IN SEARCH OF SYNERGY FOR SCIENCE: A COLLABORATIVE LESSON PLAN ASSIGNMENT FOR PRESERVICE ELEMENTARY SCHOOL TEACHERS AND PRESERVICE SCHOOL LIBRARIANS

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Information and Library Science.

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ABSTRACT

Casey H. Rawson: In Search of Synergy for Science: A Collaborative Lesson Plan Assignment for Preservice Elementary School Teachers and Preservice School Librarians
(Under the direction of Sandra Hughes-Hassell)

Although professional standards for both school librarians and classroom teachers heavily emphasize collaboration, research suggests that such collaboration remains rare in practice. This is especially true in science, where despite numerous calls in the LIS literature for more frequent and substantive collaboration between school librarians and science teachers, both parties struggle to see connections between their respective curricula.

While a number of research studies have investigated the facilitators, process, and outcomes of teacher-librarian collaboration (TLC), including science-focused collaboration, in the context of K-12 schools, comparatively little attention has been paid to how classroom teachers and school librarians are taught about collaboration in their preservice education programs. The mixed methods, iterative, design-based study that is the focus of this dissertation addressed this gap by exploring the impact of a novel collaborative lesson plan project undertaken by students enrolled in an elementary science methods course and students enrolled in a graduate-level school library course.

Findings indicate that preservice librarians deepened their understanding of TLC and the instructional role of the school librarian, the purpose and role of resources in the school library program, and the potential for school librarians to collaborate with science teachers. Preservice teacher participants reported high levels of motivation to participate in future TLC partnerships at the end of this project, despite the fact that there was little evidence to suggest

deep shifts in these participants' understanding of TLC and the instructional role of the school librarian over the course of the project. Activity theory provided a framework for identifying and discussing five tensions experienced by participants as their learning was mediated by the classroom and community context, tools, and each other.

Project outcomes include a set of design guidelines that can help teacher and school librarian educators implement similar assignments in their own contexts, a synthesized model of the TLC process as experienced by project participants, and a new proposed model of TLC that reflects participants' understandings of the various forms that TLC might take in practice and the factors that contribute to the overall intensity of collaborative partnerships.

To Steve, who made this possible, and to Emerson and Lincoln, who made it really, really difficult in the best way imaginable.

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LIST OF ABBREVIATIONS

AASL	American Association of School Librarians
ALA	American Library Association
LIS	Library and Information Science
PSL	Preservice School Librarian
PST	Preservice Teacher
TLC	Teacher-Librarian Collaboration

Chapter 1. Introduction

Scientists use the concept of synergy to describe a situation in which multiple parts of a system, working together, produce an effect that is greater than the sum of the parts. Multicellular organisms, for example, exhibit a "synergy of scale" – individual cells are capable of only basic biochemical processes, but when they work together, they can produce sight, movement, consciousness, growth, and a host of other complex phenomena. Elementary school teachers and school librarians are both in need of synergy when it comes to science:

- Instructional time for science has been slashed in elementary schools, thanks in part to the emphasis on standardized testing in reading and math (Goldston, 2005; Griffith & Scharmann, 2008), and preservice elementary school teachers have consistently reported both negative attitudes toward science and a lack of confidence in their own ability to teach science (Appleton, 2006; Tosun, 2000).
- Despite a heavy emphasis on collaboration as a focal responsibility for school librarians (American Association of School Librarians, 1998, 2009), school librarians have reported that they rarely collaborate with science teachers to plan, implement, or evaluate instruction, which is perhaps related to a lack of confidence in their own science content knowledge (Hoffman & Mardis, 2008; Mardis, 2005b).

These roadblocks along the path to exemplary elementary science education come at a time when science literacy is more important than ever. The authors of the recently released

Next Generation Science Standards, who represent a consortium of 26 states, state this clearly in the front matter to the standards document:

> Never before has our world been so complex and science knowledge so critical to making sense of it all. When comprehending current events, choosing and using technology, or making informed decisions about one's healthcare, science understanding is key. Science is also at the heart of the United States' ability to continue to innovate, lead, and create the jobs of the future. All students—whether they become technicians in a hospital, workers in a high tech manufacturing facility, or Ph.D. researchers—must have a solid K–12 science education. (NGSS Consortium, 2013)

If the vision of all students attaining excellence in science is to be achieved, then educators must incorporate high-quality science teaching into the elementary classroom, where young children can build a strong foundation of science knowledge, motivation, and practices that can be built upon in later grades (Keeley, 2009). Collaborative working relationships between elementary classroom teachers and school librarians, in which both parties work together to plan, implement, and/or assess instruction, may be one way to capitalize on the expertise of both sets of educators to create such high-quality science instruction.

Instructional collaboration (working with other educators to plan, implement, and/or assess instruction) is emphasized in professional standards for both teachers and school librarians as a critical component of professional practice (American Association of School Librarians, 2009; National Board for Professional Teaching Standards, 1989). National organizations responsible for the accreditation of school librarian and classroom teacher preparation programs require that these programs teach their students to collaborate (American Library Association, 2010; Association for Childhood Education International, 2007). Despite this, a recent comprehensive review of teacher education programs in the United States found that "although teaching is an increasingly collaborative profession, we

find little evidence of collaborative practice" in coursework assigned by these programs (Greenberg, Walsh, & McKee, 2015). Similarly, research in the LIS field has found that although collaboration is a component of preparation programs for school librarians, these programs are typically self-contained and offer few, if any, opportunities for students to practice authentic collaboration with pre- or inservice teachers before entering the field (Harada, 1996; Latham, Gross, & Witte, 2013; Neuman, 2001; Tilley & Callison, 2001). Research into best practices for teaching preservice school librarians and classroom teachers to collaborate is limited. We do not know much about how preservice students conceptualize instructional collaboration or the school librarian's instructional role and domains of expertise; nor do we have a solid understanding of how learning experiences in preservice programs might influence these understandings.

1.1 Aim of Study

This dissertation study explored the impact a collaborative, science-focused, cross-class instructional design assignment undertaken by preservice school librarians and preservice elementary teachers. The study investigated the effects of this assignment on participants' developing understanding of school librarian roles and expertise and teacher-librarian collaboration utilizing the design-based research approach. The project described herein is the second iteration of the design-based research cycle, which began with a pilot implementation in Fall 2013. Data sources for this study included participant interviews, a post-project focus group, questionnaires, student work samples, and classroom observations, including field notes and audio recordings of student presentations.

This study helps to address two gaps in the education and school library research fields: a lack of empirical research focused on teacher-librarian collaboration in science

content areas, and a lack of attention to best practices for teaching school librarian / classroom teacher collaboration within teacher and school librarian education research. Findings have implications for not only higher education, but also for state and national library associations, school districts, and individual school librarians. The outcomes of this project include practical, societal, and theoretical contributions to scholarship related to science-focused teacher-librarian collaboration and best practices for preservice school librarian and teacher education:

- Practical: By contributing to the development of general design principles for collaborative assignments such as this one, this study may help instructors of preservice teachers and school librarians to design similar experiences for their own students. Findings can also assist state or national library associations in advocating for more authentic collaboration experiences such as this one to be integrated into preservice school library programs. In addition, both professional organizations and school district level library supervisors may apply this project's findings to create meaningful professional development opportunities for inservice school librarians. Finally, the findings from this study may help individual school librarians improve their own collaborative practice, specifically as related to science or other STEM subject areas.
- Societal: This project directly impacted the understanding of more than 60 preservice teachers and 15 school librarians who participated in either iteration of the assignment; many more teachers and librarians, along with their students, could potentially be impacted if other preservice programs implement similar projects.

- Theoretical: The study findings contribute to theoretical knowledge by describing students' pre- and post-project mental models of teacher-librarian collaboration; critiquing existing models of TLC in light of project findings and proposing a new model of TLC consistent with these findings; and analyzing the students' learning process over the course of the assignment using activity theory (Engeström, 1987, 1993, 2001), which provided a framework for identifying and discussing the tensions and successes experienced by students as their learning was mediated by the classroom and community context, tools, and each other.

1.2 Research Questions

1. What do preservice elementary school teachers know and understand about the training, expertise, and collaborative instructional role of the school librarian at the beginning of this project?
2. What do preservice school librarians know and understand about the expertise and collaborative instructional role of the school librarian at the beginning of this project?
3. How does the collaborative lesson plan design project change participants' understanding of the expertise and collaborative instructional role of the school librarian, and what specific features of the project contribute to these changes?
4. What issues emerge during the collaborative process, and how do the students address those issues?
    a. Do any issues emerge during the collaborative process that are specifically related to the science content focus of the assignment, and how do the students address those issues?

5. How does participants' understanding of teacher-librarian collaboration (TLC) change over the course of this project?
    a. How does participants' understanding of science-focused teacher-librarian collaboration (TLC) change over the course of this project?

Chapter 2. Collaboration in Education and School Librarianship

Both the education community and the school library community emphasize the critical role that collaboration can play in student learning. In the education field, teacher collaboration is a key component of President Obama's recent framework for teacher professionalization (U.S. Department of Education, 2013), is one of the core propositions for what teachers should know and be able to do according to the National Board for Professional Teaching Standards (1989), and is at the heart of a wide variety of school reform efforts including Professional Learning Communities (PLCs), team teaching, and the small schools movement (Supovitz & Christman, 2005; Vescio, Ross, & Adams, 2008). In the school library field, collaboration across subject areas and across all roles of the school librarian is heavily emphasized in the most recent set of national professional standards (American Association of School Librarians, 2009). Despite this rhetoric, however, there is some disagreement in both fields regarding the definition of the term and just what counts as collaboration. This chapter provides a brief history of collaboration in education and school librarianship, discusses collaboration as concept and theory within educational and school library research, and introduces several models of collaboration from both fields.

2.1 A Brief History of Collaboration in Education and School Librarianship

2.1.1 Collaboration in education. Teacher collaboration might be a hot topic of discussion in education right now, however, the long history of teaching in the United States has been characterized largely by individualism and isolation (Evans-Stout, 1998; Hargreaves, 1992; Kliebard, 1986; Little, 1990; Lortie, 1975). Much of the current rhetoric

surrounding collaboration in education can be traced back to the mid-1970s, when federal legislation was passed to address the education of students with disabilities (Dettmer, Thurston, & Dyck, 2005; Fishbaugh, 1997; Pugach, Blanton, & Correa, 2011). Public Law 94-142, or the Education for All Handicapped Children's Act (EHA) was passed in 1975 and mandated that students with disabilities be educated in the least restrictive environment possible via the coordination of services among special education teachers and other educators (Dettmer et al., 2005; Fishbaugh, 1997). Although some instances of teacher – specialist consultation existed even before this law, passage of the EHA (later reauthorized as the Individuals with Disabilities Education Act, or IDEA) firmly established the need for coordination – if not collaboration – between classroom teachers and special education teachers (Dettmer et al., 2005; Fishbaugh, 1997; Pugach et al., 2011). In response, special education teachers "began cautiously knocking at the doors of their general education colleagues" (Pugach et al., 2011, p. 187), but at least initially, coordination between the two typically took the form of additive services that maintained clear lines of separation between the two sets of professionals (Pugach et al., 2011). While the law may not have immediately led to extensive and substantive collaboration between special education and regular education teachers, it did prompt a great deal of academic research and on-the-ground experimentation in schools, with practices ranging from simple advice-giving and one-way information provision to (later) teaming and co-teaching models in which regular and special educators worked closely together as equal partners (Cook & Friend, 1995; Dettmer et al., 2005; Fishbaugh, 1997; Pugach et al., 2011). This strand of research continues today and has provided some valuable contributions to the theoretical conception of collaboration in education, discussed later in this chapter.

In 1983, a government panel published *A Nation at Risk*, a report which sent shockwaves through the public education research and policy world by declaring that "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people" (National Commission on Excellence in Education, 1983, p. 9). The report opined that the United States had lost significant ground to other nations in industry and science, and spurred a new wave of panic and criticism directed at schools (National Academy of Engineering, Committee on Standards for K-12 Engineering Education, 2010; Pugach et al., 2011). Three years later, the Carnegie Foundation released another report titled *A Nation Prepared* (Task Force on Teaching as a Profession, 1986) which focused on the inadequate preparation and development of teachers and called for the creation of a national board to encourage teaching excellence. This board – the National Board for Professional Teaching Standards – was soon created, and in its first major position statement advocated for teacher collaboration as a core component of professional competence (National Board for Professional Teaching Standards, 1989). Around the same time (possibly in response to the National Board proposition on teacher collaboration), academic research on teacher collaboration began to become more prevalent.

Pressure to transform schools into collaborative workplaces did not come only from within education. In the business workforce of the 1980s and 1990s, teamwork became a dominant model thanks to the work of influential organizational theorists and management experts such as Peter Drucker and Peter Senge. Drucker (1959) introduced the concept of "knowledge workers," a new and growing class of workers whose jobs require not only high levels of formal education but also continuous, on-the-job learning. Knowledge workers,

Drucker explained, are specialists, which requires that they work in groups with other specialists to accomplish tasks (Drucker, 1994). Thus, in the modern organization at that time, the basic work unit was a team rather than an individual (Drucker, 1994). Similarly, Senge (1990) posited that the most adaptive and productive – and therefore the most successful – businesses were "learning organizations" in which shared vision and teamwork were critical components. In a time of rapid technological and economic change and intense criticism of public schooling, the idea of the school as an adaptable, progressive organization capable of learning and proactively addressing issues was attractive to many educational administrators, teachers, and policymakers (Senge et al., 2000).

One collaborative model in particular was widely adopted in public schools at all grade levels: the Professional Learning Community (PLC), a term that first emerged in the mid-90s (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006; Vescio et al., 2008). Based on business ideas of the learning organization, the PLC model was, in theory, defined by several core characteristics: shared values and norms among participating teachers, a focus on student learning, continuous and reflective communication among teachers, public teaching, and a focus on collaboration (Vescio et al., 2008). In practice, though, the PLC model quickly became diluted on the ground as school personnel "[used] the term to describe every imaginable combination of individuals with an interest in education" (DuFour, 2004, p. 6). The PLC model has been extensively researched and continues to be investigated in academia and implemented in schools (for reviews of the PLC model, see Stoll et al., 2006; Vescio et al., 2008). However, the particularities of this and other ground-level models featuring teacher collaboration (such as the small schools movement or the critical friends model) are beyond the scope of this review.

2.1.2 Collaboration in School Librarianship. Over the past several decades, the field of school librarianship also experienced sweeping changes that have culminated in the current emphasis on collaboration (specifically, instructional collaboration between school librarians and classroom teachers). Through the 1950s, the instructional role for school librarians described in the field's national professional standards documents was limited to cooperating with teachers to instruct students in the use of the library and assisting teachers in finding resources for teaching (American Library Association, 1927, 1945; National Education Association & American Library Association, 1925). In 1960, a new set of professional standards for school librarians advocated for library instruction that was integrated into the regular curriculum, which required a greater level of cooperation with classroom teachers than previous sets of standards (American Association of School Librarians, 1960). Literature in this decade began to highlight a more active instructional role for the school librarian and to depict school librarians as members of teaching teams (Craver, 1986). However, the school librarian's curriculum was still limited to the use of the library and its resources, and even that limited instructional role was often resisted by librarians and classroom teachers alike (Craver, 1986).

By the 1970s, literature in the school library field had largely moved beyond advocating for an instructional role and instead argued for the expansion of that role, despite continued evidence suggesting widespread disagreement among principals, teachers, and school librarians about the appropriateness and feasibility of the school librarian's assumption of such a role (Craver, 1986). New school library standards released in 1975 described a greatly expanded instructional role for school librarians that moved the school librarian's curriculum beyond use of library resources to a focus on learners' "ability to find,

generate, evaluate, and apply information that helps them to function effectively as individuals and to participate fully in society" (American Association of School Librarians & Association for Educational Communications and Technology, 1975, p. 4). In these standards, school librarians were expected to consult with teachers to develop and implement curriculum that would address these information skills in the context of classroom instruction; however, no guidelines were provided about what such "consultation" might look like in practice. Still, the expansion and suggested integration of the school library into content area curriculum was the start of what David Loertscher has called a "revolution" in school library services (Loertscher, 2000). Kathleen Craver (1986) summarized the evolution of the school librarian's instructional role from the 1950s to the 1970s as follows:

> By the end of the seventies, the school media specialist's instructional role had evolved in the literature to one of prominence. The research studies, however, demonstrated a fairly consistent pattern indicating that the evolution had not totally occurred…. librarians were still confronting the more basic questions surrounding the structuring of an educational role in a setting that, in many instances, had not evolved from the methods and curriculum practiced in the 1950s. ("The Seventies" section, para. 16).

In the 1980s, the school library field was affected by the same demands for accountability and improved outcomes placed on classroom teachers in the wake of the *Nation at Risk* report. These demands, partnered with significant budget cuts in public education, made it necessary for school librarians to justify the value of their positions for the educational mission of the school, which led to more (though hardly all) school librarians embracing their instructional roles (Small, 1998). In 1988, the influential *Information Power* guidelines for school library programs were published, replacing the 1975 standards. These standards were the first to specifically mention teacher-librarian collaboration and to describe what forms such collaboration might take in schools:

> School library media specialists hold regular planning meetings with individual teachers and teaching teams. Working *collaboratively*, they design instructional units and identify potential resources for purchase. Curriculum planning, the design of learning activities, and the development of locally produced teaching materials occur on an ongoing basis. (American Association of School Librarians, 1988, pp. 17–18, emphasis added)

The 1988 standards depicted school librarians as teachers, information specialists, and instructional consultants who work with teachers to "jointly plan, teach, and evaluate instruction in information access, use, and communication skills" (p. 39). These guidelines officially positioned collaboration with teachers as the primary vehicle for information literacy instruction and paved the way for a large corpus of research on teacher-librarian collaboration. Subsequent school library standards released in 1998 and 2009 reaffirmed and expanded upon the importance of teacher-librarian collaboration and the benefits of such collaboration for teachers, librarians, and students (American Association of School Librarians, 1998, 2009). The most recent (2009) set of standards emphasizes collaboration in nearly every aspect of library services; collaboration is mentioned roughly 50 times in the document.

Professional journals for school librarians are now replete with anecdotal descriptions of teacher-librarian collaboration projects (e.g., Okemura, 2008; Stewart, 2010), and a search of the 2013 American Association for School Librarians (AASL) Annual Conference schedule revealed that 30 out of approximately 130 sessions dealt with collaboration. These are indications that teacher-librarian collaboration is occurring in schools, although empirical research has found that it is still far from universal (Lindsay, 2005; Montiel-Overall, 2005b; Montiel-Overall & Jones, 2011; Todd, 2008).

2.2 Definitions and Models of Collaboration

2.2.1 Conceptions of collaboration in education. The term collaboration is used with great frequency in schools and in educational research, and such dialogues assume "that educators know what collaboration means, how it is practiced, and that collaboration actually happens" (Welch, 1998, p. 27). However, such assumptions may be unwarranted, as the term has been applied indiscriminately to describe nearly any educational initiative involving more than one person (Friend, 2000). Marilyn Friend (2000) described four myths about teacher collaboration that contribute to poor implementation of the concept in school: 1) everyone is already collaborating, 2) more collaboration is always better than less (or, phrased differently, every lesson / unit / school program is worthy of collaboration), 3) collaboration is about liking others and feeling good, and 4) collaboration comes naturally and there is no need to teach collaborators how to work together. These pervasive beliefs about teacher collaboration belie the reality that substantive, meaningful teacher collaboration is rare, requires significant investments of time and energy from all participants, often involves conflict, should be more about student learning than adult feelings, and is not intuitive for many educators (Friend, 2000; Joyce, 2004; Little, 1990; Welch, 1998). Many authors have commented on how the lack of a clear definition of teacher collaboration makes successful implementation in schools difficult if not impossible (e.g., Little, 1990; Riordan & da Costa, 1996; Schmoker, 2004). "Clarity precedes competence," as researcher Mike Schmoker summarized, and collaboration "was never sufficiently clarified – or shored up – as it met resistance and complication on the ground" (Schmoker, 2004, p. 85).

Despite widespread agreement that collaboration needs to be more clearly defined as a concept within education, definitions proposed in the literature vary widely and there is no

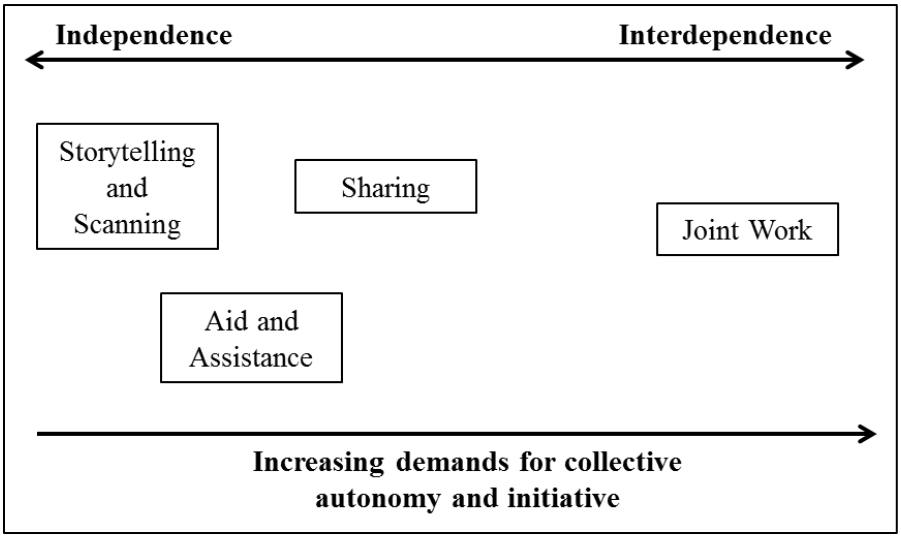
one theory or model of teacher collaboration around which researchers and practitioners have coalesced. Jose Manuel Lavié (2006) identified five distinct discourses on teacher collaboration, each with different value commitments, associated research designs, interests, and potentials for transforming (or maintaining) educational practice. These include the cultural discourse, the school effectiveness and improvement discourse, the school-as-community discourse, the restructuring discourse, and the critical discourse. In most of these discourses, the focus has not been on a definition or theory of collaboration itself but rather on the conditions that facilitate collaboration or the outcomes of collaboration.

Studies of teacher collaboration typically cite broad orienting frameworks such as Lev Vygotsky's socio-cultural theory (e.g., Van Benschoten, 2008) or Jean Lave and Etienne Wenger's (1991) concept of Communities of Practice (2011), or they may cite no theoretical framework at all (e.g., Arthaud, Aram, Breck, Doelling, & Bushrow, 2007; Jenni & Mauriel, 2004). Recently, social network theory has been applied to studies of teacher collaboration (Moolenaar, 2012). A general theory of teacher collaboration has not yet been developed, however, and this is perhaps related to the lack of a clear definition of the term. "Definitions are critical to theory-building," (Wood & Gray, 1991, p. 143) and with collaboration defined and applied so amorphously within education, a unified theory may be difficult, if not impossible, to develop (Gray & Wood, 1991). Writing within the organizational research field, Barbara Gray and Donna Wood (1991) described the necessary features of such a theory, namely that it would have to account for the preconditions, processes, and outcomes of collaboration rather than focusing on only one of these three.

While a general theory of collaboration in education may not yet exist, researchers have proposed several models or taxonomies of teacher collaboration. These models are

typically explanatory or descriptive in nature rather than predictive, although each implies that certain forms of teacher collaboration are more powerful than others in terms of improving teaching and learning. One of the earliest of these was Judith Warren Little's (1990) framework that placed several common manifestations of teacher collaboration on a continuum according to the degree of independence or interdependence they fostered and the extent to which each demands collective autonomy and initiative (see Figure 1, below). On one end of the continuum are collegial interactions that maintain, or even reinforce, norms of independence and individual autonomy. On the other end are interactions which both demand and create interdependence among teachers and in which judgments and decisions are fully shared (a state that Little called collective autonomy). With each move toward interdependence, "the inherited traditions of noninterference and equal status are brought more into tension with the prospect of teacher-to-teacher initiative on matters of curriculum and instruction" (Little, 1990, p. 512).

Figure 1 Continuum of Common Forms of Teacher Collegiality. Adapted from Little (1990).



Mary Susan Fishbaugh (1997) proposed a three-tiered model of collaborative teaching practice. Each tier addresses one of three proposed purposes for teacher collaboration – technical assistance, collegial support, or challenge solution – although all tiers have student achievement as the overarching goal. In Fishbaugh's model, the first tier is consulting, in which an expert gives advice to a less knowledgeable person via a one-way flow of information. The consulting model addresses teachers' needs for technical assistance, for example, when a general education teacher has a question about a student with disabilities. The second tier is coaching, in which two or more educators take turns advising each other. At the coaching level, information flows both ways, although not at the same time. Coaching addresses teachers' needs for collegial support as they work to improve their professional practice. Teaming, an interactive model in which all team members share ownership of challenges and solutions, is the third tier of Fishbaugh's model. Teaming responds to the need to solve individual, classroom-level, or school level challenges by helping teachers access the combined wisdom and experience of the group. At this level, information flows in multiple directions at once, and different members of the team can assume leadership roles as necessary. Fishbaugh did not position consulting, coaching, or teaming as the ideal form of collaboration, but rather argued that all forms are necessary and appropriate for teaching practice, and the choice of which to use in a given situation should depend on the reasons for the collaboration.

