals in those contexts. Librarians connect people with tools and information, empowering individuals and communities to make decisions, solve problems, and improve situations; they are the logical leaders in providing services that support data-informed decision-making. A vision of the school librarian as a data literacy leader emerges.

Statement of the Research Problem

Reports suggest that data-driven decision making (DDDM) is critical in school effectiveness (Bernhardt, 2009; Carlson, et al, 2011). Yet, preparation programs for educators and librarians are not yet consistently preparing these professionals to be data literate (Mandinach, et al, 2015; Means, et al, 2009). With targeted training, librarians are well positioned to provide leadership and services addressing this critical need. School library educators at two university locations in North Texas collaborated to propose a research initiative to address the perceived need for data literacy preparation at the pre-service level. The resulting IMLS grant (DATALEADPREP) funded the involvement of stakeholders in first providing a needs assessment and then contributing ideas for a pilot training program. The research initiative explored the potential for the school librarian to provide data literacy leadership through the systematic development of competencies in the master's-level pre-service professional preparation program. As part of this study, participants identified competencies necessary for library professionals to develop as part of a pre-service training program.

Literature Review

According to the IFLA School Library Guidelines (2015), "The key roles of a professional school librarian are: instruction, management, leadership and collaboration, and community engagement" (p. 27). Across these roles, being data literate is essential to providing instruction to students in information literacy, managing the systems and processes of a school library, collaborating across the education community, engaging the community in understanding the contribution of the school library, and promoting library programs and services. Additionally, school library evaluation involves the collection and analysis of data towards ensuring that:

> the library's programs and services support the goals of the school. Evaluation can indicate the extent to which students and teachers perceive that they benefit from those programs and services. It can also help to shape those programs and services and enhance the understanding of and commitment to those programs and services for both library staff and library users. (p. 46)

The American Library Association (ALA) standards for accreditation of library professional training programs stipulate that they must provide curriculum that "is concerned with information resources and the services and technologies to facilitate their management and use" so that professionals "assume a leadership role in providing services and collections appropriate for the communities that are served" (Committee on Accreditation of the American Library Association, 2015, p. 5). However, since there is no specific mention of competencies related to data as information resources, these may or may not be included in professional preparation programs.

Data literacy has been described by Mandinach & Gummer (2013) as "the ability to understand and use data effectively to inform decisions" (p. 30). It is important to note that this means more than interpreting standardized test scores to inform instruction; data literacy should produce more effective decision-making, problem-solving, and discernment of misinformation and disinformation. The library professional who is data literate has developed a range of competencies: posing questions that are aligned with purpose and data, locating relevant and meaningful data, data comprehension, data interpretation, the use of data in professional functions, the application of data literacy skills to accountability activities such as tracking organizational performance, instruction related activities such as informing instructional practice, and other activities such as examining organizational climate and evaluating staff performance (Means, et al, 2009). It is critical to recognize that these competencies must be applied at three levels: individual, staff, and organization. More focus on the *coaching and collaborating* role of the librarian in DDDM is needed. Where Fontichiaro and Oehrli (2015), focused on adding data literacy skills to

instruction given by school librarians, the current study focuses on the competencies needed to provide instruction, coaching and leadership, and how those competencies can be developed.

Methodology

A one-day summit brought together a range of stakeholder perspectives: from K-12 schools (school principals, teachers, and pre-service school librarians), public libraries (library directors, branch librarians, and pre-service public librarians), higher education (the planning initiative team), a school librarian in practice as a data literacy leader and consultant, and an advocate/visionary consultant for library programs. The focus group participation included brainstorming, discussion, documenting ideas, completing a survey, and providing feedback. The focus group was held in the fall of 2018 and took less than 5 hours to complete. Activities were organized according to nine key questions designed to elicit participant data related to data-informed decision-making in schools and public libraries. This article reports on school library-related responses. The following questions were used:

1. What are the challenges you face in your organization?
2. In your work setting, what data are meaningful to you, and why?
3. Now, what data are meaningful to you with regard to these challenges?
4. Now, look at the challenges again and choose those that are the most important for your organization to address.
5. How is data used to make informed decisions at the staff and organization level?
6. What competencies are necessary for data literacy?
7. After reading the list provided, which are the most important for a data coach in rank order?
8. What additional competencies do data coaches need?
9. Share your final thoughts and reflections on the activities of the day.