Geoffrey Riordan and Jose da Costa (1996) proposed a detailed model of teacher collaboration based on their work with high school teachers involved in collaborative efforts. Unlike Little's and Fishbaugh's models, Riordan and da Costa's model is premised on a single definition of teacher collaboration and, within that definition, focuses on the

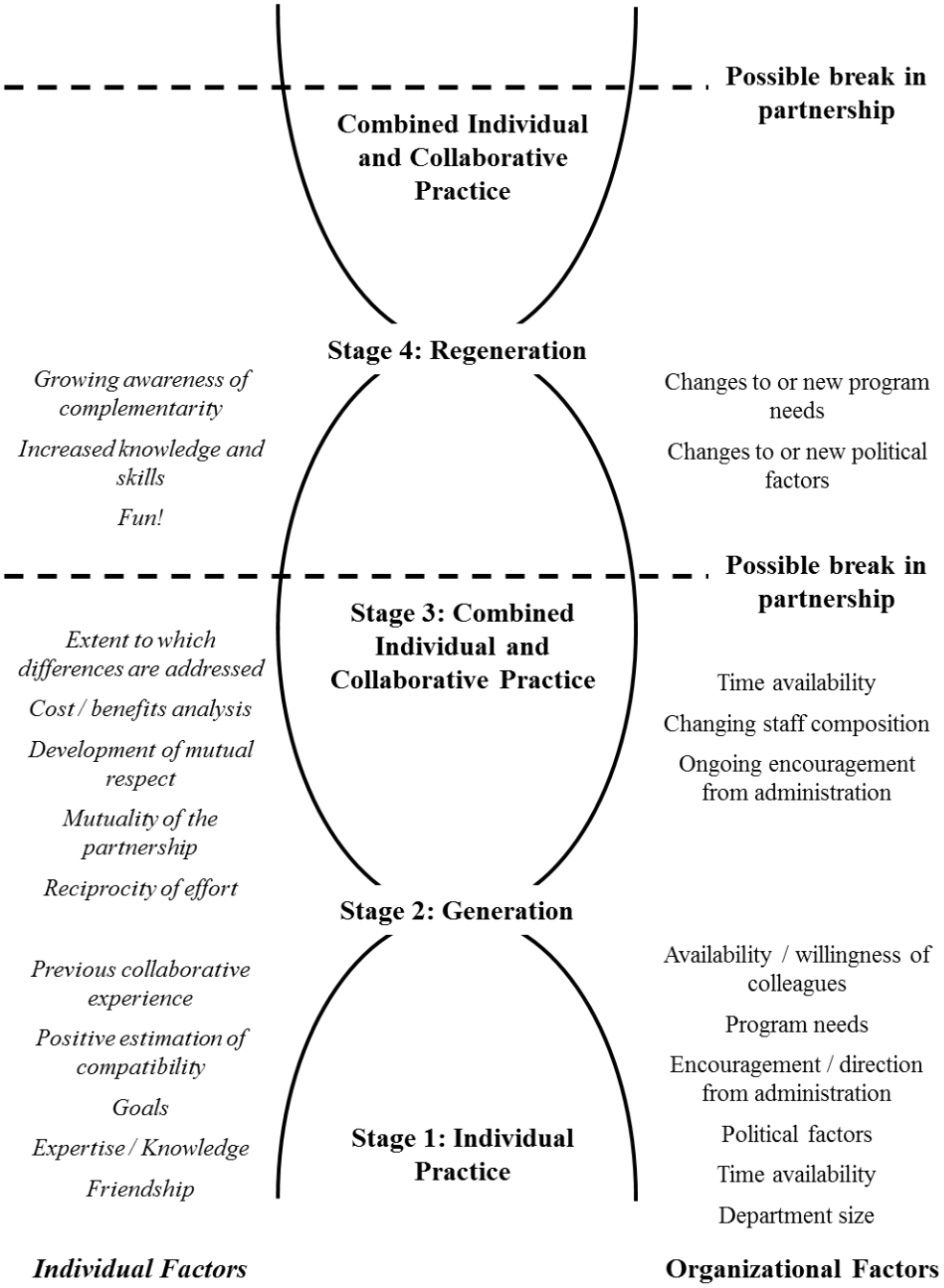
conditions under which collaborative partnerships develop, operate, and fall apart and the tasks undertaken over the course of a collaborative partnership. Based on the work of previous scholars, Riordan and da Costa defined collaboration as

> joint work, shared responsibility, and the existence of high levels of trust, respect, and mutuality…. Teachers who work collaboratively think and behave on the basis of an understanding of teaching as a shared responsibility and an understanding of student learning as the result of cooperative activity. The scrutiny of peers therefore is welcomed. (Riordan & da Costa, 1996, p. 3)

Riordan and da Costa proposed four developmental stages to collaborative partnerships between teachers (for a graphic depiction of these stages, see Figure 2, next page). At each stage, individual and organizational factors either coalesce to facilitate collaboration or work to create distance between teachers. In Phase 1, teachers practice individually, although they sometimes share stories, ideas, and resources. During this stage, teachers develop knowledge of their own teaching practice and beliefs as well as those of their colleagues. They may or may not identify potential collaborative partners during this phase, and organization factors such as time availability, scheduling, and administrative views on collaboration may or may not encourage them to work more closely with their peers. Phase 1 represents the typical situation in non-collaborative schools, and teachers may stay in this phase for years, or, in some cases, for their entire careers.

In Phase 2, Generation, individual and organizational factors conspire to spark a collaborative partnership between two or more teachers. In Riordan and da Costa's qualitative study, the specific circumstances leading to collaborative partnerships were complex and unique to each pair studied. However, a few general individual and organizational factors were identified, including shared goals, positive conceptions of compatibility, previous collaborative experience, encouragement from administrators, and program or department needs.

Figure 2 Riordan and da Costa's model of teacher collaboration. Adapted from Riordan and da Costa (1998).



Once the collaborative partnership has been established, it moves into Phase 3, characterized by combined individual and collaborative practice. In this stage, individual and organizational factors influence the duration, process, and frequency of collaboration as well as the relative proportions of individual vs. collaborative teaching. Some of these factors, such as the development of mutual respect between collaborators, may encourage the continuation of the collaborative partnership; others, such as unaddressed differences in pedagogical beliefs, may work to end the partnership. As individual and organizational factors evolve over time, collaborative partnerships may go through Phase 4, Regeneration, which represents a reformulation of the partnership and a renewal of commitment to collaborative teaching. Teachers may progress through this developmental cycle iteratively or may repeat Phases 3 and 4 with the same partner, or may restart the cycle with new partners at multiple points in their teaching careers.

Riordan and da Costa's model addresses not only the development but also the content of collaborative partnerships among teachers. They identified four purposes for collaboration among the teachers they studied, each purpose associated with different collaborative tasks. Those purposes were pedagogical (tasks directly related to instruction), professional development (tasks focusing on developing teachers' knowledge or skills), micropolitical (tasks undertaken to influence others, deal with differences between teachers, or gain status), and individual support and relationship maintenance (tasks that involved sharing the workload, giving positive feedback, or having fun). Riordan and da Costa emphasized that collaborative partnerships may serve multiple purposes at once, and sharing of educational resources and materials was a common task across all purposes and thus a basic feature of teacher collaboration.

Since it deals with both the preconditions and processes of teacher collaboration, Riordan and da Costa's model comes closest to fulfilling Gray and Wood's (1991) qualifications for a general theory of collaboration. However, none of these models addresses the outcomes of teacher collaboration or makes any explicit claims about the effects of varying levels of teacher collaboration on student learning. In part this may be because determining the impact of any educational intervention on student achievement is notoriously difficult due to differences in how one chooses to conceptualize and measure "student achievement" and the complexity of schools and classrooms. Even within the models of collaboration discussed above, there is considerable variation regarding what counts as collaboration, underscoring the need for clarity on this concept within educational research and practice.

2.2.2 Conceptions of collaboration in school librarianship. Definitions of teacher-librarian collaboration in the school library literature have converged on a fairly small number of components, shown in Table 1, next page. Perhaps because it includes all of the most popular components of these definitions, Patricia Montiel-Overall's (2005b) definition of collaboration in the school library field is the most cited. Montiel-Overall defined teacher-librarian collaboration as

> a trusting, working relationship between two or more equal participants involved in *shared thinking*, *shared planning*, and *shared creation of innovative integrated instruction*. Through a shared vision and shared objectives, student learning opportunities are created that integrate subject content and information literacy by co-planning, co-implementing, and co-evaluating students' progress throughout the instructional process in order to improve student learning in all areas of the curriculum. (p. 32, emphasis in original)

There has been much discussion in the school library literature of "what counts" as teacher-librarian collaboration (e.g., Dickinson, 2006; Marcoux, 2007). If a school librarian provides a cart of books for a lesson that is entirely taught by the classroom teacher, is that

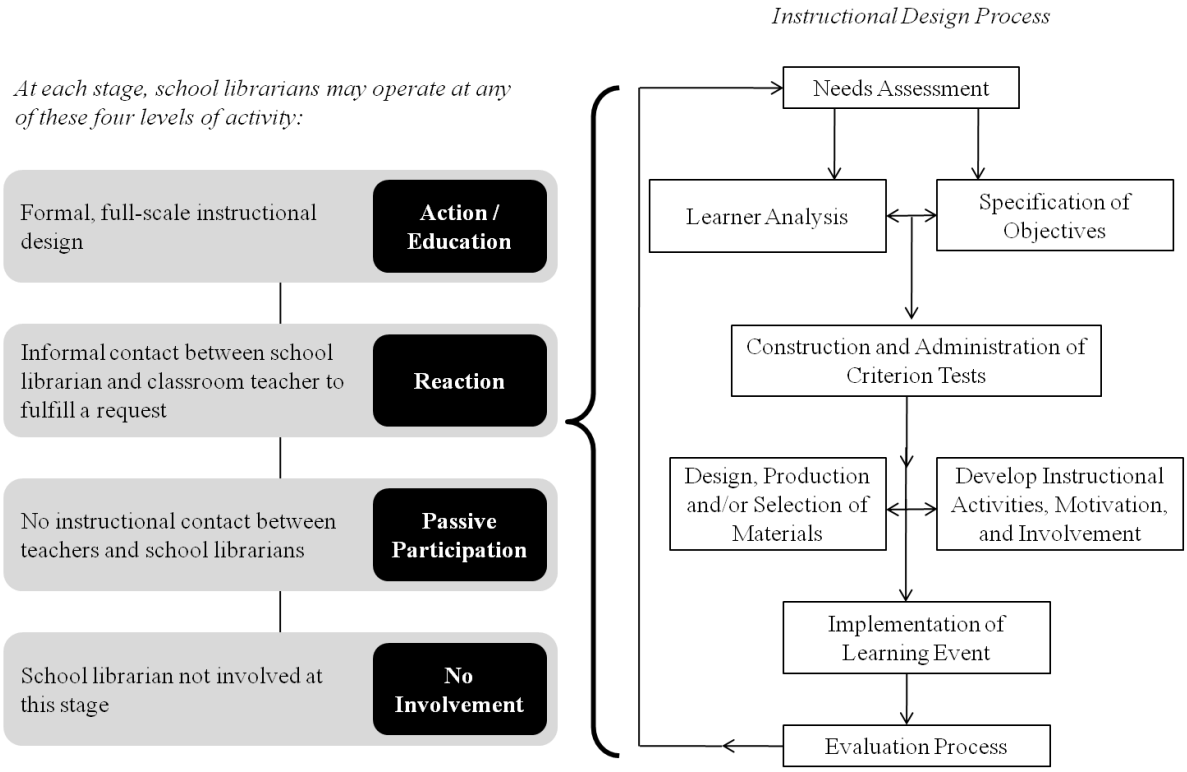
collaboration? If the classroom teacher asks the school librarian to prepare and teach a lesson on website evaluation to her students, is that collaboration? As noted above, clear definitions and boundaries of collaboration must be understood before educators can effectively practice collaboration (M. Welch, 1998). To help school librarians and classroom teachers determine whether they are truly practicing teacher-librarian collaboration, a number of researchers in the school library field have presented continuums or taxonomies of collaboration that rank interactions between school librarians and classroom teachers. However, these models disagree about which interactions might properly be called collaboration.

Table 1 Common Elements in Definitions of Teacher-Librarian Collaboration

	AASL,1998	(Ash-Argyle & Shoham, 2012)	(Buzzeo, 2002)	(Callison, 1999)	(Dickinson, 2006)	(Doll, 2005)	(Donham, 1999)	(Marcoux, 2007)	Montiel-Overall, 2005
Co-planning	X		X		X	X	X	X	X
Co-teaching	X		X	X	X	X	X	X	X
Co-assessment	X		X	X	X	X	X	X	X
Integration of classroom content and information literacy skills	X		X		X		X	X	X
Trust and support; a "collaborative relationship"		X		X		X			X
Equal status and responsibility			X	X					X
Shared vision and goals		X		X					X
Well-defined roles		X		X					
Takes place over a relatively long period of time		X		X		X			
Shared risks, control, resources, leadership, and results		X		X					

In the early 1980s, Philip Turner and Janet Naumer (1983) developed a model of school librarian instructional consultation that mapped the instructional design process and provided a hierarchy describing the school librarian's possible level of interaction with classroom teachers at each stage (see Figure 3, below). While this model referred to consultation rather than collaboration, its general structure was duplicated by later models of teacher-librarian collaboration. Turner and Naumer argued that every activity level except for the lowest ("no involvement") qualified as a form of consultation, although they also encouraged school librarians to aim for the upper levels of the model (Action / Education and Reaction).

Figure 3 Turner and Naumer's Model of School Librarian Instructional Consultation. Adapted from Turner and Naumer (1983).



Gail Dickinson (2006) proposed a three-stage continuum for collaboration that begins with cooperation, moves through coordination, and ends with true collaboration. On the cooperation end of the continuum, the school librarian provides instructional resources for classroom teachers and may also deliver isolated information literacy lessons, but performs these responsibilities independently from the classroom teacher. At the coordination level, classroom teachers and school librarians participate in cursory co-planning to organize information literacy instruction that is integrated to some extent with classroom content. In coordination, teachers and school librarians each independently prepare, teach, and assess their respective parts of the lesson or unit. True collaboration, on the other hand, is characterized by co-planning, co-teaching, and co-assessing lessons or units that fully integrate information literacy content and classroom content. For Dickinson, only this final stage of the continuum qualifies as teacher-librarian collaboration.

Elizabeth Marcoux (2007) described a pyramid model of collaboration with five levels: consumption, connection, cooperation, coordination, and ultimate collaboration. As in Dickinson's model, the lower levels of Marcoux's pyramid represent low-intensity, low-commitment resource sharing and managerial connections between teachers and school librarians. The top level of Marcoux's pyramid is nearly identical to Dickinson's description of true collaboration. Marcoux, however, positioned all five levels as forms of collaboration and emphasized that not every collaborative lesson or unit can or should be at the top of the pyramid.

David Loertscher (2000) devised a ten-level taxonomy of the school library media center (LMC) that includes collaboration as one component. The taxonomy was meant to describe the various programmatic elements of the school library in order according to their

potential influence on the school's academic achievement. At the lowest level, the school library is bypassed entirely by teachers and students. Low-level teacher-librarian collaboration, involving "informal and brief planning with teachers and students for LMC facilities or network usage" (p. 17), does not appear until Level 5. At Level 6, the school librarian gathers resources for teachers or students upon request, but still does not actively participate in instruction. At Level 8, the school librarian participates in meaningful collaborative partnerships with teachers to plan and implement instruction that has an appreciable impact on student achievement; this is the first level that specifically mentions collaboration. And at the final level, the school librarian not only collaborates with classroom teachers but also contributes to general curriculum development in the school or district.

Loertscher argued that an effective school library program will simultaneously operate on multiple levels of this taxonomy. However, unlike Marcoux, he did not go so far as to suggest that every level involving interaction between librarians and teachers represented collaboration. He described teacher-librarian collaboration as operating on a continuum of its own ranging from support (where the librarian delivers resources and assistance to teachers and students without necessarily knowing the instructional reasons) to intervention (where librarians and teachers are equal partners in the design and implementation of instruction), and suggested that "true collaboration begins at the point when support becomes partnership" (p. 70).

One final model of teacher-librarian collaboration is the TLC model proposed by Patricia Montiel-Overall (Montiel-Overall, 2005b, 2007) as part of a theory of teacher-librarian collaboration. This model will be further elaborated in Chapter 5, as Montiel-Overall's theory informed the design of the collaborative lesson plan project. The TLC model

proposes four levels or "facets" (Montiel-Overall, 2007) of teacher-librarian collaboration which vary in terms of intensity, effects on student achievement, purpose, types of activities involved, and requirements for success. These four levels, in order from least to most intense, are:

1. Facet A – Coordination: Coordination is a low-intensity collaborative effort that is characterized by a minimal amount of involvement between the teacher and librarian.
2. Facet B – Cooperation: This facet is characterized by higher levels of communication between teachers and librarians and by integrated work toward a common goal. Unlike in Facet A, student achievement is the focus of cooperative efforts and both partners share some responsibility for the project or lesson, although the division of labor is typically unequal.
3. Facet C – Integrated Instruction: At this level of collaboration, teachers and librarians work together as equal partners to plan, implement, and evaluate instruction that integrates library (information science) curriculum into content area instruction.
4. Facet D – Integrated Curriculum: At this level, integrated instruction occurs at all grade levels and in all content areas across the school. In a school at the Integrated Curriculum level, the school librarian is involved in the "big picture" view of curriculum design, implementation, and evaluation, and information literacy content is integrated in every subject area at every grade level.

Like Marcoux, Montiel-Overall viewed each facet as a type of collaborative effort, declining to classify only one level of the model as true collaboration.

The similarity of these models in terms of their organization and how they describe the lowest and highest levels of teacher-librarian collaboration testifies to the relative

uniformity of the concept of collaboration in school library literature compared to education literature. While authors may still disagree about the intensity of interaction required for a teacher-librarian partnership to be accurately called collaboration, these models have all been designed with practitioners in mind and are intended to be used by librarians and teachers to assess and improve their collaborative practice (Dickinson, 2006; Loertscher, 2000; Marcoux, 2007).

2.3 Barriers and Benefits to Collaborative Practice

In the school library field, attention has recently moved beyond simply classifying various collaborative efforts to a focus on the personal and contextual factors influencing the frequency and successfulness of teacher / librarian collaborations. Haycock (2007) identified 20 such factors, classifying them into six subgroups: factors related to the school environment, to personal characteristics of the collaborative partners, to process and structure of the collaboration itself, to communication, to purpose, and to resources. Williamson, Archibald, and McGregor (2010) identified a shared vision or concern as the most important factor impacting teacher / librarian collaboration, while Montiel-Overall's (2010) study implicated knowledge sharing, relationship building, and school environment as key factors.

Regardless of the specific factors that emerge in any given project, all of these studies share an assumption that teacher / librarian collaboration is beneficial for school librarians, classroom teachers, and most importantly, students. Still, as with teacher collaboration, there are a number of barriers to effective teacher-librarian collaboration. In the next section, I will summarize some of the barriers to and benefits of instructional TLC as described by both educational and school library researchers.

2.3.1 Barriers. Despite nearly universal discussion of teacher collaboration, researchers have concluded that the actual practice of collaboration among teachers remains rare (Barlow, 1991; DuFour, 2004; Jenni & Mauriel, 2004; Little, 1990). Similarly, evidence suggests that teacher-librarian collaboration, particularly higher-level collaboration, is less common in practice than might be hoped (Lance, Rodney, & Schwartz, 2010; Montiel-Overall & Jones, 2011; Todd, 2008). Several explanations for this have been proposed. One is the intense focus on standards and accountability that was codified into national law with the passage of No Child Left Behind in 2001. Paula Short and John Greer (2002) argued that this focus on accountability, paired with the increased specialization of teachers due to certification requirements, has led to a loss of the idea that an individual teacher is responsible for the whole child and an increasing sense that teaching is a technical and limited process. In other words, teachers hold a separate-spheres conception of their roles and responsibilities compared to the roles and responsibilities of other teachers and educational professionals, and this creates a conceptual barrier to collaboration (Arndt & Liles, 2010; M. Welch, 1998). The current climate of accountability has also lessened teachers' power over matters of curriculum, staffing, scheduling, and budgets, which has limited opportunities for teacher empowerment and made it more difficult to find anything substantive about which to collaborate (Hargreaves, 1992; Supovitz & Christman, 2005).

Another major barrier to collaboration is the well-documented and persistent expectation of teacher privacy and autonomy in the classroom (Barlow, 1991; Elmore, 2002; Evans-Stout, 1998; Gardiner & Robinson, 2011; Little, 1990; M. Welch, 1998). Karen Evans-Stout (1998) attributed the persistence of teacher isolation to the wider cultural trend of individualism in the United States: "being able to claim personal responsibility for success

is so much a part of American individualism that it probably helps to explain why this [isolationist] culture continues to dominate instructional practice" (p. 121). One participant in a study of preservice teachers' views and practices of collaboration echoed this by saying "unfortunately, the American model of education isn't set up for teams. It is set up for individual success" (Gardiner & Robinson, 2011, p. 8). Some teachers may choose to enter the profession precisely because it is characterized by privacy and autonomy (Joyce, 2004), making this norm all the more intractable.

A host of logistical issues also contribute to the infrequency of teacher collaboration (Joyce, 2004; Lindsay, 2005; Supovitz & Christman, 2005; M. Welch, 1998). Chief among these is the perceived or actual lack of time for teachers to collaborate (Gardiner & Robinson, 2011; Supovitz & Christman, 2005; M. Welch, 1998). The paperwork burden that results when collaborative efforts must be documented for school administration is another logistical hurdle to collaboration (Supovitz & Christman, 2005). Teachers may also simply lack the knowledge of how to collaborate due to inadequate preparation in teacher education programs and insufficient professional development on the subject (Gardiner & Robinson, 2011; M. Welch, 1998).

An additional barrier to collaboration may be formed when administrators attempt to impose or mandate the process (Hargreaves, 1992; Joyce, 2004; Little, 1990). Andy Hargreaves (1992) called this "contrived collegiality" and argued that while administratively mandated cooperation between teachers may be a stepping stone to the creation of a collaborative culture within a school, it more often impedes the development of such a culture by making collegiality feel like a burden and a chore. In cases where shared work requirements are imposed upon teachers, teachers may view collaboration as "contrived,

inauthentic, grafted on, perched precariously (and often temporarily) on the margins of real work" (Little, 1990, p. 510). Myrna Cooper (1988) discussed the inability of administrative mandates to change teacher culture and noted that non-teachers who attempt to affect changes in teacher cultures rarely seem to realize that it is not their culture to change. Teachers, Cooper argued, must be given real power and authority to shape their own cultures. Unfortunately, school administrators may be hesitant to grant teachers this authority, since it would entail a considerable loss of control for them:

> Collaborative cultures do not evolve quickly. They are therefore unattractive to administrators looking for swift implementation expedients. They are difficult to locate, to fix in time and space, living as they do mainly in the interstices of school life…. [They] are also unpredictable in their consequences. The curriculum that will be developed, the learning that will be fostered, the goals that will be formulated – these things cannot be confidently predicted beforehand. (Hargreaves, 1992, p. 233)

It is important to note that while some educational researchers believe imposed or mandated collaboration is a barrier to the establishment of a collaborative culture within a school, others warn against the unintended consequences of allowing teachers to choose their own collaborative partners (e.g., Achinstein, 2002; Lima, 2001). These researchers believe that cognitive conflict and diversity of opinions are critical to innovation and change within a community, and that such healthy conflict is less likely to occur when teachers choose their own collaborative partners. As Jorge Ávila de Lima (2001) argued, failing to mandate collaboration among diverse sets of educators "has unwanted consequences for the change potential of teacher communities, namely, because it unintentionally inhibits the necessary degree of cognitive conflict that these communities should espouse in order to promote change" (p. 110).

Looking specifically at collaboration between school librarians and classroom teachers, the issue that has received the most attention as an obstacle to TLC is the lack of

understanding among teachers and administrators of the school librarian's instructional and teaching roles. The American Association of School Librarians (2009) has described five roles for the school librarian:

- as a *leader*, the school librarian serves as an active member of the local and global learning community and builds relationships both inside and outside of the school building to develop the school library program and improve student learning;
- as a *program administrator*, the school librarian ensures the effective management of the school library media program and attends to such concerns as budgeting, staffing, policy writing, collection development, and maintenance of the library's physical and digital space;
- as an *information specialist*, the librarian uses and is knowledgeable about a wide variety of technology tools for all aspects of the school library media program, especially where those tools might be employed to increase student achievement. The school librarian's expertise in finding, using, and evaluating information as well as in the ethical use of information (including copyright) is also part of this role;
- as a *teacher*, the school librarian instructs students in critical thinking skills, research skills, the ethical use of information, and reading for understanding and pleasure. As part of this role, the school librarian also advocates for reading in all formats and for all learners;
- as an *instructional partner*, the librarian collaborates with classroom teachers to design, implement, and assess instruction and also to develop the policies, practices, and curricula that guide student learning in their schools (American Association of School Librarians, 2009).

Awareness of each of these roles among teachers and administrators varies. A synthesis of literature related to school principals' views of the school librarian found that school principals do not understand the job of the school librarian, nor do they appreciate the school librarian's potential impact on student and teacher achievement (Hartzell, 2002). More recent research suggests that principals do, in theory, support the idea of a school librarian as an instructional leader within the school (Church, 2010; Shannon, 2009) but that they may not actually see their own school librarians acting out this role (O'Neal, 2004).

Among teachers, most existing research has found that educators are most aware of the program administrator role of school librarians and are less aware of their roles as teachers and instructional partners. In one of the earliest studies to examine teachers' perceptions of the school librarian, Irith Getz (1996) found that only one-quarter of the nearly 200 preservice and inservice teachers surveyed were aware of the cooperative roles of the school librarian, and the majority of respondents were also unaware of the training required to be certified as a school librarian. Subsequent studies have reached similar conclusions, finding that most teachers are aware of the resource provision roles of the school librarian to a greater degree than instructional and collaborative roles (e.g., Hayden, 2000; Miller, 2004). A national survey of 768 school librarians found that only around 30% of teachers were familiar with information literacy concepts and that within elementary schools, only 15% of teachers collaborated with their school librarians to teach information literacy skills (Whelan, 2003). Frances Roscello, who was at that time the AASL President, attributed this low frequency of collaboration in elementary schools to a lack of understanding among elementary teachers of the school librarian's instructional role, remarking that "some teachers tend to view the librarian as a babysitter" (Whelan, 2003, p. 52).

Qualitative studies have found similar knowledge gaps among teachers related to the roles and responsibilities of the school librarian. In a discourse analysis of interviews with three classroom teachers in a single school, Sue Kimmel (2011) found that the perceptions of the school librarian as a "story lady," a helper, and a provider of planning release time for teachers were more pervasive than perceptions of the librarian as an instructional partner or co-teacher. Even though the librarian in this school was very active in collaborative planning with teachers, the teachers interviewed were inclined to portray that librarian as an exception rather than representative of all school librarians.

Contributing to this lack of awareness among teachers and administrators is the fact that professional literature in education rarely features collaboration between school librarians and classroom teachers. Several studies have investigated the treatment of school libraries and school librarians in professional literature and conference programs for teachers and have found that articles or programs mentioning school libraries or school librarians comprise less than one percent of material published in these sources, and many of the pieces that are published do not specifically address collaboration (Stevens, 2007; Still, 1998; Whitesell, 2008). The same can be said for administrative journals written for and read by principals and assistant principals (Hartzell, 2002).

Given all of these barriers, it should no longer seem surprising that teacher-librarian collaboration is rare – in fact, it may seem surprising that it ever happens at all. These realities have potentially critical consequences for students: "the brutal irony of our present circumstance is that schools are hostile and inhospitable places for learning. They are hostile to the learning of adults and, because of this, they are necessarily hostile to the learning of students" (Elmore, 2002, p. 5).