Responses to the questions were recorded, transcribed and analyzed by the researchers.

Findings

The findings are reported as responses to each of the questions.

Question 1: What are the challenges you face in your organization?

K-12 school participants (school principals, teachers, and pre-service school librarians) revealed challenges faced, meaningful data in the school setting, meaningful data applied to challenges, the most important challenges to address, data used to make informed decisions, and the most important competencies for a data coach to master.

Question 2: In your work setting, what data are meaningful to you, and why?

Participants identified poverty, skills required to analyze data, public perception of the school library and librarian, and an overall resistance to change as the most significant challenges faced in K-12 schools.

Question 3: Now, what data are meaningful to you with regard to these challenges?

Subsequently, they identified meaningful data that would apply to these specific challenges

- Poverty: standardized testing data, cognitive assessments, data on special education students, attendance data, perceptions, grades, technology access outside of the school, student involvement in extracurricular activities, and demographic data.
- Skills required to analyze data: course content in school librarian certification programs
- Public perception of the school library and librarian: informal surveys and data on the school culture (employees, students, and parents)

- Resistance to change: employee performance evaluations, employee interactions, perception of school culture, student and employee interests and needs, and attendance.

The most meaningful data in general include assessments, varying demographics, and perceptions about multiple entities (school, employees, extracurricular activities, etc.).

Question 4: Now, look at the challenges again and choose those that are the most important for your organization to address.

The most important challenges for schools to address include poverty, access to consolidated databases about students and other school data, and low literacy rates.

Question 5: How is data used to make informed decisions at the staff and organization level?

Participants demonstrated application of prior process by identifying data sources to a number of scenarios specific to their work setting and asked how data is used to make informed decisions at their level, either staff or administrative. For example, teachers and pre-service librarians were presented with a scenario about students displaying a negative attitude toward reading, and they identified three types of data to make informed decisions for change: Lexile scores, potential learning disabilities of students, and the classroom reading climate. Principals addressed a scenario about justifying staffing allocations. The most meaningful data for making informed decisions include student/teacher ratios, community survey data, various testing data, growth demographics, program data, and schedules.

Question 6: What competencies are necessary for data literacy?

The eight broad competencies from the list provided needed for school librarians to excel at data literacy leadership, identified by the participants, include:

1. Ability to pose questions
2. Data location; access and retrieval
3. Data comprehension
4. Data interpretation, analysis and evaluation
5. Data use
6. Data tracking and accountability
7. Instruction and programming related activities
8. Communication

Question 7: After reading the list provided, which are the most important for a data coach in rank order?

Of the 8 competencies identified, the ability to pose questions and form queries that lead to actionable data ranked first. Participants also recognized the need for school staff to be data literate and to have a coach facilitating the educational process. They suggested ideas for teaching data literacy and the benefits of doing so. The power of questions as a primary competency is an important skill for a data coach, and it leads to questions of where and how school librarians can develop this competency and the seven other competencies identified by the focus group.

Question 8: What additional competencies do data coaches need?

Participants also identified specific competencies related to the general competency areas provided for them. Examples of the supplemental competencies and their related general competencies are shared in **Table 1:** Supplemental Competencies Identified by the Participants.

Table 1

Supplemental Competencies Identified by the Participants

Supplemental Competency	Related General Competency
Interacting with non-data stakeholders	Communication
Identifying the impact of data	Data interpretation Analysis, and evaluation
Differentiating between inputs, outputs, and outcomes	Data interpretation, analysis, and evaluation
Creating data collection instruments	Ability to pose questions
Prioritizing different types of data	Data use Data interpretation, analysis, and evaluation
Determining the credibility of data sources	Data interpretation, analysis Evaluation Data tracking and accountability
Monitoring data and adjusting questions for optimal data usage	Data tracking and accountability Data interpretation Analysis, and evaluation Data Comprehension
Avoiding bias	Ability to pose questions Data interpretation, analysis, and evaluation

Question 9: Share your final thoughts and reflections on the activities of the day.