2.3.2 Benefits. Despite these barriers, which are significant and not easily dismissed or overcome, most educational researchers agree that there are a number of benefits to collaboration that combine to make collaboration a worthwhile goal for educators. Ultimately, nearly all of the benefits discussed by collaboration researchers fall under the banner of "school improvement" and reflect a deeply held belief that teacher collaboration leads to better instruction, and therefore better learning (Friend, 2000; Lavié, 2006). Within the big tent of school improvement, many specific benefits of instructional collaboration have been posited:

- In recent decades, teaching has grown in complexity thanks to a deluge of new information related to teaching and learning; collaboration can help teachers deal with that complexity by pooling the knowledge and resources of several specialists (Darling-Hammond, 2006; Friend, 2000; Little, 1990; Montiel-Overall, 2005b).
- Teacher collaboration creates a sense of community within a school that improves teacher working conditions, lessens the perception of isolation among teachers, and improves teacher retention (Barlow, 1991; Evans-Stout, 1998; Schmoker, 2004).
- Collaboration eases the reality shock among new teachers that results when their previously held beliefs about teaching and learning are challenged by the realities of practice (Little, 1990).
- Collaboration distributes and shares teachers' expertise such that new solutions to problems can be accessed and teachers can avoid reinventing the wheel (Evans-Stout, 1998; M. Welch, 1998).

- Collaboration builds individual teachers' knowledge and, through models such as Professional Learning Communities, can be an effective method of professional development (Moolenaar, 2012; Vescio et al., 2008).
- Successful collaboration among teachers provides students with models of the collaborative process, which may help students develop a greater sense of the value of collaboration for themselves (Montiel-Overall, 2005b).
- When teachers from different content area backgrounds collaborate, or when teachers collaborate with other educational professionals, it facilitates multifaceted instruction that addresses the whole child (Hart, 1998).
- When students are exposed to diverse opinions and teaching styles, instruction has the potential to be integrated and mutually reinforcing across subject areas and topics, resulting in a greater understanding of material (Montiel-Overall, 2005b).
- As a result of these positive effects on teachers and teaching, collaboration increases student learning and student achievement, a supposition that has recently been supported by a number of empirical and statistical analyses (e.g., Goddard, Goddard, & Tschannen-Moran, 2007; Moolenaar, Sleegers, & Daly, 2012; Van Garderen, Stormont, & Goel, 2012). Similar studies have supported the impact of teacher-librarian collaboration in particular on student achievement (e.g., Achterman, 2008; Lance, Rodney, & Russell, 2007; Lance et al., 2010).

Somewhat outside of the school improvement discourse, teacher collaboration has also been discussed as a tool for democratizing the educational workplace and contributing to a model of schooling that is underpinned by ideals of social justice and transformative change

(Johnson Jr., 1998; Lavié, 2006). In this view, teacher collaboration is valuable as an end unto itself, rather than only as a means by which student learning might be improved.

2.4 Conclusion

> School librarians work on a "one-to-many" basis: there is only one library in most schools, but many classrooms. Thus to varying extents, school librarians have always been concerned about working cooperatively with classroom teachers, if only to ensure that library materials are regularly used. However, only in recent decades have school librarians begun to embrace their instructional roles, expand their curricula, and work with teachers on the more substantive level that most authors in the school library field refer to as teacher-librarian collaboration. Unlike in the general education field, where no single definition of teacher collaboration has been dominant, there is now fairly widespread agreement in the school library field about what teacher-librarian collaboration is and what it looks like in practice.

Teacher-librarian collaboration has become a major focus of research since the publication of the influential *Information Power* standards for school libraries in 1988. In this literature, definitions of teacher-librarian collaboration have crystallized around the vision of school librarians and classroom teachers participating as equal partners to plan, teach, and assess lessons or units that teach information literacy content in the context of the classroom curriculum. Several models provide school librarians and teachers with clear descriptions of what such collaboration might look like in practice.

With collaboration so heavily emphasized in professional literature, standards, and preservice programs for school librarians, one might expect that teachers would collaborate frequently with their school librarian in all content areas to plan, implement, and evaluate

instruction. Yet evidence suggests that this is not the case, particularly for teachers in science content areas. Former AASL President Nancy Everhart, in an introduction to a science-themed issue of *Knowledge Quest*, called science teachers "hard nuts to crack when it comes to collaboration" ((Everhart, 2010), and school librarians report less frequent collaborations with science and math teachers than with teachers of other content areas (Hoffman & Mardis, 2008; Schultz-Jones & Ledbetter, 2009). Teacher-librarian collaboration in science content areas will be the focus of Chapter 3.

Chapter 3. Teacher-Librarian Collaboration in Science[1]

In the life sciences, the term "mutualism" refers to a symbiotic relationship between two organisms in which both partners benefit. One classic example of such a relationship occurs between bees and flowering plants. The bee, in search of food, lands on a flower to drink the nutritious nectar. In the process the bee's body collects grains of pollen, and when the bee arrives at the next flower, some of those pollen grains fall off, fertilizing this second plant. The bee gets to eat, and the plant gets to reproduce. This relationship is so beneficial for both parties that they have each evolved in ways that facilitate the pollination process: bees have developed feathered hair that is more efficient at trapping pollen, and flowers have developed sturdy "landing pads" and ultraviolet coloration to attract the bees.

If schools can be thought of as gardens, as a recent book for school librarians suggests (Abilock, Fontichiaro, & Harada, 2012), then perhaps school librarians should be thought of as bees, buzzing among flowers (teachers) with pollination (learning) as the ultimate outcome. In such a collaborative environment, school librarians and teachers both benefit, and over time, each can evolve their skills and practices to make their relationships more efficient and fruitful. Yet evidence from school library literature suggests that some flowers in the school garden are rarely visited by the bees. Science teachers, in particular, are infrequent collaboration partners with school librarians. This is despite the fact that in several

[1] Significant portions of this chapter were previously published in Rawson, C.H. (2014). Every flower in the garden: Collaboration between school librarians and science teachers. *School Libraries Worldwide, 20*(1), 20-28.

key dimensions, the needs and priorities of school librarians and science teachers display significant overlap.

This chapter reviews articles related to collaboration between school librarians and K-12 science teachers and is organized into the following sections: a discussion of the current lack of collaboration between science teachers and school librarians and potential reasons for this deficiency, identification and elaboration of successful collaborative efforts and areas of instructional overlap between school librarians and science teachers described in the literature, barriers to this type of collaboration, and gaps in existing research.

3.1 Librarian – Science Teacher Collaboration

With collaboration so heavily emphasized for both teachers and school librarians (see Chapter 2), one might expect that all teachers would collaborate frequently with their school librarian to plan, implement, and evaluate instruction. However, this does not seem to be the case for science educators, who rarely partner with the school librarian to develop and implement instruction (Mardis & Hoffman, 2007; Schultz-Jones & Ledbetter, 2009). In professional journals for school librarians, calls for increased collaboration with science teachers are numerous (e.g., Mardis, 2009; Minkel, 2004; Young Jr., 2013), but the effect of these appeals (if any) is unclear.

Research suggests that the source of this issue may lie equally with the science teachers and the school librarians themselves. Science teachers, like educators in other subject areas, may be unaware of the instructional and collaborative roles of the school librarian (Miller, 2004; Schultz-Jones & Ledbetter, 2009). In addition, secondary science teachers in the United States may be particularly reluctant to invest time in collaborative efforts because a comparatively high percentage of them are new teachers who are teaching

out-of-field and thus might be struggling to keep up with the daily demands of practice (National Science Board, 2012). In elementary schools, the analogous issue is that many teachers enter the field with little previous experience in science and low self-confidence in their own scientific knowledge and ability (Appleton, 2006; Tosun, 2000). A recent review of teacher preparation programs in the United States found that out of 907 graduate and undergraduate elementary education programs, "nearly half (47 percent) fail to ensure that teacher candidates are capable STEM instructors: these programs' requirements for candidates include little or no elementary math coursework and the programs also do not require that candidates take a single basic science course" (Greenberg et al., 2015, p. 87). This factor, along with increased emphasis on the tested subjects of reading and math, may contribute to the diminishment of instructional time for teaching science in the elementary setting (Goldston, 2005; Griffith & Scharmann, 2008) and thus a decreased number of opportunities for teacher- librarian collaboration on science-themed lessons and units.

On the other side of the collaborative relationship, school librarians, many of whom come from humanities backgrounds, may lack scientific content knowledge and thus may feel unprepared to collaborate with science teachers (Mardis, 2005b). Compounding this problem is the fact that professional literature in the school library field, an important source of professional development for school librarians, rarely publishes substantive articles related to science (Mardis, 2006). In addition, school librarians may struggle to communicate the value of school library services and collections to science teachers, in part because of a belief held by some librarians that science teachers do not have time for, or are uninterested in, inquiry-based instruction or collaboration due to testing pressures (Varley & Rawson, unpublished).

Barbara Schultz-Jones and Cynthia Ledbetter (2009) examined the factors contributing to the lack of collaboration between science teachers and school librarians in a mixed-methods study that included survey and interview data from science teachers as well as surveys, interviews, and social network analysis of school librarians. Their results confirmed that lack of collaboration is a bidirectional problem. The 24 science teachers in the study had little conception of the school librarian's job beyond cataloging, managing, and retrieving resources. None of them reported receiving any instruction in their teacher education classes related to collaboration with school librarians, and most were unaware of the training that school librarians receive. One teacher commented "I never thought of the position as being more than checking books in and out, and I certainly didn't realize that [the librarian] was trained as a teacher" (p. 30). The most commonly-cited barrier to collaboration among science teachers was lack of time. Among the five school librarians in the study, none reported designing course content, teaching, or evaluating results with any of the science teachers in their schools. At least in this study, though, the librarians attributed the lack of collaboration with science teachers not to their own lack of science content knowledge but rather to a lack of understanding on the part of the science teachers about what the library could do for them.

3.2 Importance of Resources

Marcia Mardis's (2005) study of teacher-librarian collaboration in science hinted at the critical role of library resources, particularly video resources, in science-focused teacher-librarian collaboration. Among numerous library-related factors tested for their impact on 8th-grade students' science test scores, only the number of videos in the library collection had a statistically significant positive correlation with these scores. In addition, librarians

interviewed for this study emphasized the importance of their video collections in their service to science teachers, while also noting that the science teachers' reliance on video may discourage more substantive use of the library.

Sue Kimmel's (2012a) ethnographic study of teacher-librarian collaboration found that resources play a critical role in TLC in general, not only in science-focused collaboration. Kimmel used boundary theory to describe the work of a school librarian as positioned between the library and the classroom. Further, she described library resources as "boundary objects," which can serve to connect the library and the classroom, information literacy content and classroom content, and curriculum and instruction. However, the resource only has this power through the librarian, who serves as a broker between the library resources and the classroom teacher. The teachers interviewed in this study said that the librarian did more than simply connect them to resources; in addition, the librarian was able to use those resources to suggest instructional strategies that improved teaching and learning and also developed the professional and pedagogical knowledge of the teachers themselves. These studies suggest that resource sharing, identified by Geoffrey Riordan and Jose da Costa (1996) as a foundational feature of teacher collaboration, may play a critical and perhaps undervalued role in science-focused TLC.

3.3 Opportunities for and Examples of Science TLC

The lack of collaboration between science teachers and school librarians is surprising when viewed from a perspective that emphasizes commonalities between these two professional groups. Debbie Abilock (2003) pointed out that science and librarianship share a focus on inquiry-based instruction, and many dispositions emphasized in science standards align well with those in standards for information literacy. Furthermore, she noted that

science teachers ought to be particularly open to the idea of collaborative teaching, given their awareness of the ways in which practicing scientists typically work in synergistic teams (Abilock, 2003). Patricia Montiel-Overall and Kim Grimes (2013) pointed out the similarities between definitions of information literacy and science literacy and noted that "the close connection between science and information literacy is evident in the literature of both disciplines" (p. 42). A group of researchers working with a science- and information literacy-infused afterschool program developed a crosswalk between the National Research Council's *Framework for K-12 Science Education* standards and AASL's *Standards for the 21st Century Learner*, noting many similarities in skills, dispositions, and responsibilities between the two sets of standards (Subramaniam et al., 2013).

In fact, successful collaborations between science teachers and school librarians do exist, and they are sometimes described in library science publications, although empirical studies (qualitative or quantitative) are rare. These publications suggest that there are at least four main areas in which collaboration between science teachers and school librarians is (or could be) especially beneficial: instruction related to traditional literacy, instruction related to information literacy, technology integration, and connecting science to students' daily lives.

3.3.1 Traditional literacy instruction. As repositories of print materials, school libraries have long been associated with reading. Even as the school library has taken on more responsibilities in terms of school technology leadership and information literacy instruction, one of its core goals remains to promote reading as a "foundational skill for learning, personal growth, and enjoyment" (American Association of School Librarians, 2009, p. 12). Consequently, school librarians often collaborate with language arts teachers on lessons focused on traditional literacy instruction, for example literature circles, writing

workshops, and readers' theater (for an example of this type of collaboration, see Beard & Antrim, 2010). With the recent adoption of the Common Core standards in the United States, though, literacy instruction is no longer the sole province of language arts teachers. Indeed, the English Language Arts Common Core standards "insist that instruction in reading, writing, speaking, listening, and language be a shared responsibility within the school" (National Governors Association Center for Best Practices, 2010). The standards document includes benchmarks for literacy in science "to help students meet the particular challenges of reading, writing, speaking, listening, and language" within this discipline (p. 3). As previously discussed, science teachers may already feel overburdened by their existing science curriculum, and librarians may not feel confident providing instruction in science content. A collaborative project focused on reading and/or writing in science would allow both collaborative partners to draw on their respective strengths while also easing them into instruction in a content area that is unfamiliar to them.

One example of such a project is the "diary of an animal" collaborative project described by Toni Buzzeo (Buzzeo, 2006). Buzzeo, an elementary school librarian, collaborated with a several teachers on a science unit based on the children's book *Diary of a Worm* by Doreen Cronin. After reading this book, students researched an animal of their choice and created their own illustrated diaries based on their findings. The collaboration involved the librarian, who was responsible for teaching and evaluating the research and writing aspects of the project; the classroom teacher, who was responsible for teaching and evaluating the science content, including standards related to biomes, food webs, and animal behavior; an art teacher, who taught and evaluated the illustration component of the project; and a computer teacher, who assisted students with online research and computer

presentation software. This project involved several aspects of traditional literacy instruction: comprehension of the original mentor text, extraction of information from scientific informational texts during the research phase of the project, and writing an informational / entertaining final product. It allowed the classroom teacher to utilize her knowledge as a science content specialist and the librarian to apply her expertise in reading and writing instruction.

Patricia Montiel-Overall and Kim Grimes (2013) briefly described another example of school librarians leveraging their expertise in traditional literacy instruction to collaborate with science teachers. As part of a more extensive science research project collaboratively planned by school librarians and elementary teachers, the librarians used storytelling as a way to engage students in science discussions before beginning their research.

3.3.2 Information literacy instruction. Popular media is replete with stories bemoaning the low scientific literacy rates of the American public, including school-age children and teens. One recent article proclaimed "Teens Get Failing Grade on Understanding Climate Change" and reported the results of a Yale study finding that only one-fourth of American teens received a passing grade on their awareness and understanding of climate change (Welsh, 2011). To be sure, such lack of understanding derives at least partially from a lack of scientific content knowledge. However, controversial scientific issues such as climate change, evolution, and genetic modification are often discussed and reported outside of the science classroom through a variety of media, making an individual's evaluation of these issues as much a question of information literacy as science content knowledge.

Heidi Julien and Susan Barker (2009) studied high school students' information literacy skills in a science context, examining how the students went about finding and evaluating information for an in-class biology assignment. Science classrooms, they argued, are an ideal environment in which to teach information literacy skills because of the similarities between the information seeking process and scientific inquiry. While the students in the study reported a high level of confidence in their information retrieval and evaluation abilities, their demonstrated skill level was poor. They relied almost exclusively on the Internet for their information despite the availability of print resources and confused accessibility with reliability, as evidenced by this student's remark: "[the Internet is] more reliable than going to the library and trying to find a book...'cause it takes less time" (p. 3). Their search and evaluation skills were deemed "unsophisticated" by the researchers, who noted that students often simply pasted assignment questions into Google and could not articulate why they deemed a particular site more reliable than an alternative site. This study highlights information literacy instruction as a potentially fruitful area for collaboration between science teachers and school librarians. As with traditional literacy instruction, collaboration in this area would take advantage of each partner's strengths (content knowledge and science pedagogical knowledge for the science teacher, information literacy pedagogical knowledge for the librarian) and would address a critical area of need for students.

An example of such a collaboration was described by Debbie Abilock and Molly Lusignan (1998), a school librarian and science teacher who partnered to teach a collaborative project-based unit on global warming. The two educators worked together to plan and implement a unit in which their students took on the viewpoint of a participant in

the Kyoto Conference, investigating and developing arguments from a range of perspectives including industry, environmental groups, and scientific research. The project culminated with a school "Conference on Climate Change," in which students presented their findings to an assembled group of their peers, parents, teachers, and administrators. They also wrote and sent letters to government officials and examined coverage of the actual Kyoto Conference as it occurred. Throughout this process, the school librarian and the science teacher worked collaboratively to plan, implement, and evaluate the project. The science teacher utilized her expertise in content knowledge while the school librarian utilized her expertise in information literacy, and both were essential to the success of the project. The authors echoed Abilock (2003) by pointing out the similarity of their two professions: "the disciplines had an analogous set of process skills -- particularly between individual scientific investigations during science projects and information problem-solving during library research. This particular curriculum became an opportunity to flesh out the similarities and differences – a place for us to learn" (p. 42).

3.3.3 Technology integration. Integrating technology into the classroom has been a major focus across all subject areas in recent years, and science is no exception. Since 1999, the official position of the National Science Teachers' Association has been that "computers should have a major role in the teaching and learning of science" (National Science Teachers Association, 1999). Research has shown that particular types of technology tools may be especially effective in teaching scientific thinking and habits of mind. Video games, for example, have been shown to help develop specialized vocabulary, systems and model-based reasoning, and collaborative problem solving (Gee, 2009; Steinkuehler & Duncan, 2008). Yet despite this evidence and despite rapid advances in technology along with lowered costs,

teachers across all subject areas have been slow to fully integrate technology into the curriculum (Cuban, 2003; Keengwe, Onchwari, & Wachira, 2008). Reasons for this include lack of time to learn about or teach students to use new technologies, lack of access, lack of professional development, pressures related to standardized testing, and a sense that some technologies are simply not practical for classroom use, among other concerns (Cuban, Kirkpatrick, & Peck, 2001; Keengwe et al., 2008; Shirley, Irving, Sanalan, Pape, & Owens, 2010; M. M. Subramaniam, Ahn, Fleischmann, & Druin, 2012).

Technology adoption has also been a major focus within the school library field and is stressed in the American Association of School Librarians' most recent guidelines for school library media programs (American Association of School Librarians, 2009). Unlike typical classrooms, school libraries represent a "uniquely different space that might foster new innovations…. these spaces are often less tied to the pressures faced in formal classrooms, such as the need to adhere to standardized tests or requirements" (Subramaniam et al., 2012). In addition, school libraries often already serve as media and technology hubs, storing both physical and digital technology resources for the school (Subramaniam, Ahn, Waugh, & Druin, 2012; Subramaniam et al., 2012). And while library science literature may only rarely publish articles focusing on collaboration with science teachers, reviews and highlights of science resources, including digital resources, are more common (Harper, 2008; Mardis, 2006; McIlvain, 2010). In sum, as Melissa Johnston (2012) stated, "teacher librarians are in a unique position, due to knowledge of pedagogical principles and curriculum, paired with technology and information expertise, to serve as leaders and valuable assets through making meaningful contributions toward the integration of technology" (p. 18).

One example of a collaborative science project involving technology integration involved an afterschool program in school libraries for underserved middle school students that leveraged students' interest in popular science media including science fiction novels and movies, graphic novels, and science-related games (Subramaniam et al., 2012; Subramaniam et al., 2015). Using these materials as a starting point, the program (called Sci-Dentity) engaged students in storytelling and dialogue with each other both in the offline world and in a project-specific social network (http://www.sci-dentity.org/). Using the social network, students could create a personalized profile, share their work, communicate with their peers, and even remix the stories of other contributors. New media tools were integrated into all aspects of the Sci-Dentity program: in one session, "students may watch online videos about storm chasers, read comic books about mutant super-powers, find science facts via apps on an iPad, and integrate these sources into their sci-fi stories" (Subramaniam et al., 2012, p. 25). While this specific project involved collaboration between school librarians and university researchers, similar endeavors could be quite successful with school librarians and K-12 science teachers. Some of the Sci-Dentity program developers summarized the connections among science education, technology, and the school library in another paper:

> Researchers have found that young people develop their personal identities, share knowledge or information with peers, and collaboratively solve problems with their networks…. These literacy practices are not only salient in social contexts but also are vital practices of science communities. Thus, new media tools such as online communities and networks might be leveraged to create ideal hybrid spaces [in school libraries] where students can connect their personal interests and identities to STEM learning activities. (Subramaniam et al., 2012, p. 167)

3.3.4 Connecting science to students' daily lives. Finding connections between the official curriculum and students' daily lives is an essential component of inquiry-based principles of learning and teaching, but this task is not always easy or straightforward. How can a teacher connect an esoteric science concept – say, orbital configurations of electrons –

to students' existing interests and prior knowledge? This question is at the heart of several of the library science articles devoted to collaboration between the science teacher and the school librarian.

Connecting science content to students' daily lives requires first that educators know how students choose to spend their time outside of school. According to a recent U.S. study, the best answer to that question might be "engaging with media" – a national survey of more than 2,000 youth ages 8 to 18 found that children and teens in this age group spend an average of 7.5 hours *each day* consuming media, and that does not count time they spend with media in school (Rideout, Foehr, & Roberts, 2010). Even more astonishing, when you separate instances of multitasking, the average amount of time rises to 10 hours and 45 minutes per day. This media consumption includes watching television and movies, listening to music, using the computer, playing video games, and yes, reading print material.

Education research has already established links between some of this media and science content. For example, several articles focus on the potential of science fiction for teaching science fact (Czerneda, 2006; Kilby-Goodwin, 2010; Murphy, Mogus, & Crotty, 1998); it is worth noting that none of these articles mentions the school librarian or library. Other articles, already mentioned above, explore the potential of video games for teaching science-related content and habits of mind (Gee, 2009; Steinkuehler & Duncan, 2008). The library science field has also keyed into media as a potential way to connect students' existing interests to science content, and to show them the ways in which their existing interests already incorporate science: "Science is embedded in almost every aspect of the world…. Young people need guidance to link what already interests them about their world to science or to see what is around them through the lens of science" (Subramaniam et al.,

2012, p. 169). In other words, if science teachers and school librarians can locate entertaining media resources that have connections to their content, or, even better, if educators can help students create and share that media themselves, a key component of student engagement and motivation will fall into place.

Two articles describe collaborations between school librarians and science teachers that leverage students' existing media interests to connect science to their daily lives. Okemura (2008), a high school librarian, took part in a collaborative project with a chemistry teacher that leveraged students' existing interests in media to teach scientific content. The educators used video clips (such as a scene from *The Wizard of Oz*) to introduce the idea of "the chemistry behind everyday objects" (p. 48). Inspired by the video clips, students then chose an everyday object that they were interested in (further strengthening the connection between the content and their daily lives), conducted research on the chemical composition of that object, and created visual presentations (another form of media) to share with their classmates. The science teacher and school librarian collaborated throughout this process to plan, implement, and evaluate the unit.

Another collaborative unit was proposed by Marcia Mardis (2005a), who described how science teachers and school librarians could collaborate to teach units based on crime-scene television shows like *CSI*. Mardis suggested that in such a unit, the science teacher could serve as the expert on content knowledge (DNA fingerprinting, blood analysis, etc.) while the school librarian could use the television show and related content to help students locate data about real-life crime, teach students about media analysis, locate and catalog cutting-edge digital resources (since forensic science is such a rapidly changing field), and ensure the ethical and legal use of copyrighted media in the school. Mardis also pointed out

that since the library is often one of the largest spaces in the school, the school librarian might offer that space for science activities that take up a lot of floor space as a way to open the lines of communication with science teachers. Both of these articles emphasize the potential for science teacher / school librarian collaboration to connect science content to students' daily lives via their preexisting interests in a variety of media.

3.4 Gaps in the Research

Little seems to have changed in the literature since Marcia Mardis (2006) reported on the rarity of substantive articles (empirical or anecdotal) focusing on collaboration between science teachers and school librarians. Empirical studies – qualitative or quantitative – are even more rare. More research is needed at every stage of this issue:

- research to identify beliefs and perceptions of pre-service science teachers and librarians regarding collaboration and interventions that might make collaboration more likely once these students transition into practice;
- more research examining barriers to collaboration between science teachers and school librarians and how those barriers might be overcome, similar to the study by Shultz-Jones and Ledbetter (2009), which was limited by small sample size and isolated geographic location;
- more research empirically evaluating both successful and unsuccessful collaboration attempts between science teachers and school librarians; and
- research into how collaborations between science teachers and school librarians impact student achievement.

3.5 Conclusion

While the jobs of the school librarian and the science teacher may appear quite different on the surface, the literature reviewed here suggests that these two professions share many of the same concerns and process skills. Barriers to collaboration between science teachers and school librarians are numerous and real; perhaps the greatest of these is a lack of understanding on both sides regarding the content and expertise of the other's domain. However, opportunities to improve student learning via collaboration are also numerous and real. As the literature reviewed here suggests, there are at least four areas of overlapping needs and skills where science teacher / school librarian collaboration could be particularly fruitful: traditional literacy instruction, information literacy instruction, technology integration, and connecting science to students' daily lives. Yet many gaps in our understanding of this issue remain. This dissertation seeks to address some of these gaps, but recognizes that a great deal of empirical research is needed, particularly on the question of whether and how teacher-librarian collaboration in science affects student learning and achievement.

Chapter 4. The Role of Preservice Programs

So far in this literature review, I have described teacher-librarian collaboration conceptually and theoretically; attempted to place TLC in historical, practical, and academic contexts; and elaborated on teacher-librarian collaboration in science content areas. In this chapter, I explore the role of preservice teacher and school librarian education programs in preparing their students to collaborate. First, I will discuss preservice interventions related to collaboration among teachers, or between teachers and other school professionals excluding school librarians. Next, I will review preservice interventions related specifically to teacher-librarian collaboration, as well as other research investigating the state of preservice education for preservice school librarians and classroom teachers related to collaboration.

4.1 Preservice Interventions in Teacher Collaboration

Learning to teach is a lifelong process that begins with an "apprenticeship of observation" (Lortie, 1975) during one's years as a student, continues in a formal teacher education program, and persists on the job (Feiman-Nemser & Remillard, 1995). Of this decades-long journey, teacher education programs occupy only a small portion, neither as long as the apprenticeship of observation nor as intense as the on-the-job learning. Yet, research suggests that teacher education programs can play a critical formative role in the development of novice teachers, particularly when they incorporate practical components (Brouwer & Korthagen, 2005; Darling-Hammond, 2000a, 2000b; Feiman-Nemser & Remillard, 1995).

On their own, teacher education programs cannot ensure that substantive collaboration among teachers becomes the norm in schools. However, these programs can ensure that students graduate with a sound understanding of teacher collaboration and with the skills and knowledge necessary to practice it. Marshall Welch (1998) identified three ways that teacher education programs can and should develop their students' capacity for collaboration. The first of these involves providing students with a thorough and multidisciplinary theoretical, conceptual, philosophical, and ethical knowledge base for collaboration. The second way in which teacher education programs might prepare collaborative practitioners is by helping them acquire the skills to interact with a variety of educational professionals, including other classroom teachers, administrators, parents, and special service providers. The skills necessary for this interaction, according to Welch, include problem solving, interpersonal skills, communication, and conflict management. Welch noted that this training must also convey the message that an individual teacher need not be an expert in every possible area of education; instead, he or she must be able to access and work with the people who are experts in each area. Third, teacher education programs can provide students with opportunities to apply these collaborative skills through role-playing and through authentic practica in the field.

A number of teacher education programs have attempted to implement programs, courses, or individual workshops designed to address one or all of Welch's recommendations. Several of these initiatives are similar in goals or format to the collaborative assignment described in this dissertation. Wendy Gardiner and Karen Shipley Robinson (2011) studied 24 preservice teachers during a paired field placement program designed to encourage collaboration. While nearly all students expressed positive opinions

about the peer placement model, they also indicated that their prior experiences in the teacher education program had not prepared them for the level of collaboration expected of them in this program. The students also noted that while the peer placement model was beneficial as an entry point into teaching, that level of collaboration was not a realistic expectation once they were fully certified teachers. In other words, despite their positive reviews of the specific collaborative partnerships involved in the projects, students still tended "to view teaching as an autonomous profession that one gains entry into by 'sinking or swimming'" (Gardiner & Robinson, 2011, p. 1).

Katrina Arndt and Jeffrey Liles (2010) paired preservice general education students with preservice special education teachers for a lesson modification assignment. They found that while all of the preservice students were open-minded about the assignment and about collaboration in general, they also maintained a "separate spheres" view of their respective fields even after completion of the assignment. Students in both programs also reported a sense of panic or confusion related to their own lack of knowledge of their partners' fields. Students commented that they felt it was important for the special education teacher to develop a strong base of content area knowledge in order for general education students to feel confident handing over instruction to him or her, reflecting the belief that collaboration requires overlapping, rather than complementary, knowledge.

Melanie Shoffner and Carrie Wachter Morris (2010) described components of a high school English methods course designed to establish communication between preservice teachers and preservice school counselors and to encourage future collaboration between these two groups of professionals. Based on the results of a preliminary survey focused on preservice teachers' prior knowledge of the roles and training of school counselors,

counseling students prepared a 50-minute interactive professional development session for the preservice teachers. Following this session, both sets of students had the opportunity to ask questions of the other group and to share ideas and concerns related to future collaboration. Although the authors did not collect extensive data regarding the impact of this program, they did report that students responded positively to the experience and that the preservice English teachers demonstrated an increased understanding of the school counselor's role and expressed interest in future collaboration with their school counselor.

Teacher education programs face significant structural barriers in developing opportunities for their students to practice collaboration (Arndt & Liles, 2010). For example, rigid course schedules and physically separated departments can make collaboration with students in other classes difficult, if not impossible. These problems are exacerbated when teacher education programs attempt to encourage collaboration between their own students and students from disciplines typically considered separate from schools of education, such as school counseling or school library media programs (Arndt & Liles, 2010; Shoffner & Morris, 2010). As a result, "many teachers do not understand the role and talents of related personnel, and therefore do not utilize them as a resource, because they were not exposed to them during pre-professional preparation" (M. Welch, 1998, p. 32).

4.2 Preservice Interventions in Teacher-Librarian Collaboration

A number of studies have described preservice interventions with either teachers or school librarians (though notably, not both) related to teacher-librarian collaboration. These studies fall into two categories: interventions seeking to improve preservice teachers' understanding of the school librarians' roles, and interventions seeking to develop leadership and collaborative skills among preservice school librarians.

4.2.1 Interventions with preservice teachers. Several articles have been published in the school library field that explore interventions designed to improve preservice teachers' understanding of the school librarian's instructional and collaborative roles, although some of these pieces are anecdotal rather than empirical. Audrey Church (2006) reported on an initiative she undertook as a university school library instructor to visit students in the teacher education program at three points during their coursework – once at the beginning, again in their junior year during a field-based methods course, and a third time just before their student teaching experiences. While she did not collect empirical data from students, Church did report that many students seemed surprised by the teacher and instructional roles of the school librarian. Another article reported on a project in which school librarians and principals produced video clips highlighting the services and resources available in the school library; the video clips were then shown to preservice teachers during their coursework (Wallin & Small, 2012).

Judi Moreillon (2008) investigated a two-year program in which preservice K-8 teachers were enrolled in a teacher education course sequence taught by a former school librarian. Four out of the five courses in this sequence were taught in a school library, and the collaborative instructional role of the school librarian was emphasized throughout all courses. Moreillon employed a mixed methods approach to explore how the students' understanding of the school librarian's roles changed over the course of the program, and data sources included surveys, classroom observations, focus group interviews, and student work samples. Moreillon concluded that while the preservice interventions did lead to improved attitudes about teacher / librarian collaboration and improved understanding of the school librarian's roles, the most important factors contributing to whether the preservice teachers actually

collaborated with the school librarian once they were in student teaching and permanent assignments were the school librarians at those placement schools and the extent to which they supported and encouraged collaboration.

Yvonne Roux (2008), a university education librarian, collaborated with a secondary teacher educator to design and implement an assignment for preservice teachers requiring them to develop a unit plan incorporating information literacy and technology skills into content-area instruction. As part of this assignment, students were required to interview a practicing school librarian about their units and the resources and services the library might be able to provide if that unit were actually taught in the librarian's school. Based on student presentations at the end of the assignment, Roux concluded that most students gained a greater appreciation of the school librarian's role and the value of the school library through this assignment.

In a series of articles, Marlene Asselin reported on a different, more involved approach to preservice teacher intervention that involved working with school librarians, school library educators, curriculum specialists, and teacher educators to integrate information literacy instruction into a language arts methods course (Asselin, 1999, 2000; Asselin & Lee, 2002). The resulting methods course required students to observe a simulated planning session between a teacher and school librarian, observe a collaboratively taught lesson in a local school library, and plan a lesson with a practicing school librarian. Student learning was tracked with reflective logs, observations, work samples, and concept maps. All students showed evidence of an improved conception of information literacy as well as an improved understanding of the collaborative instructional role and expertise of school librarians. One student summarized this by stating that school librarians "have an important

knowledge base that we, as teachers, do not necessarily have full access to" (Asselin & Lee, 2002, p. 15).

In another course-based effort to improve preservice teachers' awareness of the school librarian's instructional role, all students enrolled in an elementary education program at one Midwestern university were required to take a one credit-hour course designed to "begin to overcome barriers to teacher-librarian collaboration" (Dow, Davis, & Vietti-Okane, 2013, p. 41). This course, taught by one of two practicing school librarians, included five hours of face-to-face instruction and approximately ten hours of online instruction. Course topics included instructional strategies for teaching appreciation of literature, resources for literature-based instruction, and teacher-librarian collaboration. Assignments included a school library observation and personal reflections. No school library students were enrolled in the course, and the students were not asked to develop a collaborative lesson plan because education faculty members felt that the students would have sufficient experience writing lesson plans in other courses (M. Dow, personal communication, November 14, 2013). Responses to pre- and post-course surveys taken by over 400 students indicated that the course was successful in improving students' knowledge about and perceptions of teacher-librarian collaboration and the school librarian's instructional role.

4.2.2 Interventions with preservice school librarians. Few studies have examined preservice interventions for school librarians related to collaboration. Joette Stefl-Mabry and Jennifer Goodall Powers (2005) reported on a study in which graduate students in a school library program were paired with undergraduate students in a web development course to create short, technology-rich curriculum units that addressed a genuine student need as submitted by practicing K-12 school librarians in the area. The technology projects were

designed collaboratively by the students in partnership with local school librarians and teachers. No empirical data was collected, but the article does include extended quotes from one graduate and one undergraduate student who participated in the project. Both students expressed great satisfaction with the project and stated that they learned a great deal about collaboration through their participation.

Judi Moreillon (2013) conducted a content analysis of three sections of an online LIS graduate course focused on the school librarian's instructional partner role to see which features of the course impacted students' development of this role. Students reported that the requirement to work collaboratively with three to four classmates over the course of the semester played the largest role in supporting their personal development of this role. Over one-third of candidates also noted that a collaborative lesson planning assignment, completed in pairs, supported them in this role. The majority of the students enrolled in this course were current or former classroom teachers, so the course did offer opportunities for school library students to interact with students from education backgrounds, providing more authentic collaborative experiences than would be the case in an LIS course taken entirely by students without prior teaching experience.

4.3 TLC in School Library Education Coursework and Curriculum

Several studies have examined the coursework and curriculum of school library masters programs, and these studies suggest that teacher-librarian collaboration is a component, if not a centerpiece, of most of these programs (Harada, 1996; Moreillon, Kimmel, & Gavigan, 2014; Neuman, 2001; Tilley & Callison, 2001). Violet Harada (1996) surveyed ALA-accredited schools to examine the nature of coursework required in their school library preparation programs, and found that over 90% of these programs reported

offering at least one course that was substantially focused on instructional leadership (including collaboration with classroom teachers). In another survey of ALA-accredited schools, Carol Tilley and Daniel Callison (2001) found that while virtually all of these schools emphasize collaboration and include coursework related to teacher-librarian collaboration, most school library programs are self-contained within library schools and offer little interdisciplinary coursework. More recently, Judi Moreillon, Sue Kimmel, and Karen Gavigan (2014) surveyed ALA- and NCATE-accredited school librarian preparation programs to determine the extent and nature of the preparation these schools were providing to their students related to the instructional partner role. The authors concluded that emphasis on the instructional partner role varied across institutions, and that there was little overlap across programs in the readings assigned to students related to this role. All responding programs included a lesson plan assignment in their coursework for preservice school librarians, some of which required students to work with practicing classroom teachers, but no programs reported an assignment in which preservice school librarians were partnered with preservice classroom teachers to design instruction.

In response to the publication of the 1998 *Information Power* guidelines, the University of Maryland hosted a one-day conference to gather data about a potential restructuring of its school library program (Neuman, 2001). Content analysis of the conference data revealed that while collaboration was not often mentioned by name, the concept was emphasized as both a challenge and an opportunity for school library preparation programs. Several conference participants suggested cross-listed classes with education schools or team projects across disciplines that would provide school library students with opportunities for authentic collaboration. One participant suggested a project

much like the one described in this dissertation, focused on "design and development of actual lessons that are a collaborative effort between preservice teachers and school library graduate students" (Neuman, 2001, p. 107).

More recently, Don Latham, Melissa Gross, and Shelbie Witte (2013) conducted a case study analysis of faculty in LIS and education at a single university, focusing on their views and experiences on teaching preservice school librarians and teachers about TLC and 21st century skills. They found that collaboration was more likely to be a focus in LIS classes than in education classes, with both sets of professors indicating that collaboration was desirable but difficult to achieve in practice. LIS faculty reported that several courses included components of collaboration, two dealing specifically with TLC, but none included assignments in which students collaborated with anyone outside of their class. Education faculty reported a general emphasis on the importance of using library resources across their curriculum, but no specific instances of TLC discussion or practice within their curriculum. When asked to describe how TLC might be taught, participants suggested class projects involving both school library and education students working together to achieve a particular set of goals. However, participants noted logistical and institutional barriers to this.

4.4 Conclusion

As previous chapters have illustrated, instructional collaboration is heavily emphasized for both teachers and school librarians, and there is a large body of research about the definitions, boundaries, facilitators, processes, barriers, and benefits of collaboration in both fields. However, we know much less about the ways in which preservice programs for teachers and school librarians prepare their students to collaborate. Most existing studies in this area, including those reviewed in this chapter, describe a

particular preservice intervention related to collaboration but fail to connect this intervention to theoretical knowledge of collaboration or teaching and learning, or to other interventions designed and implemented in other contexts. Many of these studies also fail to collect empirical evidence regarding the impact of such interventions. As a result, there are no established best practices for teaching preservice teachers and school librarians about collaboration, or for teaching them how to collaborate. This dissertation study begins to address this gap, however additional research is necessary to establish more generalized guidelines for teaching collaboration as well as to develop theoretical models that help teacher and school library educators understand the transformations in understanding that characterize their students' learning on this topic.

Chapter 5. Theoretical Framework

The importance of theory for research in both education and Library and Information Sciences (LIS) has been the subject of much discussion (e.g., DiSessa & Cobb, 2004; Gregor, 2006; Kumasi, Charbonneau, & Walster, 2013). Although theory development is more complex in the social sciences due to the seemingly chaotic or messy nature of human action, that same messiness makes theory in these fields all the more valuable (DiSessa & Cobb, 2004). Theories may help researchers prioritize their questions and concerns, crystallize their desired outcomes, make sense of their observations, inform practice in their fields, and advance the knowledge base in their area of expertise (DiSessa & Cobb, 2004; Gregor, 2006; Kumasi et al., 2013). For design-based studies such as this one, a strong theoretical grounding is especially critical since one of the primary goals of design-based research is the development or refinement of theory (Anderson & Shattuck, 2012; Barab & Squire, 2004; Design-Based Research Collective, 2003; DiSessa & Cobb, 2004; see Chapter 6 for more discussion of the role of theory in design-based research).

Theories may operate at a number of levels, from "grand" theories that are presumed to be universal and relatively unaffected by context down to extremely specific, context-limited theories of local phenomena (DiSessa & Cobb, 2004; Gregor, 2006). Theories may also vary in their purpose and goals: they may be designed to analyze or describe a phenomena, to explain, to predict, or to prescribe a course of action (Gregor, 2006). In the LIS field, and in design-based research studies, particular emphasis is placed on the use and development of so-called "middle range" theories, grounded in data, that have real-world

implications for researchers and practitioners (Chatman, 1996; DiSessa & Cobb, 2004; Kumasi et al., 2013). In this chapter, I will discuss one such theory – Patricia Montiel-Overall's (2005a, 2005b) theory of Teacher-Librarian Collaboration (TLC) – which informed the design and implementation of the dissertation study described here. In addition, in keeping with Andrea DiSessa and Paul Cobb's (2004) discussion of the importance of declaring one's broader theoretical commitments to identify "family resemblances" among educational researchers (p. 81), I will very briefly discuss the orienting framework – social constructivism, as developed by John Dewey and Lev Vygotsky – that provides a broad rationale for this work.

5.1 Teacher-Librarian Collaboration Theory

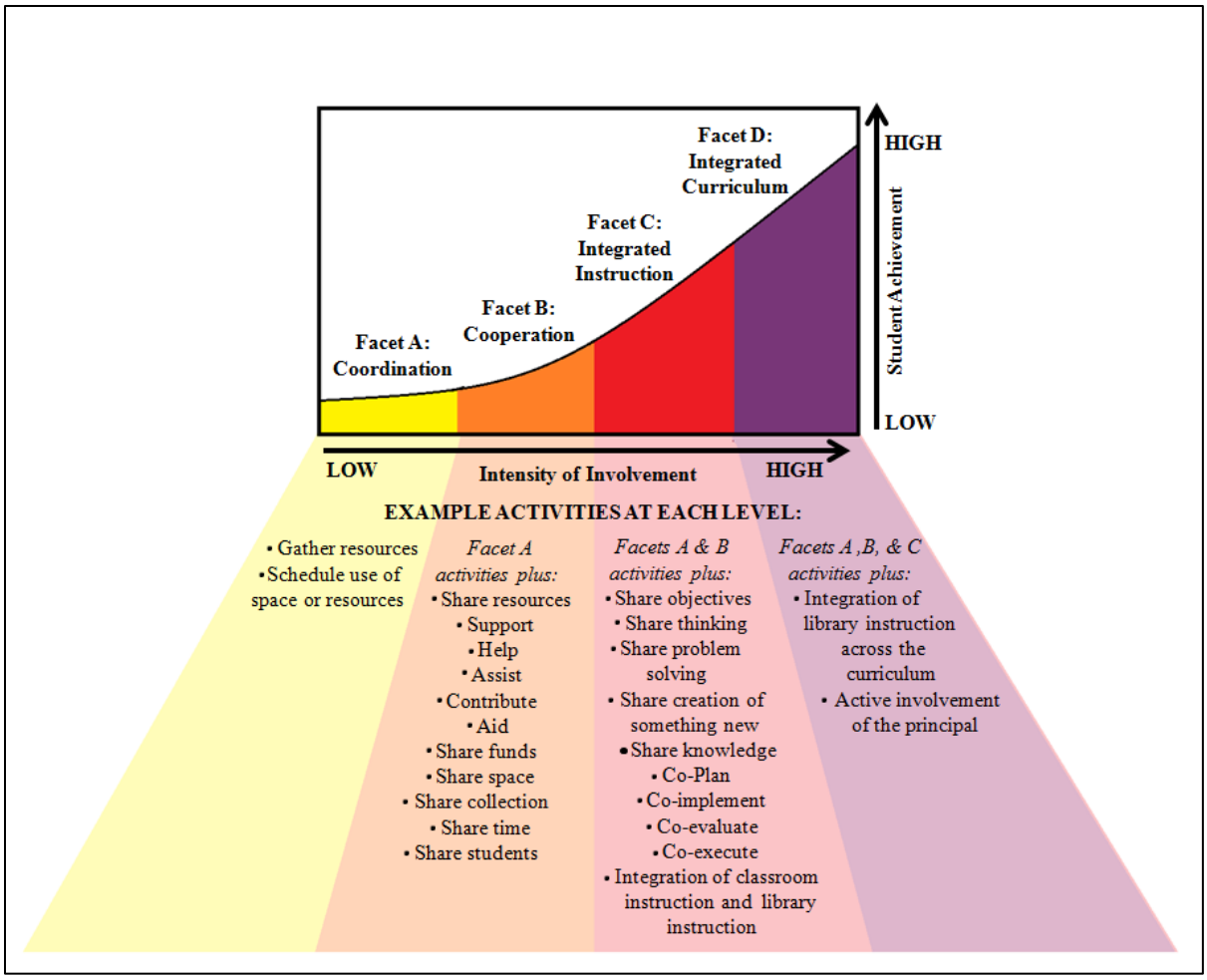
In response to the ubiquitous yet poorly defined nature of the term "collaboration" (discussed in Chapter 1) and what she saw as the great potential for collaboration between classroom teachers and school librarians to improve student achievement, Patricia Montiel-Overall undertook an extensive literature review in the early 2000s to develop a theory of teacher-librarian collaboration, hereafter referred to as TLC Theory (Montiel-Overall, 2005a, 2005b). Drawing from the work of social constructivists such as Dewey, Jerome Bruner, and Vygotsky, Montiel-Overall based her work on the assumption that meaning and knowledge are co-constructed via social interaction. Montiel-Overall reviewed definitions and models of collaboration from a number of disciplines including LIS, education, management and organizations, and community development. Based on these sources as well as "discussions with teachers and librarians and direct observation," (Montiel-Overall, 2005a, p. 26), Montiel-Overall developed the commonly cited definition of teacher-librarian collaboration discussed in Chapter 2:

> a trusting, working relationship between two or more equal participants involved in *shared thinking, shared planning*, and *shared creation of innovative integrated instruction*. Through a shared vision and shared objectives, student learning opportunities are created that integrate subject content and information literacy by co-planning, co-implementing, and co-evaluating students' progress throughout the instructional process in order to improve student learning in all areas of the curriculum. (p. 32, emphasis in original)

Having established this definition, Montiel-Overall then described four distinct models or "facets" of working relationships between classroom teachers and school librarians: Coordination, Cooperation, Integrated Instruction, and Integrated Curriculum (2005a, b). Montiel-Overall initially insisted that coordination and cooperation were distinct from collaboration, stating that the former "may evolve into full collaboration but they serve markedly different purposes" (2005b, Section B, para. 2). However, in later writings, Montiel-Overall removed this distinction, referring to all four models as "a type or form of collaboration" (2005a) with coordination and cooperation representing lower-level collaboration. The models vary along several dimensions: intensity, focus on student achievement, purpose, types of activities involved, and requirements for success (Montiel-Overall, 2005a, b; 2007). See Figure 4 for a graphic depiction of the entire model.

- Facet A – Coordination: Coordination is a low-intensity collaborative effort that is characterized by a minimal amount of involvement between the teacher and librarian. Typically, the focus of a coordinated effort is not on student achievement but rather on efficiency (although increased student achievement may still be observed as a result of coordination-level efforts). While Montiel-Overall (2005b) suggested that friendliness and congeniality are facilitators of Coordination-level collaborations, projects at this level do not require high degrees of trust or communication. An example activity at this level would be gathering resources and scheduling use of the library space for a spelling bee or science fair.

Figure 4 Montiel Overall's Model of Teacher-Librarian Collaboration (TLC). This diagram was developed by the author based on Montiel-Overall (2005a, 2005b, 2008).



- Facet B – Cooperation: This facet is characterized by higher levels of communication between teachers and librarians and by integrated work toward a common goal. Unlike in Facet A, student achievement is the focus of cooperative efforts and both partners share some responsibility for the project or lesson, although the division of labor is typically unequal. At the Cooperation level, the school librarian and library serve as supports for classroom instruction, but are not fully integrated into that instruction as equal partners. Each partner may be responsible for teaching a

particular part of the lesson or unit, but planning, teaching, and evaluation are often developed independently. Collaborations at this level are most successful when there is an atmosphere of mutual respect and open dialogue, but again, only shallow trust is required (2005b). An example of collaboration at this level would be a librarian independently planning, teaching, and evaluating a lesson on web searching that takes place at the beginning of a classroom research project, or a librarian creating an online pathfinder for students to use during a unit that is taught by the classroom teacher.

- Facet C – Integrated Instruction: At this level of collaboration, teachers and librarians work together as equal partners to plan, implement, and evaluate instruction that integrates library (information science) curriculum into content area instruction. High levels of trust and respect are required to achieve student learning goals. In addition, Montiel-Overall (2010) found that shared knowledge of collaboration and each partner's roles, flexibility, individual and shared motivation, and deep thinking around instructional concepts also contributed to the success of collaborative efforts at this level. An example of collaboration at this level would be a classroom teacher and librarian working together to plan an inquiry-based research project incorporating both information science and content area skills and standards; the unit would be co-taught and both the classroom teacher and the school librarian would share responsibility for evaluating student work.
- Facet D – Integrated Curriculum: At this level, integrated instruction occurs at all grade levels and in all content areas across the school. This facet is characterized by a school-wide culture of trust and respect that facilitates teacher-librarian collaboration.

> The principal is key to establishing and maintaining such a culture. In a school at the Integrated Curriculum level, the school librarian is involved in the "big picture" view of curriculum design, implementation, and evaluation, and information literacy content is integrated in every subject area at every grade level. Facet D is characterized by high levels of mutual trust and respect among collaborators and an intense focus on student achievement. Consequently, Montiel-Overall has predicted that collaboration at this level has the greatest potential impact on student learning (2005a, b).

Taken as a whole, this model comprises an explanatory theory of teacher-librarian collaboration. Shirley Gregor (2006) defined an explanatory theory in LIS as one that "says what is, how, why, when, and where" (p. 620) with the goal of promoting greater understanding of some phenomenon of interest (in this case, teacher-librarian collaboration). Explanatory theories explore relationships among various concepts related to the central phenomenon (Gregor, 2006). In the case of TLC theory, these concepts include:

- Intensity of the collaborative effort: Montiel-Overall described the intensity of a collaborative effort in terms of the "degree of involvement, commitment, or participation among participants" (2005b, Section B, para. 3). Intensity may also relate to the amount of time required for the collaborative activities (Montiel-Overall, 2005a).
- Collaborative activities: This refers to the numerous activities that might collectively comprise a collaborative effort, for example sharing resources, jointly implementing instruction, or shared problem solving. Different facets of collaboration are characterized by different collaborative activities, and as a

result, observing collaborative activities is one way to classify a particular collaborative effort as representative of a particular facet. These activities are listed in the lower half of Figure 4.

- Trust between collaborators: Montiel-Overall defined trust in the context of TLC as "believing that when an individual mutually agrees carry out a responsibility it will be carried out as promised" (2005b, "Trusting, working relationship" section). When collaborative efforts are lower-intensity and there is little at stake, outcomes for either partner are contingent on the other person to only a limited degree, and therefore low levels of trust are required. However, as collaborative relationships increase in intensity, greater trust is required since each partner's actions (or inaction) will strongly impact the outcomes for both partners.
- Focus on student achievement: Montiel-Overall (2005a, b) proposed that higher-intensity collaborative partnerships would be more likely to feature a shared concern for student learning, broadly defined. Consequently, these higher-level partnerships are theoretically more likely to result in student achievement gains (also broadly defined).

While not fully predictive in the sense that TLC Theory does not lay out explicit testable propositions (Gregor, 2006), this theory does include the hypothesis that higher-level teacher-librarian collaboration will result in increased student achievement (indicated in Figure 4 by the vertical axis at the top right of the diagram). Montiel-Overall has not yet tested this prediction, nor has she operationalized the meaning of "student achievement" as a measurable outcome variable. She has, however, worked to develop a survey tool that could accurately assess the level of collaboration among teachers and librarians (Montiel-Overall,

2007, 2009; Montiel-Overall & Hernandez, 2012), thus laying the groundwork for testing this proposition in the future.

Much of Montiel-Overall's recent work has concentrated on validating that the model's facets accurately reflect the actual practices of teachers and librarians. This research has largely confirmed the model's validity. A qualitative study of highly collaborative teachers and librarians (Montiel-Overall, 2008) did result in one refinement of the theory: rather than each facet always being carried out in isolation, Montiel-Overall observed that in higher-level collaboration, multiple facets often work together in a non-linear fashion with each contributing to the success of the whole. For example, a collaborative effort at the Integrated Instruction level may also involve some degree of coordination and/or cooperation. This refinement is reflected in Figure 4 by the list of collaborative activities, which specifies that higher-level collaborations may also incorporate collaborative activities from lower-level facets. Additional work has begun to explore the process of teacher-librarian collaboration itself and the factors that contribute to its success or failure. This work has also resulted in extensions of the TLC theory and will be discussed below.