When asked to reflect on the day's activities, the participants provided a variety of final thoughts. For example, there was a general interest in learning to be data literate. While some participated acknowledged that there needed to be data literacy experts, others did not know how to begin with data literacy. One participant stated that they were concerned about how they were "supposed to be out there helping individuals and communities to be data literate." There was a suggestion that case studies be written to help with the development of competencies. Comments noted that real-world scenarios and experiences could help with preparation.

In addition to communicating the need for data literacies and data literacy education, participants spoke about issues related to data usage and storage. Participants commented that numbers could be arbitrary if the background for data is not presented. Similarly, few participants observed that since data is stored in so many places, responsible parties must communicate about the available data, comprehend the meaning

of the data, and interpret the outcomes of analysis. However, data can not be used to its fullest potential until it is stored using accessible methods.

The participants were enthusiastic about how data can be used to tell their stories. For them, data is a great way to problem-solve issues in schools. Because the data reflects the needs of students, a participant noted that students need to be a part of working with data. Still, they noted that there are discrepancies between collected data and the challenges present in schools.

Finally, participants said that being data literate is beneficial. However, there is a disconnect between teacher education programs and professional practice. A participant observed that pre-service teachers do not have access to courses that simulate the use of school data. The participant wondered if simulations could be made to help students practice.

Implications and Conclusions

The most important competency for data literacy chosen by the participants was the ability to pose questions. Responses suggest there is a gap between the data that is collected and the challenges that are faced. One could conclude that since there is not enough data literacy training, schools librarians are not able to make completely informed decisions about how to serve their communities. Often, great efforts are made to collect data, and only a fraction of it is used because it is not relevant to the processes that are necessary to make decisions. Therefore, plans are being made without adequate evidence to support them.

Overall, the participants saw the need for data literacy coaches. The need was emphasized by comments relating to the insufficient consistency in storage methods, a lack of understanding about how to interpret data, and discrepancies in the type of data that is stored. While the need for the position is clear, the participants were not sure how data literacy coaches should be trained in the future or how to implement the position now. Requests were made for case studies, examples of real-world experiences, and the development of a simulation to help current and future school librarians grasp the position requirements. The request for education is an opportunity for school districts and university programs to develop learning resources that can prepare school librarians to be leaders and impact initiatives and academic achievement outcomes for students.

Perceptions of librarians were one of the factors that were listed as a challenge for the participants. Although librarians can receive training in data literacy, they will also need to be able to articulate and demonstrate how they can serve as leaders. Unfortunately, decades of beliefs about librarians as book shelving shushers has played a part in how librarians are viewed as professionals. Administrators may not be likely to automatically think of librarians as data literacy coaches.

Training about data literacy should include modules about leadership behaviors and how to advocate for the profession. For instance, librarians will need to develop plans for sharing their data literacy skills. It will be essential for them to know how to understand strategic planning to articulate the strengths, weaknesses, opportunities, and threats revealed by data. Librarians seeking to become data literacy coaches will likely need to request a dataset and demonstrate how it can be analyzed to make decisions instead of waiting to be invited to leadership teams.

By addressing the need for improved data-driven decision-making in K-12 schools through enhanced training of the school librarian workforce, it is anticipated that a vision of the school librarian as a data literacy leader will be clarified and shared by a broader range of stakeholders; this has been the

experience of a school librarian (Lansford, 2017). With a shared vision of leadership from the librarian, the expectation of competency development in training programs for library professionals will drive the need for effective programs.

The school librarian as a data coach suggests a multi-dimensional role that encompasses various competencies. Opportunities for skill building in data-driven decision-making in K-12 schools, for school librarians, could be offered as in-service personal development sessions and included as part of the curriculum for pre-service school librarians. Plans for curricular inclusion include integration across the body of coursework and the availability of specific tutorials for individual aspects of data literacy and data literacy coaching.

As the next step in fulfilling our commitment to this research, the faculty researcher team is working on the pre-service curriculum, with the input from our research participants. We anticipate that design and delivery will be ready for inclusion in the fall 2019 semester for both universities. Once tested and confirmed, the training ideas and components will be shared with our colleagues worldwide.

Acknowledgement: This research is supported in part by the IMLS Grant# RE-97-18-0109-18.

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