5.2 Applications and Extensions of TLC Theory

As stated above, Montiel-Overall's definition of teacher-librarian collaboration, developed as part of her work on TLC theory, is often cited in LIS literature. However, applications of the theory itself are less common. Montiel-Overall herself has applied the theory several times, in a variety of contexts and for a variety of purposes. Some of this work has led to extensions of the TLC Theory beyond the original four-facet model described above.

One such study (Montiel-Overall, 2009; Montiel-Overall & Jones, 2011) had the dual goals of continuing to develop a valid instrument to assess the level of teacher-librarian collaboration and to compare teachers' perceptions of the importance of teacher-librarian collaboration at each level of the model to their reported frequency of collaboration at each level. Teacher responses to the survey instrument indicated low frequencies of collaboration overall, indicating that most teachers did not collaborate with their school librarian often at any level of the model. In fact, nearly half of the teachers indicated that they never worked with their school librarian to plan, teach, or evaluate student progress (Montiel-Overall & Jones, 2011). In addition, there was a negative (although non-significant) relationship between the order of the item and its mean, indicating that higher-level collaborative activities were less frequent than lower-level activities. However, means for perceived importance to student learning of each collaborative practice were all higher than the reported frequencies, indicating a disconnect between what teachers may view as desirable in theory versus their actual practices. For the importance to student learning items, there was a significant negative correlation between item order and response mean, indicating that teachers in this study viewed more complex forms of teacher-librarian collaboration to be less important to student learning than simpler forms of collaboration. Correlation analysis showed that in general, teachers who perceived an activity to be more valuable to student learning were more likely to carry out that activity frequently.

Montiel-Overall has also applied TLC Theory in a case-study examination of teachers, university educators, and school librarians who worked together to develop professional development workshops for cohorts of elementary school teachers and librarians (Montiel-Overall, 2010). The workshops focused on teacher-librarian collaboration for

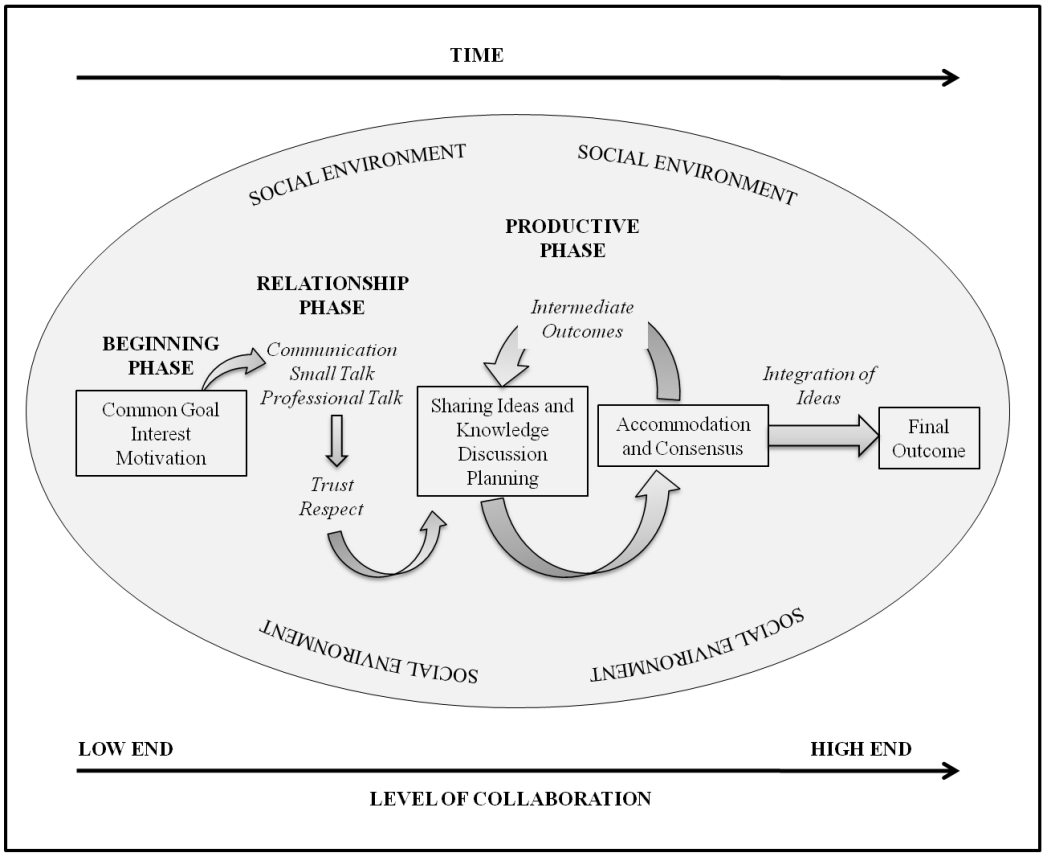
science information literacy development among Latin@ students. The TLC model was shared with all participants to inform them about various levels of teacher-librarian collaboration, and was also used as an assessment tool for the workshop planning teams as they endeavored to model high-level collaboration in the professional development session planning process. Using case study methodology, Montiel-Overall collected a variety of data including observation and field notes, team meeting artifacts, and pre- and post-interviews with planning team participants. Data was analyzed using the grounded theory approach and qualitative coding techniques.

Findings indicated that in general, most teachers and university educators on the planning team were initially unaware of the school librarian's collaborative instructional role or what teacher-librarian collaboration looked like in practice. However, as the planning process progressed, participants' understanding of teacher-librarian collaboration grew. Several "integral components of collaboration" (p. 38) were identified as essential to the productivity of the planning group. These were shared knowledge, which included having a common understanding of the goals of the project; relationship building, which included elements of trust, respect, and communication; and deep thinking around ideas. Ultimately, the planning group exhibited evidence of collaborating at the Coordination, Cooperation, and Integrated Instruction levels, indicating that they higher-level collaboration despite initial difficulties. This work resulted in an extension of the TLC Theory that proposed a model of the collaboration process itself, shown in Figure 5, next page.

The case study methodology used in this study, which looked intensively at one extended collaborative partnership, does not allow for a high degree of generalization of this model. For example, it is unclear whether all of the phases represented in the model above –

beginning, relationship building, and productive – would be evident or necessary in a collaborative partnership operating only at the Coordination or Cooperation level, or whether the essential components of successful collaboration identified here (such as communication and trust) are truly necessary for lower-level collaborations.

Figure 5 The process of teacher-librarian collaboration (TLC). TLC starts with a beginning phase that lays the groundwork for higher-level collaboration. Relationship building activities lead to the development of trust and respect, which allow collaborative partners to enter the productive phase of their partnership. In this phase, participants share knowledge and expertise and work to build consensus related to their shared goals. This diagram was created by the author based on two figures in Montiel-Overall (2010).



Following the collaborative preparation of the professional development sessions, the planning team implemented the professional development intervention with a cohort of twelve elementary school teachers and six school librarians (Montiel-Overall & Grimes, 2013; Montiel-Overall & Hernandez, 2012). The professional development course included monthly afterschool sessions focusing on teacher-librarian collaboration, information literacy, inquiry-based science instruction, and students' language and culture. The four-facet TLC model was again used as an explanatory tool to inform participants about varying levels of teacher-librarian collaboration. Data collection included both quantitative and qualitative components. On the quantitative side, participants were surveyed both before and after the workshops to determine the effect of the workshops on the frequency and perceived importance of varying levels of teacher-librarian collaboration (Montiel-Overall and Hernandez, 2012). Researchers also surveyed a control group of 12 teachers who did not participate in the professional development sessions. The instrument used in this study consisted of an expanded and revised version of the TLC survey previously developed by Montiel-Overall (2007, 2009).

Results indicated that teachers who participated in the workshops reported increases in both frequency of teacher-librarian collaboration and perceived importance to student learning from pre- to post-assessment, while the control group means did not significantly change over the same time period. When the results were broken down by level of collaboration using the four-facet model, findings indicated that teachers who participated in the workshops reported carrying out significantly more collaborative activities in Facets A, B, and C after the workshops than before; reported collaboration at the Integrated Curriculum level (Facet D) also increased, but not significantly. Score changes for Importance to Student

Learning also increased among participant teachers for all facets, but these changes were generally not large enough to be significant, perhaps because importance was initially ranked higher than frequency and thus had less room for improvement over the course of the study. This study contributed to the further development of a valid and reliable instrument to assess the frequency and perceived importance to student learning of teacher-librarian collaboration at each level of the TLC model and also underscored the potential importance of professional development in contributing to changes in these perceptions.

Extensive qualitative data was also collected to further explore the examples of teacher-librarian collaboration that resulted from these workshops (Montiel-Overall & Grimes, 2013). This data included field notes, artifacts, classroom observations, participant journals, and pre- and post-interviews. Qualitative data analysis was ongoing throughout the two years of the study and was used to inform the continued development of the professional development model. Initial categories for data analysis were derived from the TLC model, but these categories were refined or replaced as analysis continued and four major themes eventually emerged: preparation, experience, transformation, and motivation.

The theme of *preparation* related to participants' perceptions that the professional development sessions helped them plan, teach, and think in different ways about teacher-librarian collaboration and inquiry-based science instruction. *Experience* refers to the hands-on collaboration and practice activities that occurred during the professional development workshops, which participants noted was particularly helpful in developing their knowledge and confidence related to teacher-librarian collaboration. Many participants reported a gradual *transformation* of their teaching practice over the course of the workshops, and a developing sense of the importance of collaboration for student learning. Finally, participants

also reported a high level of *motivation*, interest and enthusiasm for collaborative planning and teaching, fueled by their observations of increased student interest, engagement, and achievement in lessons that were collaboratively planned.

The qualitative data analysis confirmed or supported several proposed elements of TLC Theory. First, participants participated in a wide array of collaborative activities at the Coordination, Cooperation, and Integrated Instruction levels of the TLC model, each of which contributed to an integrated, high-level collaborative effort, as described in Montiel-Overall (2008). Second, relationship building, knowledge sharing, and common goals arose as important elements of successful collaboration, supporting Montiel-Overall's (2010) findings.

This study also resulted in additional contributions to TLC Theory. Peer mentoring and professional development were identified as two additional factors that may contribute to the success of teacher-librarian collaboration. A number of challenges or obstacles to teacher-librarian collaboration were also identified. These included a schoolwide norm of direct (rather than inquiry-based) instruction, lack of adequate resources, lack of knowledge among teachers and school librarians about each other's disciplines and standards, lack of administrative support, and time constraints.

A small number of other researchers have used Montiel-Overall's TLC Theory as a framework for their own studies. Bernadete Campello (2009) interviewed 28 Brazilian school librarians in an effort to determine the nature and extent of their collaborative instructional practice, using the four facets of the TLC model as a classification scheme for their responses. Examples of activities at the Coordination, Cooperation, and Integrated Instruction levels were observed.

TLC Theory was also applied in the design and implementation of Project CATALYST (Collaboration among Teachers and Librarians Yields Successful Teaching), a three-year professional development program for school and public librarians designed to increase their knowledge and practice of collaboration with the ultimate goal of improving library service for students of limited literacy or information literacy proficiency (Oyer, Tipton, Larimore, & Goodwin, 2012). Participating librarians were asked to self-assess the level of their collaborative activities over the course of the program using a tool created by the researchers and modeled on the four-facet TLC model. Participants were given a series of simple statements corresponding to the four levels of collaboration proposed by Montiel-Overall and asked to choose the statement that best described their collaborative activity. For example, the statement corresponding with Facet A (Coordination) read "My collaboration with teachers is generally focused on scheduling events and activities" (p. 9). Results indicated that participants engaged in higher-level collaborations more often as the project progressed. Neither of these studies proposed any extensions or modifications to TLC Theory.

5.3 Broader Theoretical Lens: Social Constructivism

Throughout the early stages of this project, TLC Theory was the primary theoretical framework consulted to inform design choices for the collaborative assignment (activity theory (Engeström, 1987, 1993, 2001) was the primary theory employed during the data analysis phase and is introduced in Chapter 9). Additionally, I would like to briefly discuss one broad theoretical lens, social constructivism, which has also influenced this study in terms of providing a general rationale for this work and support for its underlying assumptions. These assumptions include the belief that learners construct their own

understanding through interactions with their environment, tools, and other people; and that collaboration is fundamentally a process of social negotiation in which teachers (and librarians) acquire new knowledge about educational practice while also enacting this practice in a real-world, "messy" context.

The philosophy of social constructivism is typically traced back to John Dewey and Lev Vygotsky (Garrison, 1995; Powell & Kalina, 2009; Pritchard, 2009) and has been immensely influential in education, influencing or propagating a number of other prominent education theories such as Situated Cognition (Brown, Collins, & Duguid, 1989), Communities of Practice (Lave & Wenger, 1991), and Discovery Learning (Bruner, 1961). Social constructivism shares with cognitive constructivism (typified by the work of Jean Piaget) the belief that learning is an active process in which the learner constructs knowledge based on personal experience. However, social constructivists emphasize the cultural and social context in which learning takes place, noting that "all human experience is ultimately social; that it involves contact and communication" (Dewey, 1938, p. 38). Knowledge is not simply constructed; it is *co*-constructed through social negotiation in a real-world context. In this view, learning is not just the assimilation of knowledge. It is also the means by which individuals are integrated into communities of knowledge and practice (Vygotsky, 1978).

One often-discussed concept within social constructivism that has particular salience for this study is Vygotsky's Zone of Proximal Development (ZPD). Typically, the ZPD is defined as the theoretical space just beyond a learner's present level of understanding. Learners may work effectively in this zone, but initially only with support from others (Gray & MacBlain, 2012; Pritchard, 2009; Vygotsky, 1978). One implication of the ZPD concept is that diversity of thought is not only beneficial, but is in fact necessary for learning to take

place, as there must exist some difference in understanding between the learner and the other(s) providing support (Powell & Kalina, 2009). In the context of teacher-librarian collaboration then, the ZPD concept provides theoretical support for the idea that the diverse backgrounds and expertise of teachers and librarians could lead to changes in each partner's understanding of teaching and learning via the process of social interaction.

Jim Garrison (1995) provided an alternative interpretation of the Zone of Proximal Development, taking issue with the typical definition of the concept because of its implied unidirectionality: the learner grows and develops only in the direction of a more knowledgeable other, thus restricting the learner's freedom and ignoring any possibility of growth or development on the part of the other. Instead, Garrison described the ZPD as a multidirectional community that has the potential to change not only the learner as an individual but also the broader social and cultural context in which the learner operates. In other words, "education as a creative and constructive activity is progressive and productive rather than merely reproductive of the pre-existing social order" (p.731). This alternative conception of the ZPD allows us to view teacher-librarian collaboration as a democratic process of sharing, negotiation, and growth which has the potential to alter not only the understanding and practice of those engaging in this collaboration but also the wider school cultures in which they work. It also allows us to explore the unexpected directions in which understanding might progress when there is no predetermined learning goal, or when participants sharing a learning experience are at roughly equal levels of understanding and there is no more knowledgeable other guiding the learners' progress, as is the case for this dissertation study.

Sandhya Baviskar, R. Todd Hartle, and Tiffany Whitney (2009) described four essential components of constructivist learning environments, all of which were considered when designing the collaborative lesson plan project and all of which were observed during its implementation. Constructivist learning environments:

- elicit students' prior knowledge and draw learners' attention to their existing conceptions and mental models (Baviskar et al., 2009; D. H. Jonassen & Easter, 2012),
- create cognitive dissonance for learners by making them aware of how their prior conceptions differ from new or desired knowledge, thus encouraging them to restructure their prior knowledge and resolve cognitive conflict (Baviskar et al., 2009; D. H. Jonassen & Easter, 2012; Richardson, 1997),
- give learners the opportunity to apply their knowledge and receive feedback (Baviskar et al., 2009; Winitzky & Kauchak, 1997), and
- require students to reflect on their learning and express what they have learned (Baviskar et al., 2009).

Chapter 6. Design-Based Research[2]

The field of Library and Information Science (LIS) has long been vexed by two related concerns: first, a recalcitrant divide between research and practice (Bowler & Large, 2008; Crowley, 2005; Cruickshank, Hall, & Taylor-Smith, 2011), and second, a shortage of usable, middle-range theories generated within the discipline (Chatman, 1996; Kim & Jeong, 2006; Kumasi et al., 2013). Design-based research (DBR), a methodology developed over the past two decades in the field of educational research, offers a promising means of addressing both of these concerns simultaneously by placing research, design, practice, and theory generation into a real-world context. This chapter will provide context for the development of design-based research, define and delineate this approach, examine associated theoretical approaches and methodologies used in DBR, explore the applicability of DBR to the field of library and information science, and discuss the approach's limitations and criticisms.

6.1 Development of Design-Based Research in Education

Design-based research was developed in part to address the intractable divide between theory and practice in the field of education (Brown, 1992), a divide that has been the focus of much concern in educational research since at least the turn of the 20th century. It was then that John Dewey remarked upon the schism between researchers and teachers and the "simple" yet profound differences in their aims and desired outcomes. He likened this blindness of each to the efforts of the other to a "'great big battle'… fought with mutual

[2] Portions of this chapter were adapted for publication in Rawson, C. H., & Hughes-Hassell, S. (2015). Research by design: The promise of design-based research for school library research. *School Libraries Worldwide, 21*(2), 11-25.

satisfaction, each side having an almost complete victory in its own field" (Dewey, 1904, p. 10).

Design-based research first emerged in the early 1990s with the work of Ann Brown (1992) and Allan Collins (1992), who attempted to systematically design and study classroom innovations in real-world contexts using engineering principles with the goals of developing student knowledge, design principles, and theory simultaneously. Other phrases have been used to denote this approach, such as "design experimentation" or "design research," but in general the term design-based research is preferred since design experimentation implies a controlled experiment and thus is too narrow to encapsulate DBR, while design research is overly broad and may be confused with studies in which a design is developed and refined out of context (Sandoval & Bell, 2004). It is worth noting that DBR is also distinct from Alan Hevner and colleague's "design science," (Hevner, March, Park, & Ram, 2004) a framework in use in the Information Systems field.

The DBR approach emerged from, on one hand, an acknowledgement of the inadequacy of laboratory studies for generating valid, useful theoretical knowledge about teaching and learning and, on the other hand, the inability of ethnographic methods to affect change in classroom practice (Barab & Squire, 2004). Design-based research is an iterative approach that focuses on the *in vivo* development and implementation of an educational intervention. The range of interventions that might be the focus of design-based research is broad and could include such varied products as curricula and instructional sequences, technological tools or software, museum exhibits, or even large-scale educational policy (Bell, 2004). DBR studies have the twin goals of developing an intervention in the real world and generating new theoretical knowledge that impacts practice (Anderson & Shattuck, 2012;

Barab & Squire, 2004; Design-Based Research Collective, 2003; McKenney & Reeves, 2013). As such, DBR cannot be categorized either as purely applied or as purely basic research, but instead bridges the gap between them. Stokes (1997) classified such research as belonging to "Pasteur's quadrant" in which studies are concerned with both fundamental understanding and real-world use of resulting knowledge (Anderson & Shattuck, 2012).

In the early 2000s, a series of special issues in influential journal articles put DBR on the map within the field of education and helped to define and delimit the approach (these special issues are *Journal of the Learning Sciences, 13*(1), *Educational Researcher, 32*(1), and *Educational Psychologist, 39*(4)). Since that time, increasing numbers of DBR studies have been published each year in educational journals and the field has continued to refine the boundaries and key features of the methodology (Anderson & Shattuck, 2012). One recent literature review of DBR identified eight defining characteristics of a DBR study: 1) situated in a real context, 2) focused on the design and testing of an educational intervention, 3) using mixed methods, 4) involving multiple iterations, 5) involving collaboration between researchers and practitioners, 6) yielding design principles and theoretical knowledge, 7) distinct from action research, and 8) having a practical impact on practice (Anderson & Shattuck, 2012). A response to this review also highlighted one additional defining feature of DBR, namely that it departs from a problem of practice (McKenney & Reeves, 2013). These features are summarized in Table 2 (next page).

Table 2 Defining Features of Design-Based Research. Based on Anderson & Shattuck, 2012 and McKenney& Reeves, 2013.

Situated in a real context	DBR studies take place in vivo in real-world contexts such as a classroom rather than in artificial settings such as laboratories. This contributes to the ecological validity of the study.
Departs from a problem of practice	Identification and thorough understanding of an existing problem of practice are necessary first steps for a design-based study. Initial design of the intervention is in response to this problem and is informed by relevant literature, theory, and practice.
Focuses on the design and testing of an educational intervention	An initial intervention is designed, carefully documented, and continuously refined throughout the study.
Uses mixed methods	The DBR approach does not restrict researchers in their specific choice of methods of data collection or evaluation. Methods are chosen based on their ability to address research questions and may be changed as necessary based on the progression of the design.
Involves multiple iterations	The designed intervention is continuously refined throughout the study and may go through many iterations before the research program is complete.
Involves collaboration between researchers and practitioners	Researchers and practitioners work closely with one another to design and implement the DBR study. In many cases, the researcher and practitioner are one and the same.
Yields design principles and theoretical knowledge	The goal of a DBR study is not only to fine-tune a specific intervention, but also to derive more general design principles, models, and middle-range or grounded theory. DBR studies should result in knowledge that is usable beyond the original context of the research.
Distinct from action research	The focus on advancing theoretical knowledge and generating theories that "do real work" distinguish DBR from action research, which is typically conceived only to meet local needs.
Has a practical impact on practice	A primary focus of DBR studies is improvement of educational practice, not only within the research setting but also for practice more generally conceived. This connection to practice is heightened by the situated nature of DBR studies.

One example of a prototypical design-based study in education is the passion school model developed and tested by Diana Joseph (Allan Collins, Joseph, & Bielaczyc, 2004; Joseph, 2004). The problem of practice identified in this case was a lack of learner motivation and engagement in traditional classrooms. Joseph and a team of co-researchers and practitioners designed the passion school model as an intervention designed to combat this problem. The initial design was informed by existing literature and educational theory. In the passion school model, students were grouped not by age level but by interests, and they were taught core skills and concepts by engaging in work that is personally meaningful.

Specifically, Joseph's initial intervention involved a curriculum in which groups of students created films on topics of shared interest. This intervention was tested in a real classroom with real students, and was refined both during and after the initial implementation. A variety of data was collected and analyzed using mixed methods to assess the effectiveness of the design related to student learning. The project went through two additional phases of design, refinement, and testing over the course of several years. Project outcomes included the refined curriculum design itself, evidence of student learning among the project participants, a set of more general design principles to guide the development of engaging curriculum outside of the initial context of the study, and contributions to theory on learner engagement and motivation. This project fulfills all nine of the defining characteristics of a design-based research study as shown in Table 2.

6.2 The Role of Theory in Design-Based Research

As with any methodological approach, not every project under the banner of design-based research hews as closely to the prototypical DBR study as the passion school model described above. One area in which many design-based studies fail to adhere to the idealized

norms for this form of research is in theory development (Dede, 2004; DiSessa & Cobb, 2004). While most definitions of design-based research emphasize theory development as a primary goal of this form of research (e.g., Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003; Design-Based Research Collective, 2003), published scholarship in the field does not always contribute new theoretical knowledge (Dede, 2004; DiSessa & Cobb, 2004). Yet, a focus on the generation of theory grounded in real-world context is precisely what sets design-based research apart from other methodologies such as laboratory experiments, action research, or engineering design studies (Anderson & Shattuck, 2012; Barab & Squire, 2004; Bell, 2004). As noted by Philip Bell (2004),

> The design research approach, without the theory work and rigorous empirical research, sometimes leads to the development of products that are genuinely useful, but such work does not stand to inform the nature of the specific educational phenomena at hand…. This "theory work" is a defining feature of the design experimentation enterprise. (p. 245)

DBR is fundamentally pragmatist in nature (Anderson & Shattuck, 2012; Barab & Squire, 2004) and always maintains an eye toward the usefulness of its findings to practitioners in the field. Pragmatism as a philosophical stance arose in the early 1900s from the work of C. S. Pierce, William James, George Herbert Mead, and John Dewey (Cherryholmes, 1992). Research in the pragmatic tradition focuses on actions, situations, and most critically, consequences; researchers thus make choices related to the "what" and "how" of research by examining the anticipated consequences of each alternative and choosing the path most likely to lead to their desired result (Cherryholmes, 1992; Creswell, 2009). Like design-based research itself, pragmatism "is not committed to any one system of philosophy and reality," (Creswell, 2009, p. 10), which frees researchers to utilize both qualitative and quantitative methods of research according to which provides the best understanding of their research problem (Creswell, 2009; Morgan, 2007). Thus, pragmatism has become closely

associated with the mixed methods paradigm of research (Creswell, 2009; Johnson, Onwuegbuzie, & Turner, 2007). Pragmatists reject the idea of absolute truths and "take seriously the assumption that we are historically and socially situated" (Cherryholmes, 1992, p. 14), and this focus on context is another link between pragmatism and design-based research.

Because of the pragmatist nature of DBR, theories generated by such research are not judged primarily by their usefulness to scholars but by their "ability to produce changes in the world" (Barab & Squire, 2004, p. 6). Christopher Hoadley (2004) and Sasha Barab and Kurt Squire (2004) described this criterion of usefulness as *consequential validity*, extending the use of this term from its original context of evaluating educational assessments (Messick, 1994). Paul Cobb et al. (2003) summarized DBR's relationship to theory in this way: "Theories developed during the process of experiment are humble not merely in the sense that they are concerned with domain-specific learning processes, but also because they are accountable to the activity of design. The theory must do real work" (p. 10). Theories generated by design-based research typically occupy the middle ground between grand theories that are relatively context-independent and narrowly-tailored accounts of a single system (Anderson & Shattuck, 2012; Cobb et al., 2003). Theories developed in a DBR study are often categorized as grounded theory (Glaser & Strauss, 1967), as they both emerge from and are closely connected to the study data. Since they are developed in real-world environments and in direct response to problems of practice, they "are filtered in advance for instrumental effect" and have the potential for immediate practical use (Cobb et al., 2003, p. 11).

While the description above addresses the nature of much of the theory produced by design-based studies, the content of those theories may vary widely. Like the LIS field, education is fundamentally multidisciplinary (Bates, 1999), and education researchers include those with backgrounds in psychology, linguistics, the natural sciences, sociology, and anthropology, among others (Bell, 2004). The design-based research approach has been used successfully by researchers from a wide variety of intellectual traditions, and the flexibility of the approach has been praised as one of its greatest features (Bell, 2004). Design-based studies may vary not only in the theoretical and philosophical commitments of the researchers themselves but also in the nature of the interventions studied and the scale of the intervention's dissemination, and this variety reflects the complexity and breadth of educational research as a whole (Bell, 2004).

6.3 Mixed Methods for Data Collection and Analysis in DBR

While DBR has been described as a methodology unto itself (Anderson & Shattuck, 2012), some scholars have taken issue with this terminology, noting that DBR utilizes established qualitative and quantitative methods of data collection and analysis and is thus less a specific methodology than an approach or series of approaches (Barab & Squire, 2004; McKenney & Reeves, 2013). DBR differs from other forms of research more in its goals than in its methods (McKenney & Reeves, 2013) and has been described as "largely agnostic" concerning researchers' choices of data collection and analysis techniques (Anderson & Shattuck, 2012, p. 7). However, because of DBR's dual focus on advancing theory and designing solutions to real-world problems, researchers typically use mixed methods study designs (Anderson & Shattuck, 2012). Again, this emphasizes the approach's pragmatist underpinnings, as DBR researchers choose the methods that are most appropriate to their

research questions and most likely to generate usable data (Anderson & Shattuck, 2012; Barab & Squire, 2004; Creswell, 2009).

While mixed methods studies have been performed since at least the late 1950s, the mixed methods approach remains less well-known than either qualitative or quantitative strategies (Creswell, 2009). In the introduction to the first issue of the *Journal of Mixed Methods Research*, Abbas Tashakkori and John Creswell (2007) defined mixed methods as "research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry" (p. 4). While this definition seems relatively straightforward, many questions have arisen about mixed methods research, some still unresolved. For example, does collection of both quantitative and qualitative data automatically qualify a study as mixed methods, or must the data be integrated in some meaningful way? If the data are to be integrated, for what purposes, in what order, and to what extent should this occur? What philosophical and theoretical underpinnings are consistent with or required for a mixed methods study? Is mixed methods research truly a unique research paradigm? Despite the disagreement surrounding some of these issues, mixed methods research continues to grow in popularity, particularly in education research (Johnson et al., 2007).

The origin of mixed methods research is typically traced back to the multitrait-multimethod matrix of Donald Campbell and Donald Fiske (1959). The approach emerged from a recognition among researchers that all methods have limitations and the idea that combining methods might help to neutralize or eliminate the biases inherent in any single method (Creswell, 2009). Using multiple data sources and methods of data collection and analysis allows for triangulation – a means of strengthening the validity of a study by

examining the research questions from multiple perspectives and seeking convergence of evidence across varied methods and data sources (Creswell, 2004, 2009; Jick, 1979). Multiple methods may also be used sequentially, with data from one phase of the study informing the design of the next phase (Creswell, 2004, 2009). Mixed methods studies may be categorized by their timing (whether qualitative and quantitative data collection occur simultaneously or sequentially), their weighting (the relative emphasis given to each type of data collected), the extent to which and manner in which data from different methods are mixed, and their use (or non-use) of theory (Creswell, 2009).

Mixed methods research is more than the sum of its parts; researchers utilizing this approach must not only be familiar with both quantitative and qualitative methods and their associated validity and reliability concerns, but also with some data analysis and validation procedures that are unique to mixed methods studies, such as data transformation (Creswell, 2009). In this approach, a researcher may quantify qualitative data, for example by counting instances of a certain code or theme in a piece of text, to provide an alternative way of understanding the qualitative data, to perform statistical analysis, or to make comparison with existing quantitative data more straightforward. Alternatively, he or she may transform quantitative data into qualitative data, for example by creating qualitative themes based on factor analysis data. In either case, data transformation can raise legitimacy concerns, and the researcher must justify the choice to transform the data. For example, some qualitative researchers assert that quantifying qualitative data is inappropriate because the resulting numerical data does not retain the rich context of the original text (Onwuegbuzie & Teddlie, 2003). I will discuss specific methods and validity / transferability concerns for this study in the methods chapter (Chapter 7).

6.4 Applicability to LIS Studies

Like education, the LIS field has also grappled with a research-practice gap (Crowley, 2005). A recent study of LIS research impact in the UK found a widespread disconnect between published LIS research and the community of LIS practitioners (Cruickshank et al., 2011). Practitioners who participated in this research program perceived most LIS research as remote from their daily work and unresponsive to their actual needs. The source of this gap is not singular: differences in knowledge, cultures, motivations, and terminologies between researchers and practitioners all play a role in creating and sustaining the divide, among other elements (Haddow & Klobas, 2004).

Responding to the theory-practice divide, William Crowley (2005) called upon the LIS community to develop "useful" theory, which he defined as "mental constructions that reflect, to some degree, 'how things work' in real-world contexts" (p. 7). Yet theory development is a second stumbling block for the LIS field. In an influential article, Elfreda Chatman addressed the need for LIS researchers to deepen the theoretical knowledge of the field:

> As researchers who wish to develop theory, we must identify problems central to our field. The basis for this argument is that once these problems have been identified, we might be led to the formulation of conceptual issues that underline these problems…. [In the LIS field], we have no central theory or body of interrelated theories we can view as 'middle range.' In light of this discussion, it would appear we are currently focused on the application of conceptual frameworks rather than on the generation of specific theories. (Chatman, 1996, p. 193)

More recent research confirms the continued relevance of Chatman's commentary, finding that most published scholarship in the LIS field fails either to contribute to existing theory or to generate new theory (Kim & Jeong, 2006; Kumasi et al., 2013; Pettigrew & McKechnie, 2001). In fact, the very definition and nature of theory are still under negotiation in LIS (Gregor, 2006), which is perhaps not surprising given the multidisciplinary nature of

the field. All of this is not to say that there are no LIS-specific theories to be found or that LIS research never employs theory; in fact there are quite a number of theories that have been developed or widely used by LIS researchers (see Fisher, Erdelez, & McKechnie, 2005 for an overview of these theories). However, calls for additional and novel theory development work in LIS continue, particularly for theories that might help to address the research-practice gap discussed above (Crowley, 2005; Kumasi et al., 2013). To borrow once more from Dewey (1904), "We should remember that there are times when the most practical thing is to face the intellectual problem, and to get a clear and comprehensive survey of the theoretical factors involved" (p. 42). In other words, despite the perceived differences between theory and practice, sometimes the former is the best way to solve the problems encountered in the latter. Design-based research has the potential to help LIS researchers address both the research-practice divide and the shortage of useful theory being generated within the field.

Leanne Bowler and Andrew Large (2008) discussed the potential usefulness of the design-based approach for LIS, focusing primarily on applications of this approach within the user-centered paradigm of information systems research. Potential applications of design-based research within the LIS field are numerous. Over the past several decades, libraries have seen momentous shifts in their day-to-day practices, with sweeping changes in user expectations, library services, physical space, and the library workforce, all commonly attributed to both the digital revolution and changing economic climates (American Library Association, 2013). In response to these shifts, libraries have developed many innovations related to their spaces, collections, and services, and creative solutions to problems of practice in libraries continue to be developed (American Library Association, 2013). The

existence of so many relatively new and pressing problems of practice in libraries makes them perfect settings for design-based research. Moreover, many libraries may be facing identical problems of practice and could therefore greatly benefit from the development of theory or generalized design principles related to those concerns, another benefit that the DBR approach could offer.

6.5 Criticism of Design-Based Research

Design-based research is not without its drawbacks or detractors. The flexibility and breadth of the DBR approach that are praised by some researchers cause others to question whether design-based research might not exhibit some of the same flaws of multipurpose tools, which "do a little of everything, but usually do nothing particularly well" (Dede, 2004, p. 104). DBR has also been criticized for the copious amount of data it produces (Collins et al., 2004; Dede, 2004), the lack of standards to decide whether an initial design is "good enough" to undergo successive iterations, frequent under-specification of theory in published work (Dede, 2004), the impossibility of controlling for potentially important variables due to the naturalistic context, and the difficulty of comparing effectiveness across designs (Allan Collins et al., 2004).

Researchers have also acknowledged the difficulty of defining and delimiting the real-world context of a DBR study, noting that "the world does not divide itself at researcher-defined seams" (Barab & Squire, 2004, p. 12). In order for findings from DBR studies to be useful outside of their original environment, the research context must be carefully described (Barab & Squire, 2004; Collins et al., 2004; Fishman, Marx, Blumenfeld, Krajcik, & Soloway, 2004). Yet often, researchers fail to consider or describe anything beyond the specific classroom in which they are conducting their research, which ignores the reality that

classrooms are nested into systems such as schools, school districts, and local communities, the particulars of which may impact the research and its outcomes (Barab & Squire, 2004; Fishman et al., 2004). Determining which aspects of context are relevant and important to the generalizability of a study can be problematic. Barry Fishman and colleagues (Fishman et al., 2004) proposed that DBR studies should explicitly address systemic issues of scalability, usability, and sustainability to overcome these difficulties.

Design-based research also faces unique validity concerns, primarily due to its interventionist nature (Barab & Squire, 2004; Bell, 2004; Cobb et al., 2003; Sandoval & Bell, 2004). In a design-based study, the researcher is intimately involved in every stage of the study from initial design to implementation, revision, and assessment. Furthermore, the researcher is not simply a passive observer as the designed intervention is implemented. Instead, the researcher is "implored to intervene where possible" to improve upon and test the design as it is being delivered rather than waiting until a complete cycle of implementation has occurred before making design changes (Barab & Squire, 2004, p. 10). There are two commonly-raised validity concerns related to this level of researcher involvement: first, that the researcher's involvement makes it difficult or impossible to determine whether it was researcher or intervention that produced the study's outcomes, and second, that researcher bias may make research claims suspect (Anderson & Shattuck, 2012; Barab & Squire, 2004; Sandoval & Bell, 2004). To the first concern, scholars in the DBR field have responded that researcher intervention throughout the design process is not only the best, but often the only way to thoroughly understand the systems at work in the project, and that sterilizing the research context by removing the researcher's involvement is counter to DBR's primary goal of developing theory in naturalistic contexts (Barab & Squire, 2004).

To the second concern, it has been argued that the intense and long-term nature of a DBR study demands a researcher who is enthusiastic about the project (Anderson & Shattuck, 2012), and while this may lead to some bias, there are well-established means of minimizing this threat to validity and establishing the trustworthiness of the research (Hoadley, 2004; Lincoln & Guba, 1985). In particular, design-based research relies on careful documentation and thick description by the researchers to assist in identifying the mechanisms by which interventions produce outcomes (Hoadley, 2004).

Of course, while some validity threats are magnified by the use of DBR, others are reduced or eliminated. Specifically, one of DBR's greatest strengths is its ecological validity, especially when compared to laboratory studies or studies in other artificial contexts (Barab & Duffy, 2000; Bell, 2004; Sandoval & Bell, 2004). Studies done in artificial contexts are quite common in the LIS field as in many other disciplines, and the DBR approach can help complement these studies to gain a greater understanding of how LIS systems, services, and users actually behave in the real world.

Chapter 7. Methodology

The study described below represented the second iteration or cycle of the design-based research process. The design of this study and of the intervention itself (the collaborative lesson plan assignment) was informed not only by a review of relevant literature and theory, but also by the data collected in the initial (pilot) implementation of this study.

7.1 Research Questions

This study addressed the following research questions:

1. What do preservice elementary school teachers know and understand about the training, expertise, and collaborative instructional role of the school librarian at the beginning of this project?
2. What do preservice school librarians know and understand about the expertise and collaborative instructional role of the school librarian at the beginning of this project?
3. How does the collaborative lesson plan design project change participants' understanding of the expertise and collaborative instructional role of the school librarian, and what specific features of the project contribute to these changes?
4. What issues emerge during the collaborative process, and how do the students address those issues?
    a. Do any issues emerge during the collaborative process that are specifically related to the science content focus of the assignment, and how do the students address those issues?

5. How does participants' understanding of teacher-librarian collaboration (TLC) change over the course of this project?
    a. How does participants' understanding of science-focused teacher-librarian collaboration (TLC) change over the course of this project?

Question 1 pertains only to preservice teachers and was explored through questionnaires, work samples, classroom observations, and a post-project focus group. Question 2 pertains only to preservice school librarians and was explored through pre-project interviews, work samples, and classroom observations. Questions 3, 4, and 5 and Sub-questions 1 and 2 pertain to all participants and were addressed through questionnaires, work samples, classroom observations, a post-project focus group with preservice teacher participants, and interviews with school library participants. For a summary of research questions, participants, and data sources, see Figure 6 (p. 101).

7.2 Participants and Context

Participants for this study included senior undergraduate students enrolled in an elementary science methods course and first-year graduate students enrolled in Curriculum Issues and the School Librarian, a required course for students in the school library track of the Master of Science in Library Science (MSLS) program. The elementary science methods course is embedded into a nine-hour integrated methods block that includes literacy, mathematics, and science methods instruction for students during the semester immediately before their student teaching experiences. The course includes a field-based component and the science portion stresses inquiry-based and constructivist principles of teaching and learning. The library science course is a critical component of the school library program and focuses on the instructional role of the school librarian by examining state and national

standards, curriculum, learner characteristics, instructional design, assessment, and collaboration, among other topics.

7.3 Project Overview

Instructional design has traditionally been a focus of both the science methods course and the school library curriculum issues course. Both courses have included lesson plan assignments in past semesters, and the courses share similar commitments to inquiry-based teaching, backward design (Wiggins & McTighe, 1998), and technology integration. In past semesters of the school library course (prior to Fall 2013, when the collaborative lesson plan project was piloted), students were instructed to write an inquiry-based lesson plan from the school librarian's perspective that is designed to be taught and assessed collaboratively with a classroom teacher. However, traditionally, many students in this course have lacked teaching experience, and even students with teaching experience typically have not had extensive experience with collaboration. Therefore, imagining the role of a collaborative partner was a challenge for students and weakened the authenticity of this assignment. Collaboration with school librarians was not part of the lesson plan assignments in past semesters of the elementary methods course prior to Fall 2013.

This project grouped one preservice school librarian with 3-6 elementary methods students. The designed intervention in this study was a group assignment in which each set of students were tasked with designing a collaborative, inquiry-based lesson plan that addressed both information literacy and elementary science standards. North Carolina Essential Standards for Science and for Information and Technology were used as content-area and information literacy standards, respectively. In the pilot study, AASL's *Standards for the 21st Century Learner* were suggested for use as the information literacy standards, but the

preservice school librarians in this study preferred the North Carolina Essential Standards both for their perceived simplicity compared to the AASL standards and for their increased relevance for the PSTs in the project groups, all of whom were placed in North Carolina schools for their student teaching. The lesson plan followed the format used by the School of Education, which is based on the Teacher Performance Assessment (TPA) planning structure (see Appendix C). Groups had two opportunities to work on their lesson plans together during class time and were also provided with access to a private wiki where they could communicate and share materials online outside of class time. At the end of the semester, school library students prepared brief (~10 minute) presentations, delivered to only the school library class, focused on their experiences with the project.

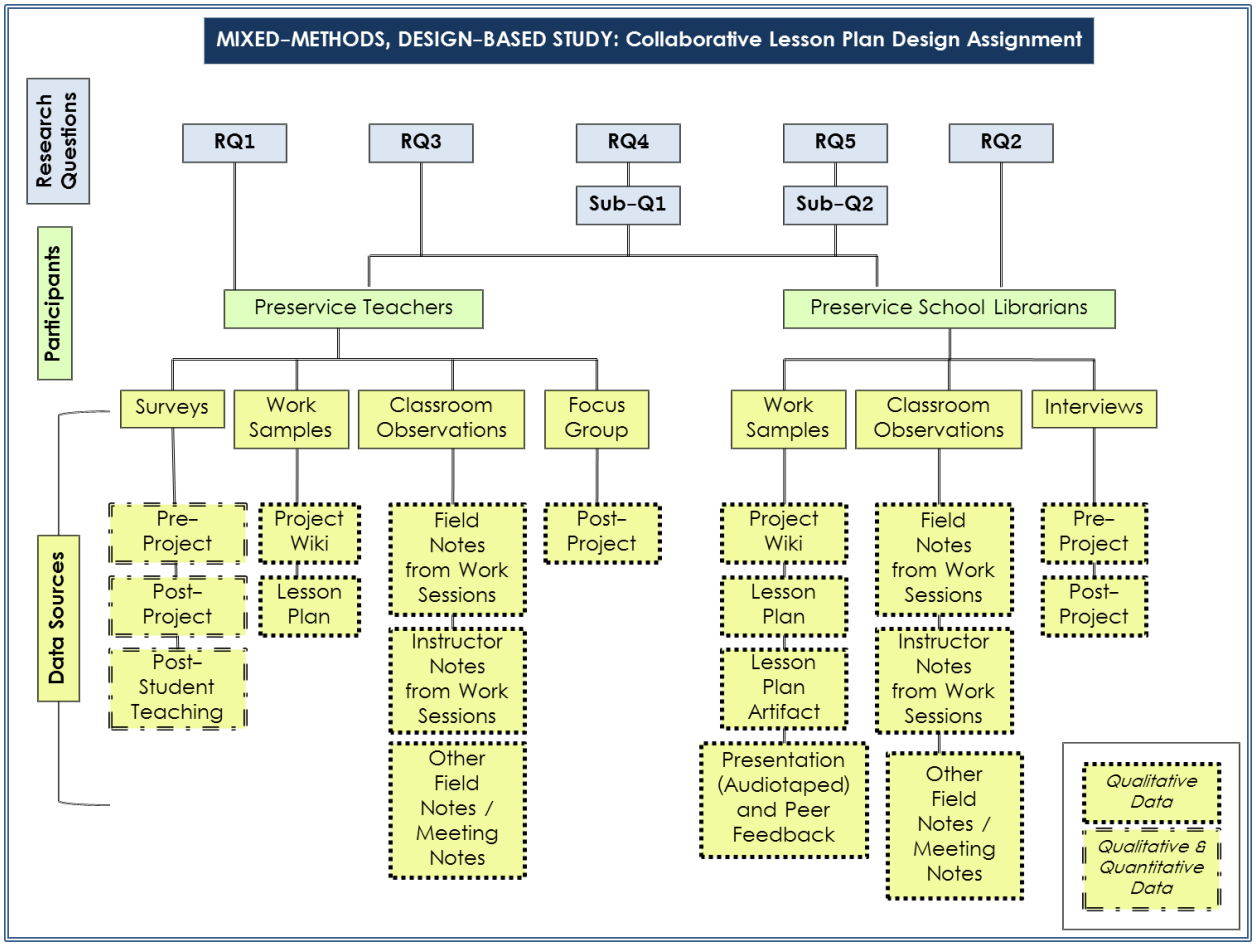
Each group was responsible for negotiating specific workload divisions, for example which partner is responsible for writing certain sections of the lesson plan document. However, the instructors monitored each group to ensure that each preservice school librarian's total workload was roughly equivalent to PSLs in other groups. Instructions provided to students for this project are provided in Appendix C.

7.4 Data Sources

A variety of quantitative and qualitative data were collected before, during, and after the lesson plan design project (see Figure 6, next page, for a summary of data sources). These included:

- Questionnaires: Questionnaires for this project were modeled after those used by Moreillon (2008) in her study investigating the factors that contribute to preservice teachers' understanding of collaboration between classroom teachers and school librarians and Church (2010) in her study of principals' perceptions of the school

Figure 6 Study Overview.



librarian's instructional role. Some questions from these two surveys were kept as-is, some were modified, and other questions are unique to this study. In Appendix A, I have annotated the pre-project survey to indicate which questions fall into each of these categories (I did not annotate the post-project or post-student teaching surveys since these were variations of the pre-project survey). Three questionnaires provided the quantitative data for this study and also provided some qualitative data in the form of responses to open-ended questions. These surveys were administered to preservice teachers before and after the collaboration project:

- one *pre-project survey* focusing on the participants' backgrounds vis-à-vis school libraries; their understanding of the roles, training, and expertise of school librarians; and their conceptions of teacher / librarian collaboration and self-reported likelihood to participate in such a collaboration as a classroom teacher. Part III of this survey consisted of 24 Likert items and assesses preservice teachers' knowledge of the various roles of the school librarian and was subdivided into three categories according to the three roles for school librarians identified by AASL (2009) that most closely relate to instruction: information specialist (questions 1-8), teacher (questions 9-16), and instructional partner (questions 17- 24). See Appendix A, Pre-Project Survey for Preservice Teachers. This survey was administered via paper and pencil during a break in the first class session of the PST methods course.
- one *post-project survey* administered at the conclusion of the project focusing on participants' experiences with the project; their understanding of the roles, training, and expertise of school librarians; and their conceptions of teacher / librarian collaboration and self-reported likelihood to participate in such a collaboration as a classroom teacher. Questions in Part III of this survey were identical to Part III of the pre-project survey. See Appendix A, Post-Project Survey for Preservice Teachers. This survey was administered via paper and pencil during a break in the last class session of the PST methods course.
- one *post-student teaching survey* administered at the end of PSTs' student teaching semester, including questions designed to assess the extent to which PSTs observed school librarians practicing various roles within the school,

whether the PSTs participated in collaboration with their school librarian during their student teaching experience, and what factors contributed to their participation or non-participation in TLC. Questions in Part I of this survey were identical to items in Part III of the pre- and post-project surveys, except that they asked participants to indicate whether they observed the school librarian behavior instead of the extent to which they agreed it should be practiced. See Appendix A, Post-Student Teaching Survey for Preservice Teachers. This survey was administered online via Qualtrics.

PSTs were asked to identify their pre- and post-project surveys with a 4-digit number (chosen by the students to retain anonymity) such that pre- and post-project surveys could be compared.

- Work Samples: At the end of the project, student groups turned in their lesson plans. I only reviewed the lesson plans turned in by the PSL participants, not the completed unit plans later turned in by PST students. Some PSLs also turned in instructional artifacts related to their plans, such as resource lists or PowerPoint slides. PSL participants delivered presentations to their classmates in the school library course at the end of the semester; these presentations were an opportunity for students to reflect on the assignment as well as their understanding of TLC and the school librarian's instructional role and how those understandings may have changed over the course of the assignment. The instructors and I had access to each group's wiki site. In addition, I collected other work samples from PSL participants related to TLC and the school librarian's role, including these students' Portrait of a Collaborator assignments (Moreillon, 2015) (discussed in Chapter 8), entrance and exit slips, and artifacts from

in-class group assignments (for example, lists of "top ten things librarians teach," created by small groups of PSL students during the first class session). All of these work samples served as qualitative data sources for this project.

- Classroom Observations: During the face-to-face work sessions, I took field notes using a chart to focus my observations (see Appendix A). Observations focused on the interactions among group members and also included notes on how student groups approached the assignment itself. In addition, I wrote reflective memos after each work session to capture etic, interpretive data (Creswell, 2004). I also attended most of the school library class sessions and took general field notes during those sessions (reflected in Figure 6 under the heading "Other field notes / meeting notes"). Although I focused on listening for comments related to collaboration and the school librarian's instructional role, I also took general notes about class activities.
- Semi-Structured Interviews: Preservice school librarians were interviewed twice, once between the first and second class sessions of the school library course and again at the conclusion of the project. Pre-project interviews focused on the participants' backgrounds and career aspirations, their understanding of the roles and responsibilities of the school librarian, and their understanding of teacher / librarian collaboration, especially as it related to science content areas. Post-project interviews focused on participants' experiences with and impressions of the lesson plan assignment, their understanding of the roles and responsibilities of the school librarian, and their understanding of teacher / librarian collaboration, especially as it related to science content areas. All interviews were audio recorded and transcribed to facilitate analysis. In addition, I wrote reflective / analytic memos immediately

following each interview to capture etic data representing my interpretation of the interview data (Creswell, 2004). See Appendix A, Pre-Project Semi-Structured Interview Guide and Post-Project Semi-Structured Interview Guide.

- Focus group: Following the conclusion of the lesson plan project, I conducted a semi-structured focus group interview with two PST participants.[3] In this focus group, I asked the PSTs to describe their experiences with the collaboration project, their understanding of teacher-librarian collaboration and science-focused teacher-librarian collaboration, their perceptions of the roles and expertise of school librarians, and how / to what extent they expected to work with the school librarians in their student teaching and professional teaching schools. See Appendix A, Post-Project Focus Group Guide.
- Instructor notes: In his discussion of the rigor of design-based studies, Christopher Hoadley (2004) stated that the researcher "often documents what has been designed, the rationale for this design, and the changing understanding over time of both implementers and researchers of how a particular enactment embodies or does not embody the hypothesis that is to be tested" (p. 204). Before the project began, the instructors documented the designed intervention by preparing assignment instructions and timelines. As the assignment progressed, I took note of any changes that occurred in implementation, reasons for those changes, and proposed changes for future iterations of the assignment.

7.5 Data Analysis

All data were analyzed using the concurrent mixed-methods triangulation design (Creswell, 2009; Tashakkori & Teddlie, 2003), in which qualitative and quantitative data

[3] I had intended to have 8-10 participants in this focus group, however only two PSTs attended the session.

collection occur simultaneously and each data set is given equal weight, consideration, and priority in the final analysis (although this project collected much more qualitative than quantitative data, no single form or source of data was considered to trump another in the data analysis). Each research question was addressed by multiple data sources (see Figure 6), providing triangulation of the conclusions to assist with confirmation, cross-validation, and corroboration of the findings (Tashakkori & Teddlie, 2003). Other methods through which I addressed validity and reliability of these results are discussed at the end of this chapter. Data analysis is discussed further below and organized by research question. A summary of the relationships between data sources, research questions, and data analysis is provided in Table 3, next page. While only certain sources are checked below for each research question, all sources were examined for their relevance to each question.

7.5.1 Research question 1: What do preservice elementary school teachers know and understand about the training, expertise, and collaborative instructional role of the school librarian at the beginning of this project?

Research Question 1 pertained to classroom teachers only, and data sources that addressed this question included the pre-project survey for preservice teachers, work samples (particularly the project wiki), and classroom observations and field notes. Likert items in Part III of the pre-project survey were subdivided into three groups of eight questions each; each group of questions focused on one of the roles for school librarians identified by AASL (information specialist, teacher, and instructional partner). Five options for each item ranged from "strongly disagree" to "strongly agree." Since responses to these items were ordinal, I analyzed this data by determining response frequencies for each question as well as total response frequencies for each set of eight questions.

Table 3 Data Sources, Research Questions, and Data Analysis Summary.

Data Source	RQ1	RQ2	RQ3	RQ4	Sub-Q1	RQ5	Sub-Q1	Data Analysis Summary
Pre-Project Survey	✓		✓			✓	✓	Quantitative analysis of Likert items; qualitative coding of open-response items
Post-Project Survey			✓	✓	✓	✓	✓	
Post-Student Teaching Survey			✓			✓	✓	
Post-Project Focus Group			✓	✓	✓	✓	✓	Transcription followed by qualitative coding
Project Wiki	✓	✓	✓	✓	✓	✓	✓	
Lesson Plan			✓			✓	✓	
Lesson Plan Artifact(s)			✓			✓	✓	
Work Session Field Notes	✓	✓	✓	✓	✓	✓	✓	
Instructor Notes from Work Sessions	✓	✓	✓	✓	✓	✓	✓	
Other Field Notes / Meeting Notes	✓	✓	✓	✓	✓	✓	✓	
Presentation and Peer Feedback			✓	✓	✓	✓	✓	
Pre-Project Interview		✓	✓			✓	✓	
Post-Project Interview			✓	✓	✓	✓	✓	
KEY:								
PST Participants	*PSL Participants*		*All Participants*			*Quantitative and Qualitative Source (all other sources are qualitative)*		

In addition to the quantitative data, this question was also investigated using qualitative coding of the open-response items, classroom observations, and student work samples. Coding followed the constant comparative approach (Corbin & Strauss, 1990; Glaser & Strauss, 1967) in which data is analyzed as collected as well as at the end of the project (Creswell, 2004). The constant comparative method involves the inductive

development of codes from raw data (open coding), interconnection of codes into categories (axial coding), and connection of categories to themes to create a coherent narrative (selective coding). Each round of coding informed the next iteration of data collection and analysis until I achieved a strong theoretical understanding of the project.

7.5.2 Research question 2: What do preservice school librarians know and understand about the collaborative instructional role of the school librarian at the beginning of the project?

This question is similar to Research Question 1 but pertained only to preservice school librarians. Data sources that addressed this question included the pre-project interview and work samples (including the project wiki and researcher / instructor notes). Data related to this question were analyzed using qualitative coding of the interview transcripts, classroom observations, and student work samples. Coding followed the constant comparative approach outlined above.

7.5.3 Research question 3: How does the collaborative lesson plan design project change participants' understanding of the expertise and collaborative instructional role of the school librarian, and what specific features of the project contribute to these changes?

This research question pertained to both PST and PSL participants, and relevant data for this question came from all data sources. Quantitative data related to this question came from the pre- and post-project surveys taken by the PST participants. Questions on Part III of the post-project survey for preservice teachers were identical to Part III questions on the pre-project questionnaire. To assess whether preservice teachers' understanding of the roles of the school librarian has changed over the course of the project, pre- and post-test responses on the Likert items were compared using the Wilcoxon signed-rank test, a nonparametric, paired-samples test appropriate for ordinal data (Burnette,

2010; Lowry, n.d.). Qualitative data, in particular responses to open-ended post-project survey questions, focus group and interview transcripts and any notes taken during or following the focus group and interviews, classroom observations, and work samples also provided insight into this question and were analyzed using the constant comparative method outlined above.

7.5.4 Research question 4: What issues emerge during the collaborative process, and how do the students address those issues?

Research Question 4 involved both preservice teachers and preservice librarians. Data sources that address Question 4 included the open response items on the post-project survey for preservice teachers, the post-project interview for school librarians, the post-project focus group for preservice teachers, work samples, and classroom observations. These data sources were analyzed using the constant comparative method outlined above.

7.5.5 Sub-question 4a: Do any issues emerge during the collaborative process that are specifically related to the science content focus of the assignment, and how do the students address those issues?

This question is related to Research Question 4 and was analyzed using the same data sources and procedures, with specific attention given to any data related to the science content focus of the lesson plan assignment. Specific data sources that relate to this question included open-response item 3 in Part I of the post-project survey for preservice teachers and question 3 of the post-project interview guide for preservice school librarians. However, relevant data also came from other sources. These data sources were analyzed using the constant comparative method outlined above.

7.5.6 Research question 5: How does participants' understanding of teacher-librarian collaboration (TLC) change over the course of this project?

This

question pertained to both preservice teachers and preservice school librarians. Specific data sources that addressed this question included question 2 in Part I of the post-project survey for preservice teachers and questions 7 and 8 of the post-project focus group guide for preservice teachers, as well as question 7 of the post-project interview guide for school librarians. However, relevant data also came from other sources. These data sources were analyzed using the constant comparative method outlined above.

7.5.7 Sub-question 5a: How does participants' understanding of science-focused teacher-librarian collaboration (TLC) change over the course of this project?

This question pertained to all participants and was addressed in the post-project survey and focus group for PSTs as well as in the post-project interviews and presentations for school librarians. Other data sources were also examined for their relevance to this question. These data sources were analyzed using the constant comparative method outlined above.

7.6 Research Quality

Regardless of the research paradigm (qualitative, quantitative, or mixed methods) in which one works, ensuring the quality and usefulness of a study by using accepted standards for reliability, validity, and generalizability (or their qualitative counterparts) is critical. Therefore I will address strategies that I employed related to each of these issues below.

7.6.1 Quantitative reliability and validity. In the context of quantitative data obtained from a survey instrument, reliability refers to the stability of the instrument over time (whether the same results are obtained with repeated administration of the instrument to similar participants) or the consistency of the instrument within a single administration (whether an individual participant answers closely related questions in the same way)

(Creswell, 2004). For this study, stability was examined by comparing the pilot study results and the Fall 2014 results for each survey instrument and obtaining the test-retest reliability (Pearson r coefficient). Consistency was examined using Cronbach's alpha (Cronbach, 1984), a statistical test used to measure the internal consistency (via average correlation) of a set of related items. In this case, each subset of eight items pertaining to the instructional partner, teacher, and information specialist roles of the school librarian was tested for internal consistency using this measure. According to Bonett's (2002) guidelines for determining minimum sample size appropriate for analysis using Cronbach's alpha, a sample size of 19 is necessary to obtain a power of .90 at the .05 significance level for an 8-item set with an expectation of achieving a Cronbach's alpha value of at least 0.70. This sample size was achieved, with 33 and 32 responses to the pre- and post-project surveys, respectively.

When applied to survey instruments, the concept of validity refers to the degree to which data obtained from the instrument make sense, are meaningful, and allow the researcher to draw accurate conclusions (Creswell, 2004). In other words, does the instrument actually reflect or measure the underlying concept of interest (in this case, PSTs' understanding of school librarian roles)? For this study, instrument validity was established in two primary ways. First, many of the questionnaire items were written and field-tested by Judi Moreillon (2008) and Audrey Church (2010). Moreillon's survey was also administered to preservice teachers, and while Moreillon did not report quantitative reliability and validity measurements for her surveys, neither did she report any comprehension or wording issues with any of the items. Where adaptations were made to the existing items, I tried to keep the wording as close as possible to the original item, only editing as necessary for better fit with this project or for alignment with the answer stems. I developed the original items in this

study by examining other documents related to school librarian roles (for example, AASL's *Empowering Learners*) and basing new question stems on role descriptions provided therein. This process helped to ensure that the survey items were consistent with the way each school librarian role (teacher, instructional partner, and information specialist) is described in literature and official school library documents. Both complete survey instruments were examined by two researchers with experience in education and library science. This oversight helped to establish content and construct validity, or how well the instrument's questions represent the variety of questions possible for a given concept and what the instrument is actually measuring. Second, results from this survey were compared with results from similar studies that have investigated preservice and/or inservice teachers' understanding of school librarian roles. This comparison helped to establish criterion-related validity, or whether the results from this instrument correlate with results from other studies already shown to be valid (Creswell, 2009).

7.6.2 Qualitative dependability, trustworthiness, and transferability. The concepts of reliability, validity, and generalizability each have somewhat different meanings in qualitative versus quantitative research. In fact, some researchers prefer to use terms like trustworthiness, believability, authenticity, transferability, or credibility to describe benchmarks of qualitative research quality to distance this research from the positivist, quantitative paradigm (Creswell, 2004; Lincoln & Guba, 1985). Many procedures have been developed for establishing the quality of qualitative research, and I utilized a number of them in this study.

Dependability in qualitative research refers to whether the researcher's approach is consistent across data sources and over time as well as with other researchers (Lincoln &

Guba, 1985). Several procedures were used in this study to establish dependability, in line with Lincoln and Guba (1985), Gibbs (2007), and Creswell (2009): 1) research procedures were carefully documented, 2) I checked the audio transcripts to ensure that no obvious errors were made, 3) I maintained a qualitative codebook containing memos about all codes and their definitions, and 4) members of my dissertation committee served as auditors to ensure that I applied and developed my codes and themes consistently and coherently.

Credibility of a qualitative study is generally interpreted as the degree to which the findings are accurate from the standpoint not only of the researcher, but also of the participants and readers of a research study (Creswell, 2009; Lincoln & Guba, 1985). I used several strategies to establish the credibility of this study:

1. Triangulation: Findings from a variety of sources (both quantitative and qualitative) were compared to build a coherent narrative and justification for research themes (Creswell, 2009; Jick, 1979).
2. Presentation of researcher bias: Creswell (2009) discussed reflectivity, or a researcher's openness about how their own background and identity shapes their interpretation of research findings, as a core feature of qualitative research. Researcher subjectivity inevitably impacts the research process as the researcher's perceptions, judgments, and appraisals will be guided by his or her conceptual framework. Clarifying this bias in research reports "creates an open and honest narrative" (Creswell, 2009, p. 192) and helps provide readers with a deeper context for your findings. In my case, as a former science teacher who did not collaborate with the school librarians at my schools but who saw enormous potential for such

collaborations during my time in the MSLS program at SILS, I bring my own beliefs about the positive value of TLC for science teachers into this research study.

3. Presentation of negative or conflicting information: Since this project (and all design-based studies) took place in the "messy" context of two real classrooms, there were some data and cases that contradicted the overall themes of my findings. Rather than discounting this data, I have presented it alongside the evidence in support of my themes.
4. Auditing of research project and findings: All aspects of this project, from design to implementation to data analysis, have been carefully audited by my academic advisor and dissertation committee, members of which have experience with the methods and concepts explored in this study.

Finally, I have addressed the question of transferability of my findings primarily through the provision of thick, rich description of my study context, as discussed further below. Qualitative studies typically do not aim for generalizability in the same manner as quantitative studies, since these studies place high value on the importance of context and do not seek to contribute universal knowledge (Creswell, 2009; Gibbs, 2007). However, qualitative studies can contribute to broader theory and their findings may be applied in other contexts with appropriate modifications. For this to be possible, detailed descriptions of the research setting are necessary for readers to determine how closely their own context resembles that of the original researcher. I have endeavored to provide such descriptions in this manuscript.

7.7 Limitations and Conclusions

Like any study, this one has limitations. One such limitation, applicable to all design-based research studies, is the potential lack of generalizability (or transferability of the project to other preservice education classrooms). Since this study emphasizes local context, there is no guarantee that study findings are applicable in a different context. However, by providing detailed description of the context in which this study takes place, I have attempted to supply other researchers with the information necessary to determine whether and how this study applies to their own local contexts. Another limitation involves the number of changes to the intervention design from the initial (pilot) implementation to the Fall 2014 implementation. These changes – all based on preliminary data analysis of the pilot project – include:

- providing PST students with additional information regarding the roles and curriculum of the school librarian before the initial work session, in the form of additional course readings;
- moving the first work session later in the semester and requiring groups to use a backward design planning sheet to structure this work session;
- requiring PSL students to post to their group wiki site during the project;
- grouping PST students by topic area (for example, life science or force and motion) instead of by grade level; and
- moving the school library class meeting time to Monday mornings in order for it to overlap with the regularly-scheduled time of the methods course.

Given these changes to the structure of the collaborative assignment, as well as other changes to the course including the addition of an assignment designed to attune students to

their strengths and needs within a collaborative partnership (see Chapter 8), it was impossible in many cases to link specific project design changes to improvements in the project outcomes compared to the pilot implementation. To help address this limitation, I added questions to the post-project focus group and interview guides that asked students specifically about some of the changes (see question number 4 in the post-project focus group guide and question number 2 in the post-project interview guide, Appendix A). I also examined the remaining data, on its own and in comparison to the pilot project data, for any evidence that might indicate the impact (positive or negative) of any changes to the project design.

In addition to changes in the project design, the instructor of the school library course changed. For the pilot implementation of this assignment, I was the instructor of the school library course. However, IRB requirements aimed at ensuring participant privacy and voluntary consent made it necessary for me to hire a third party to conduct the initial interviews and administer pre-project surveys (as the instructor of the course, I could not know who had chosen to participate in the project until after grades were turned in). To avoid these issues in the second iteration of the project and to allow for my full participation in the project as a researcher, I did not teach the school library course in Fall 2014. Instead, the course was taught by my advisor and dissertation committee chairperson, who had taught the course several times prior to the pilot implementation in Fall 2013. As my advisor, she participated in the design of both iterations of this assignment and was knowledgeable about the results from the pilot iteration. The student makeup, particularly of the school library course, also changed from Fall 2013 to Fall 2014. For example, during the pilot implementation of this study, only one student in the course was in her second year of the

SILS program, and this student was not in the school library track. Thus, no students in this course had much prior knowledge of teacher-librarian collaboration. In the Fall 2014 iteration of this course, two students were second-year SILS students in the school library media track, who came in with a greater depth of existing knowledge about the school librarian's instructional role. One other student already had an MS degree in Information Science, had professional experience working with children in a public library setting, and was in the program only to obtain her school library media certification. These changes in the makeup of the course likely had a large impact on students' initial and developing understandings over the course of the semester. Where relevant, I have attempted to indicate in the results and discussion chapters instances where either the change in instructor or PSL students' background knowledge might have impacted the project findings, especially in comparison to the pilot implementation.

An additional limitation of this study is the difficulty of knowing which elements of the context play a role in determining the project's outcomes and should therefore be described and communicated in research reports. Defining and describing the context is critical in a DBR study because one of the main goals of such a study is to develop design principles that might be used in other environments. In order to modify an intervention for success in another context, others need to know how their own setting differs from the one in which the intervention was originally designed and tested. Yet, as discussed above, researchers often fail to consider or describe anything beyond the specific classroom in which they are conducting their research, which ignores the reality that classrooms are nested into systems such as schools, school districts, and local communities, the particulars of which may impact the research and its outcomes (Barab & Squire, 2004; Fishman et al., 2004).

While many possible features of participants' placement classrooms, other courses, school districts, etc. may inform my participants' thinking, logistically, it was impossible for me to collect data on every possibly impactful feature of the context. Thus, one limitation of my particular study is that certain important elements of context that may have impacted the success or failure of the lesson plan assignment will simply be unknown and unknowable. I attempted to compensate for this somewhat during the data collection period by constantly being on the lookout for elements of broader context that did impact the assignment and/or my research questions, and gaining what information I could about that context via the data sources I already had access to – interviews and focus groups, student work samples, surveys, and classroom observations. I also worked to document as much of the visible context of this study as I can, even elements that might seem obvious or inconsequential, since I could not know in advance what elements may prove important or what elements may be present or absent in other contexts where instructors may wish to develop a similar assignment. Finally, the use of activity theory as an analytical lens (see Chapter 9) helped to mitigate this limitation by assuring that meaningful elements of the local context were considered, and by suggesting other contextual elements that might be worthy of consideration for this and other similar projects.

A final limitation of this study is related to the copious amount of data produced by design-based research studies (Collins et al., 2004; Dede, 2004). Herrington, McKenney, Reeves, and Oliver (2007), while arguing that DBR is an appropriate and powerful methodology for use in doctoral dissertation studies, acknowledge that "design-based researchers often cope with the methodological challenges brought forth by serving as designers, advisors and facilitators while working on one design project." These issues are

compounded when data analysis involves not only analysis of the current project iteration's data, but also comparison analysis to previous project iteration data. Simply put, design-based research studies involve an intense amount of work for a single researcher. In the absence of additional researchers to assist with data collection and analysis, there are thus logistical limitations on the breadth of this study that might not be the case if multiple researchers were working on it. In my data analysis, I have attempted to extract the most pervasive themes and findings, and those most relevant to my specific research questions. However, there is no guarantee that another researcher looking at my data could not find additional valuable information related to my topic. To some extent this is an issue with all qualitative studies, where subjectivity in data analysis is an expected and accepted part of research (so long as established criteria for trustworthiness are met, as discussed in Section 7.6 above). However, these issues are magnified by the scope of a design-based research project, and the researcher's multiple roles within that project.

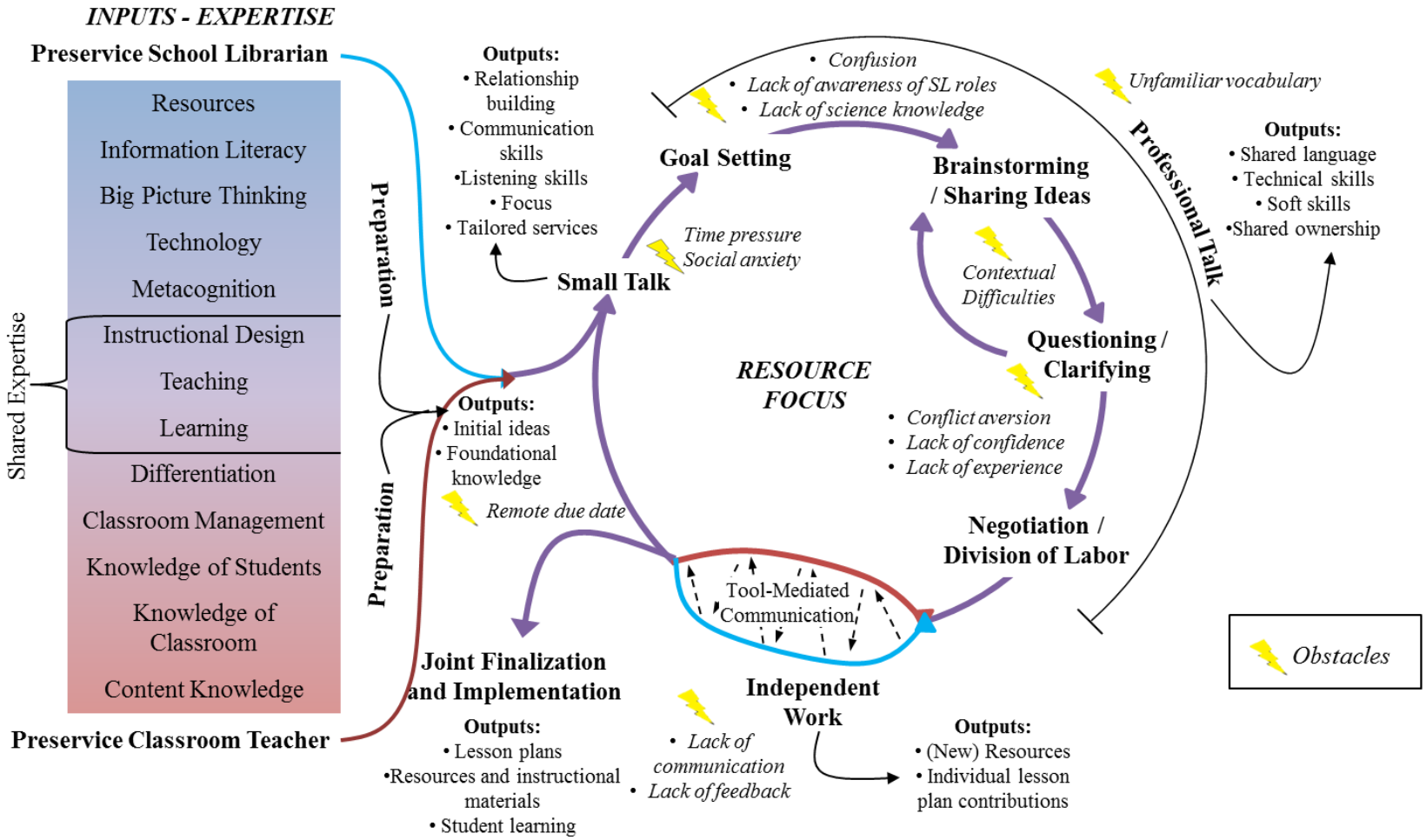
Chapter 8. Results

Findings from all data sources are reported in this chapter and are organized by research question. Within each research question section, results are organized by theme, with qualitative and quantitative data integrated and discussed where relevant to each theme. Appendix B contains a table summarizing the major themes that arose from qualitative data analysis for all questions, a definition for each theme, example text that coded as belonging within the theme, and example codes included in each theme. This chapter also includes a synthesized model of students' progress through the project, a description of project participants, and a discussion of other course experiences (primarily in the school library course) besides the collaborative project which may have influenced participants' understanding of school librarianship and TLC.

8.1 Synthesized model of progress through project.

Based on data from all sources, I created a synthesized model that depicts participants' progression through the project as described by participants themselves and observed by the researcher and instructors. This model is depicted in Figure 7, next page, and I will reference it throughout this chapter where relevant. The process model includes the features listed after the model diagram, each of which will be explained in more detail and supported with evidence as I discuss relevant results. The model is not universal (not all participants experienced all elements) nor is it fully exhaustive (in some cases, participants may have had experiences that are not represented on the model). However, the model does include all major elements and pervasive themes that emerged in data analysis.

Figure 7 Synthesized Model of Participants' Progression Through the Project.



- Inputs: The far left side of the model lists the domains of expertise that participants felt were brought to the collaborative table by PSLs, PSTs, or both.
- Process steps: Based on participant descriptions of the work process and observational data, a series of steps in the collaborative project were identified, named, and placed in order in the cyclical pathway indicated by blue, red, and purple arrows in the model. Red paths indicate PSTs' work, blue paths indicate PSLs' work, and purple paths represent face-to-face collaborative work. Not every participant or group experienced all of these steps in the order indicated; the model represents a simplified and generalized pathway.
- Outputs: Participants noted a variety of outputs at various stages of the project, not merely at the end; observational data and work samples confirmed that outputs were generated throughout the assignment. The model indicates typical outputs resulting from each stage of the work process in bulleted lists.
- Obstacles: Participants, the researcher, and instructors also noted some obstacles that hindered students' progress through the project (or, in some cases, caused tension for the participants, even as they also created opportunities for learning; for more discussion of this, see Chapter 9). These obstacles are represented in the model in italicized text.

8.2 Participants

All students in the undergraduate science methods course agreed to participate in the research study and completed the initial (pre-project) survey. One PST dropped the course after the first week but before the first project work session for a total of 32 participants, all of whom also completed the post-project survey (the pre-project survey from the student who

dropped the course was excluded from analysis). Of these 32 participants, seven were assigned to kindergarten classrooms for their student teaching, six to first grade, six to second grade, four to third grade, five to fourth grade, and four to fifth grade. Student teaching assignments were spread across six local elementary schools. For the purposes of this assignment, PST students were grouped according to the general science content area they would be focusing on for their unit plan. These content areas included Force and Motion; Earth, Moon, and Sun; Weather; Ecosystems; Living Organisms; and Matter and Change. Only two PST students agreed to participate in the focus group, and since one student arrived 30 minutes late, this session essentially became two individual 30-minute interviews. Findings for these interviews are reported below but should not be assumed to be representative of all PST participants. Finally, nine PST participants completed the online follow-up survey, which focused on their experiences with TLC during their student teaching semesters. The low response rate for this survey (28%), while not ideal, is unsurprising given that this survey was sent out months after the end of the project and during the final weeks of these students' undergraduate careers.

Six preservice school librarians (out of seven students in the course) consented to the research study, completed both pre- and post-project interviews, and provided work samples. I assigned pseudonyms to each student as noted in Table 4, next page, which also summarizes each PSL participant's progress toward the MSLS degree and academic and professional background. None of the PSL participants had any academic or professional background in science.

Table 4 Preservice School Librarian Participants.

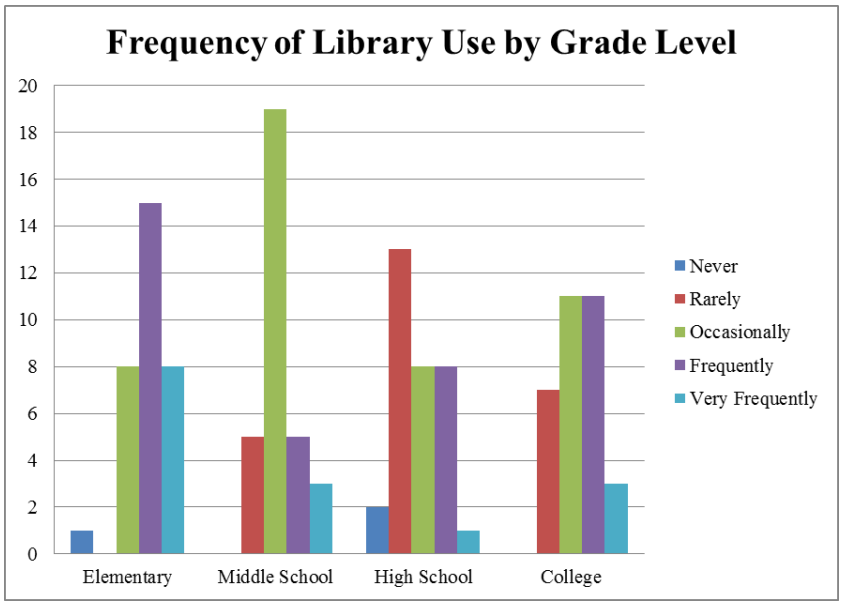
Participant Pseudonym	*Progress Toward MSLS Degree*	*Academic Background*	*Professional Background*
Jane	First-semester MSLS student	B.S. in Middle Grades Education (English Language Arts)	Student teaching (8th grade English Language Arts); Public library internship
Megan	Third-semester MSLS student	B.A. in History and Religious Studies	School library internship
Gina	First-semester MSLS student	B.A. in English with a minor in Economics	Retail experience
Shelby	First-semester MSLS student	B.S. in Political Science	Preschool teacher; Focus group / survey administrator; School library volunteer
Meredith	First-semester certificate-only student	B.S. in Interdisciplinary Studies; M.S. in Information Science	Children's librarian (public library); Data steward for pharmaceutical company
Ellen	Third-semester MSLS student	B.A. in English	English teaching assistant and teaching intern (private high school); Assistant to Head of School (private high school); Academic library reference and research assistant

8.3 Research Question 1. What Do Preservice Elementary School Teachers Know and Understand About the Training, Expertise, and Collaborative Instructional Role of the School Librarian at the Beginning of This Project?

Pre-project questionnaires completed by PST participants provided the majority of the data used to answer this question. Work session observations, the focus group interview, and comments made by PSL participants in their presentations and post-project interviews were secondary data sources that also provided insight into PSTs' knowledge and understandings at the beginning of the project.

8.3.1 Previous experience with school libraries and librarians. PST participants reported that they personally used the library most frequently in elementary school (where 23 or 71.9% of participants reported using the library "Frequently" or "Very Frequently"). Participants reported decreasing use in middle and high school (where only 8 (25.0%) and 9 (28.1%) of students, respectively, reported frequent or very frequent use). Participants reported increased library use in college, with 14 (43.8%) reporting frequent or very frequent use of the library (see Figure 8, below, for a full breakdown of library use by grade level).

Figure 8 PST Library Use by Grade Level



In general, participants did not recall their school librarians playing a key role in their educational experiences during their years as K-12 students. More than one-quarter of participants reported that school librarians only rarely played a key role, while slightly less than one-quarter reported that their school librarians frequently or very frequently played a key role (the remainder of participants stated that school librarians occasionally played a key role). Even fewer participants stated that they regularly observed their classroom teachers working with a school librarian during their K-12 experiences; no participants reported that

they observed this occurrence very frequently, only 12% reported that they observed this frequently, and the majority of participants (54.5%) reported that they never or rarely observed this. However, participants did report somewhat more frequent observations of teacher-librarian collaboration as adults visiting or working in K-12 classrooms; the large majority of respondents (84.8% reported observing teacher-librarian collaboration in this setting at least occasionally. Furthermore, the majority of participants (72.7%) stated that they personally expect to collaborate with a school librarian frequently or very frequently, with only one respondent selecting "Rarely."

8.3.2 Knowledge of school librarian licensure requirements. On the pre-project survey, PSTs were asked "In North Carolina, what do you think is necessary for a person to obtain licensure as a School Library Media Coordinator (school librarian)?" Out of 32 PSTs who responded to this question, only five knew that licensure required a master's degree and only five mentioned an exam. Most respondents stated that participants needed only an undergraduate degree (9 respondents) or simply "a degree" (7) in library science or education. Three students said that licensure required school or education experience, with an additional two responses mentioning a field experience. Only one response mentioned a teaching license. Two respondents said they didn't know. Several responses mentioned knowledge requirements (for example, knowledge of literature, mentioned by three respondents), but respondents didn't specify how that knowledge was to be proven (for example, a degree or exam). One student thought there were no requirements for licensure.

8.3.3 Perceptions of school librarians' expertise. In the pre-project survey, participants were also asked "In what areas would you consider school librarians to be experts?" Responses were listed individually (many participants listed multiple areas) and

similar responses were combined (for example, “digital materials,” “databases,” and “media” were combined as “digital media”). Individual areas listed by respondents were then grouped into categories according to the AASL school librarian role with which they most closely aligned (teacher, instructional partner, information specialist, program administrator, or leader). Areas listed by respondents are summarized in Table 5, below. All participants (N=32) responded to this question.

Table 5 PSTs’ Pre-Project Perceptions of School Librarian Expertise.

Category	*Total Respondents Mentioning This Role*	*Area of Expertise*	*# of Mentions*
Information Specialist	30	Books	23
		Research	11
		Technology	9
		Digital Media	6
		Authors	3
		Digital Resources	1
		Print Resources	1
Teacher	13	Literacy	10
		Content / subject area knowledge	6
		Lesson planning	2
		Story time / Read-alouds	2
		Education	2
		Teaching	1
Program Administrator	11	Organization of library materials	10
		Library space	1

Out of 32 responses, many of which mentioned multiple areas of expertise, the large majority (*n* = 30, 93.8%) included a mention of the Information Specialist role, in particular the school librarian’s expertise with books, research, and technology. Roughly two-fifths of the responses mentioned the Teacher role, most in the context of the school librarian’s expertise with literacy. Approximately one-third of the responses mentioned the Program Administrator role, nearly all in the context of the school librarian’s knowledge of materials

organization (such as book classification schemes). No areas listed by respondents aligned with the instructional partner or leader categories.

Part III of the pre-project survey posed 24 Likert items, grouped into three categories representing the information specialist, teacher, and instructional partner roles (see methods section and Appendix A). These items all began with the stem "School librarians should…" and asked participants for their level of agreement or disagreement with each statement. I conducted Cronbach's Alpha tests to determine the internal consistency of each group of eight items. Values for each group are reported in Table 6, below, and were all above the recommended threshold value of .70 (Cronbach, 1984). Participant responses were assigned a numerical value (1 = strongly disagree, 5=strongly agree) and responses in each category were summed. Respondents indicated the highest level of agreement with statements in the information specialist category, and lower agreement with statements in the teacher and instructional partner categories. Wilcoxon signed-rank indicated that each of these means was significantly different from the others. Results are summarized in Table 6.

Table 6 Summary of Wilcoxon Signed-Rank Tests, Means, and Standard Deviations for Statements Related to School Librarian Roles, Pre-Project

	Information Specialist	*Teacher*	*Instructional Partner*	*M*	*SD*	*Cronbach's alpha*
Information Specialist	—	Z = 4.813 *p* = .000	Z = 4.419 *p* = .000	35.00	3.70	.90
Teacher	Z = -4.813 *p* = .000	—	Z = -2.018 *p* = .044	30.00	4.33	.84
Instructional Partner	Z = -4.419 *p* = .000	Z = 2.018 *p* = .044	—	31.06	3.11	.75

Classroom observations and statements made by preservice librarian participants in interviews and their reflective in-class presentations provided confirmatory evidence for survey data suggesting that preservice teachers were primarily aware of the school librarian's Information Specialist role, and less aware of the teaching and instructional partner roles, at the beginning of the project. Ellen stated that in the first face-to-face meeting with their PST group members, PST students didn't know "why collaboration with a librarian would be helpful or what we could offer to their lessons."[4] Megan agreed, saying that while her group members were very eager to find ways for the school library to be integrated into their instruction, they initially had very few ideas for what forms such integration might take.

The instructor of the school library course opened the first work session by telling PST students that they should expect their school librarians to work with them and provide support for them as teachers by not only providing resources, but also by planning lessons and co-teaching with them. PSL participants were observed reinforcing this idea in the opening minutes of the work session. For example, Jane told her group members that as a school librarian, her job would be to teach information skills through collaboration with classroom teachers. She then walked her group members through the Marcoux and Montiel-Overall models of collaboration, giving them specific examples of TLC at each level and telling them that although "it all counts" as collaboration, she would like to aim for the higher levels of the models.

In addition to statements made by the school library course instructor and PSL group members, PST students were potentially exposed to information about the school librarian's roles as teacher and instructional partner through readings assigned in their course pack and

[4] All participant quotes are reported verbatim, however occurrences of filler words such as "like" and "you know" have been removed for increased readability.

selected by the school library instructor and me (a list of these readings is including in Appendix C). These readings were chosen because they emphasized the teaching and instructional partner roles of the school librarian in what we felt was an accessible and brief format. For example, one of the readings was a one-page newsletter article written by Joyce Valenza titled "Ten Reasons to Hug Your School Librarian" (Valenza, 2004). In this article, Valenza encouraged classroom teachers to "get out of your classroom and collaborate…. Your librarian will teach *with* you. While you present the content you know so well, your teaching partner will help you deliver such transferable skills as information seeking, evaluation, analysis, synthesis, and communication" (p. 6). Although PST students were supposed to have read these articles before the first work session, there is no guarantee that the readings were actually completed (and none of my data directly answers the question of how many PST students read this material).

Most of the discussion observed during the first work session focused on clarifying the assignment itself and setting student learning goals (see Research Questions 3 through 5 for more description of the work sessions). However, in groups that had moved on to discussing specific ways that the school librarian might fit into their lessons, PST students were observed suggesting mainly resource- or book-based contributions from PSLs. These suggestions included finding a book for a read-aloud and developing a student writing exercise based on a nonfiction science book. In the debriefing session following the first work session, Shelby reported that her group members seemed surprised that the school librarians in their placement schools could be a resource for the teachers and could help them with instruction.

8.4 Research Question 2. What do Preservice School Librarians Know and Understand About the Expertise and Collaborative Instructional Role of the School Librarian at the Beginning of This Project?

Based primarily on pre-project interviews, I identified three themes related to PSL's initial understanding of the expertise and instructional role of the school librarian. These themes were *the influence of prior experience with school libraries and librarians, the primacy of the information specialist role,* and *school librarianship as distinct from teaching*. See the Coding Table (Appendix B) for a summary of these themes and their associated codes. It is important to note that because study recruitment was conducted in class for both courses, it was not possible to conduct pre-project interviews before the first day of class (all PSL students were interviewed between the first and second class sessions). The first class session for the school library course focused on the instructional role of the school librarian; for example, it included a group activity in which students came up with lists of the "Top Ten Things Librarians Teach." Readings assigned to PSL students for the first class session also emphasized the instructional role. Thus, PSL participants did have some exposure to the school librarian's teaching and instructional partner roles before I conducted the pre-project interviews.

8.4.1 The influence of prior experience with school libraries and librarians.

Similar to other studies on the career motivations of school librarians (Jones, 2010; Shannon, 2008), PSL participants described how their prior experiences with school libraries and librarians, both positive and negative, led them to consider school librarianship as a career. Nearly all participants recalled positive memories of their school libraries and librarians, especially in elementary school. These memories often focused on books and reading and the

school librarian's role in fostering a love of literacy; as Megan stated, "the things that I remember just all have to do with books." These strong associations between the school library and books drew some participants to the field. Jane, for example, cited her lifelong love of reading and desire to pass that love onto students as the reason she decided to pursue the MSLS degree, while Gina said that she was attracted to the job because of the "mix of getting to do the basics of research but also just getting to give [students] a book."

No participants recalled seeing their school librarian collaborate with a classroom teacher, and Jane was the only participant who recalled using technology in the library. Like the PST participants, several PSL students reported decreasing library use in middle and high school.

Shelby was the only student to report negative previous experiences with her school library growing up. She attended a private religious school with no school librarian where parent volunteers who checked out books to students were "very judgmental" about students' reading choices. Because of this, Shelby developed strong convictions about the importance of equal access and the potential impact of the school librarian; it was precisely her negative experiences with the school library that led her to pursue the career.

8.4.2 The primacy of the information specialist role. Perhaps because of their early experiences with school libraries and librarians as promoters of books and traditional literacy, at the beginning of the project, PSL participants emphasized and seemed most comfortable and familiar with the school librarian's Information Specialist role, communicating in particular the conviction that traditional (print) resource collection and provision remain critical in today's school libraries. When asked what they considered to be the most important part of the school librarian's job, Megan provided a typical response by

stating that in her mind, the job "still has a lot to do with reading instruction and books." Shelby and Gina both discussed resource collection and provision as most important, while Jane's response focused on building students' literacy skills and developing positive relationships with them. Only Meredith went beyond this focus on resources and literacy; although her response included promoting a love of reading, she also listed technology and digital citizenship, teacher support, and facilitating inquiry-based instruction as among the most important parts of the school librarian's job. This difference could be due to the fact that Meredith already had an MSIS degree and professional experience as a children's public librarian, and thus had a different existing knowledge base than her classmates. Meredith was in enrolled in the school library course as part of her work toward obtaining school library media licensure (she was a "certificate-only" student).

One notable addition to the general focus on traditional resources expressed by these students is the concept of the school librarian *as a resource for teachers and students*, as expressed by Ellen and Gina in their pre-project interviews. Ellen repeatedly referred to the school librarian as a resource for both teachers and students, elaborating that because school librarians may have more unstructured time, they can investigate things that teachers may not have time to (like new technology) and through this process "we can be experts not only on the resources we have but also on ways of teaching." Gina echoed this by saying that she was just beginning to learn about "being a resource for teachers" and that she felt like "the librarian could really be the person to help make everything happen." This conception of the librarian-as-resource seems to bridge the Information Specialist and Instructional Partner roles in ways that echo Kimmel's (2012a) description of the ways that school librarians can act as mediators between library resources and instruction.

PSL students' greater awareness of the Information Specialist role (compared to the Teacher and Instructional Partner roles) was further communicated in their pre-project interview responses to the question "How would you describe school librarians' expertise?" Collectively, PSL participants listed ten areas of school librarian expertise; four of these responses (Technology, Books, Research, and Instructional Resources) align with the Information Specialist role. "Teaching and Learning" (listed by three participants) and Literacy (listed by one participant) were the only responses that aligned with the Teacher role. One participant described "Big Picture Thinking" (seeing the connections among content areas and curricula) as a way that school librarians serve as instructional partners. The remaining three areas of expertise mentioned (Professional Growth, People Skills, and Knowing the Students) do not map neatly to any individual school librarian role. These areas of expertise are summarized in Table 7, below.

Table 7 PSL's Pre-Project Perceptions of School Librarian Expertise

Category	*Areas of Expertise*	*Mentioned By*
Information Specialist	Technology	Ellen; Jane
	Books	Megan; Meredith
	Research	Megan; Meredith; Shelby
	Instructional Resources	Meredith
Teacher	Teaching and Learning	Ellen; Gina; Meredith
	Literacy (esp. Information Literacy)	Ellen
Instructional Partner	Big Picture Thinking	Shelby
Other	Professional Growth	Gina
	People Skills	Gina
	Knowing the Students	Shelby

When asked to imagine what a typical day as a school librarian might be like, most participants minimized the teaching role, in one case explicitly. Ellen thought that a typical day would likely include "a lot of behind-the-scenes administrative tasks" and time spent

assisting individual students. While she said there would "definitely" be "some instruction," she went on to say that she had been told by other MSLS students that "maybe that's not as much of a focus as we think it is" for practicing school librarians. Similarly, Gina described the typical day as a mix of consultations with teachers, "kids dropping by," and perhaps "lessons with the librarian about resources and that kind of thing," although she anticipated more individual work with students versus whole-class instruction. Of all the participants, Meredith put the most emphasis on the teaching role, saying that she imagined the school librarian would spend most of the day planning and teaching, either independently or with another teacher, and that assistant staff (if present) could handle most administrative duties. Again, this difference may be attributable to Meredith's more extensive prior experience with librarianship compared to the other PSL participants.

8.4.3 School librarianship as distinct from teaching. In their pre-project interviews, several participants stated that they had initially wanted to pursue classroom teaching as a career but eventually came to the conclusion that school librarianship was a better fit for them. Implicit or explicit in these statements was the conviction that school librarianship is fundamentally different from classroom teaching, primarily in ways that suggested only a limited instructional role for the school librarian. Gina stated that she decided classroom teaching wasn't in her future because of "the intimidation of having kids every day and needing a lesson every day" (implying the school librarian doesn't teach on a daily basis). Jane agreed, saying that the school librarian doesn't "have to be 'on' all the time," and that she preferred the school librarian job because "physically being in front of the kids teaching is probably not [her] best point," despite having a bachelor's degree in middle grades education and student teaching experience in an 8th grade English Language Arts

classroom. Ellen drew a different comparison by stating that in contrast to classroom teachers, school librarians can "be a collaborator with students instead of really being the one who's giving the assignments." She also communicated the opinion that school librarians have more variety in their day and more independence and autonomy than classroom teachers. Megan also noted that the school librarian's job was fundamentally different from that of a classroom teacher, stating in her pre-project interview that while she felt it was "definitely appropriate for a librarian to… suggest ideas…, the teacher is the teacher."

Perhaps because PSL students perceived the school librarian job as entailing less lesson planning and instruction than classroom teaching, and because of their previously-discussed emphasis on and heightened awareness of the Information Specialist role at the beginning of this project, most PSL students were surprised at the emphasis placed on the Teacher and Instructional Partner roles during the first class session for the school library course. In the pre-project interview, which took place between the first and second class sessions of the school library course, Jane discussed how the initial class opened her eyes to the school librarian's roles beyond that of resource provider, saying "I guess the surprise would be not just being there for resources but there to actually teach with other teachers." Megan concurred, saying that although she had already known that technology and collaboration were part of the school librarian's job, she wasn't aware of the extent of their importance before the first class session. Shelby also expressed surprise at the frequency of collaboration between school librarians and classroom teachers, although she clarified that this surprise came, for her, not from the first class session but from her time volunteering in a local school library. Gina described her feelings of both intimidation and excitement related

to her realization that the school librarian can play a major role in teaching and learning in the school.

Meredith and Ellen said they were unsurprised by the emphasis on the teaching and collaborative roles communicated in class, as they were both already aware of these roles. Meredith already had an MSIS degree and public library experience, while Ellen was a second-year student in the program, so it is unsurprising that these two students would have already been aware of the school librarian's instructional partner and teaching roles.

8.5 Research Question 3. How Does the Collaborative Lesson Plan Design Project Change Participants' Understanding of the Expertise and Collaborative Instructional Role of the School Librarian, and What Specific Features of the Project Contribute to These Changes?

All data sources (pre- and post-project PSL interviews, PSL in-class presentations, pre- and post-project PST surveys, the post-project PST focus group, classroom observations and field notes, and work samples) contained themes and findings that were relevant to this question. This question is similar to Research Question 5, which deals with changes in participants' understanding of teacher-librarian collaboration. Considered broadly, many of the results presented below may also address Research Question 5 (and conversely, some of the results presented for Research Question 5 (section 8.8) may be pertinent to this question). However, for clarity, this section will deal only with participants' changing understanding of the school librarian's *expertise and role as a collaborator*, while results addressing students' changing understanding of the *process and definition of teacher-librarian collaboration* will be discussed below with Research Question 5. Results are reported arranged first by participant group (PSTs and PSLs) then thematically within each group.

8.5.1 Preservice teachers.

8.5.1.1 Shift in language. In their post-project surveys, PST participants were again asked "In what areas would you consider school librarians to be experts?" Table 8, next page, summarizes their pre- and post-project responses to this question. As in the pre-project survey, most respondents (n = 28, 87.5%) mentioned areas of expertise that aligned with the information specialist role, including books, technology, and research. However, a striking change in the specific terms used to denote librarians' Information Specialist expertise was evident.

Prior to the start of the project, only one respondent used the word "resources" in her response (the entire response was "print resources at various reading levels, research techniques, digital and electronic resources, classification of books and text."). In the post-project survey, seventeen responses included the word "resources." Although most responses simply listed "resources" with no elaboration, a small number of responses explicitly connected these resources to instruction. For example, one respondent said that the school librarian had expertise in "all subjects because they have to access / evaluate resources, plan and teach lessons, provide insight, etc. in everything in elementary school." Another response noted that school librarians were experts in "finding resources *to help student learning*" (emphasis added).

Both PSTs who participated in the post-project focus group used the term "resources" liberally when describing their experience with the project and what their PSL group member was able to bring to the table. For example, Bree[5] said that in her group, the PSL[6] "gave us a lot of handouts with resources we could use, and she e-mailed me when we weren't in class a

[5] Pseudonym
[6] The PSL is not named because this student chose not to participate in the research study.

Table 8 PSTs' Pre- versus Post-Project Perceptions of School Librarian Expertise

Category	*Total Respondents Mentioning This Role, Pre / Post*	*Area*	*# Mentions, Pre*	*# Mentions, Post*
Information Specialist	30 / 28	Books	23	12
		Technology	9	9
		Research	11	8
		Digital Media	6	2
		Authors	3	0
		Data Collection	0	1
		Graphic Organizers	0	1
		Resources	0	14
		Digital Resources	1	3
		Print Resources	1	2
Teacher	13 / 8	Literacy	10	2
		Content / subject area knowledge	6	2
		Lesson planning	2	3
		Story time / Read-alouds	2	1
		Education	2	1
		Teaching	1	1
		Differentiation	0	1
		Assessment	0	1
		Student Projects	0	1
Program Administrator	11 / 2	Organization of library materials	10	2
		Library space	1	0
Instructional Partner	0 / 2	Co-teaching	0	1
		Collaboration	0	1
Other	0 / 1	All areas	0	4
		Not sure	0	1

few times of really good resources that I could use in my lessons. So that was helpful." Later in the interview, Bree reiterated this when asked what her PSL group member brought to the assignment, saying that the PSL "was helpful with providing a variety of resources, and she sent me a video before my lesson and she included a separate list of resources along with the lesson that she gave me. And it had a lot of different things that I could use, or use some of them, use some of them together." Likewise, Abby (the other PST focus group participant)

said that for the second work session, her group's PSL "had resources that she found… we were doing life cycles, and she had some good lesson plans and unit plans that had already been made, and resources that I really liked, and that we talked about. So that was helpful."

Notably, the focus on resources in post-project survey responses to the question about school librarian expertise overshadowed mentions of the teaching and program administrator roles, which decreased between the pre- and post-project surveys. Only two respondents mentioned literacy or content area knowledge as domains of school librarian expertise in the post-project interview; these were mentioned by ten and six respondents, respectively, in the pre-project survey. Similarly, only two respondents mentioned organization of library materials in the post-project survey, compared to ten in the pre-project survey. Two students did mention either co-teaching or collaboration as domains of school librarian expertise in the post-project survey; these two responses were the only ones that portrayed school librarians as having expertise related to the instructional partner role. Responses to this question in the post-project survey were, on average, shorter than the pre-project survey responses (an average of 7.6 words per response on the post-project survey compared to 10.6 words per response on the pre-project survey); this could indicate a narrower perception of school librarian expertise after the project but could also simply be a result of fatigue with the project or the course, or a desire to finish the survey as quickly as possible. The decreased focus on the teaching role observed in the data for this question might also be a result of the fact that most PST students did not actually work with their PSLs on a lesson plan that included a teaching role for the school librarian; this will be discussed further below.

8.5.1.2 Librarians have resources and librarians are resources. In the post-class survey and interviews, PST participants discussed resources in two ways: physical or digital

resources that the school librarian finds, has access to, or shares; and the librarian herself as a resource for teachers. This trend was most clear in post-project survey responses to the question, "What was the most important thing you learned from the collaborative lesson plan design project?" Half of the responses to this question focused on either the role that school librarians can play in finding or sharing resources (12 responses) or the role that school librarians can play *as* resources for teachers (5 responses). Among responses in the first category were: "I learned of the extensive ways librarians can assist in lesson planning! There are a variety of resources they are aware of and willing to share;" "Librarians have a lot of great resources to help make lesson plans better and more interesting for students;" "Librarians can offer you different resources even when you don't think so;" and "Librarians are helpful in creating plans for the classroom. Librarians have many resources to share."

Responses that mentioned the school librarian as a resource included: "Librarians are valuable resources when planning lessons;" "librarians can be a wonderful resources for classroom teachers if they have effectively communicated;" and "collaboration with specialists in classrooms can make your life a lot easier as a teacher, as they are great resources with a lot of knowledge to share."

Two responses referred to the school librarian as both having resources and being a resource: "[School librarians] are a great resource for teachers to collaborate with when we need resources," and "Librarians are a great resource that I had never first considered! They can not only teach but introduce me to new resources I had not known before." As discussed above, the two students who participated in the post-project focus group discussed resources extensively; these students did not label the school librarian herself as a resource but instead focused on the school librarian providing or creating resources.

8.5.1.3 The collaborative instructional role.

Quantitative data from the Likert-scale items in Part III of the pre- and post-project surveys, as well as qualitative data from open-response survey items, interviews, and observations, provide evidence that PSTs did increase their awareness of the school librarian's teaching and instructional partner roles over the course of the project.

As discussed above, Part III of the both questionnaires posed 24 Likert items, grouped into three categories representing the information specialist, teacher, and instructional partner roles (see methods section and Appendix A). In the pre-project survey, respondents indicated the highest level of agreement with statements in the information specialist category. There was less agreement with statements relating to the teacher and instructional partner roles. Wilcoxon signed-rank tests indicated that each of these means was significantly different from the others.

Cronbach's Alpha tests were conducted on each set of eight items in the post-project survey to determine internal consistency. Cronbach's Alpha values are reported in Table 9, next page, and were all above the recommended threshold value of .70 (Cronbach, 1984). Respondents once again indicated the highest level of agreement with statements in the information specialist group, with lower levels of agreement for statements in the teacher and instructional partner groups. Wilcoxon signed-rank tests indicated that each of these group means varied significantly from other group means. See Table 9, next page, for a summary of these results.

Mean levels of agreement for statements in all three groups increased between pre- and post-project survey administrations, however paired sample t-tests indicated that this

difference was only statistically significant for the instructional partner group (see Table 10, below).

Table 9 Summary of Wilcoxon Signed-Rank Tests, Means, and Standard Deviations for Statements Related to School Librarian Roles, Post-Project

	Information Specialist	*Teacher*	*Instructional Partner*	*M*	*SD*	*Cronbach's alpha*
Information Specialist	—	Z = 4.711 *p* = .000	Z = 3.940 *p* = .000	35.94	3.69	.92
Teacher	Z = -4.711 *p* = .000	—	Z = -4.031 *p* = .000	30.87	3.68	.76
Instructional Partner	Z = -3.940 *p* = .000	Z = 4.031 *p* = .000	—	33.06	4.12	.89

Table 10 Comparison of Pre- and Post-Project Levels of Agreement By School Librarian Role, Paired Samples T-Tests

	Mean Difference (Post – Pre)	*t*	*df*	*p*
Information Specialist	1.01	1.80	30	.082
Teacher	1.12	1.57	31	.127
Instructional Partner	2.22	3.73	31	.001*

Note. *$p < .01$

Wilcoxon Signed-Ranks tests were conducted on each individual item in the instructional partner category to determine which particular questions accounted for the observed increase in agreement within this group. These tests indicated significant increases in levels of agreement for question numbers 18 (Z=-2.13, p = .033), 19 (Z=-2.78, p = .005), 20 (Z=-2.55, p = .011), and 22 (Z=-3.00, p = .003). The text of these four questions read:

> 18. School librarians should help classroom teachers design and plan lessons and units of instruction.

19. School librarians should co-teach lessons and units of instruction with classroom teachers.

20. School librarians should assess students' learning on projects in which they have taught some or many components.

22. School librarians should attend classroom teachers' planning and Professional Learning Committee meetings.

Observational data and PSL interview and presentation data show that each of these question foci – lesson planning, co-teaching, assessment, and attendance at planning meetings – was discussed in the face-to-face work sessions and/or explicitly included in the handout and readings that were provided to PST students prior to the first work session (the handout is included in Appendix C, along with citations for the readings assigned to PST students).

PST participants also expressed their increased awareness of the school librarian's collaborative instructional role via their responses to the open response post-project survey item, "What was the most important thing you learned from the collaborative lesson plan design project?" More than two-fifths of the respondents discussed the school librarian's potential role in working with the teacher to either plan or teach lessons. Responses included:

- "Librarians and teachers can collaborate together to create lessons that reinforce the curriculum."

  "Librarians can help with more than just finding books. They can help planning lessons with a variety of resources."
- "That we CAN collaborate. There is so much for teachers to cover in terms of standards, and knowing there is an expert willing to help instruct is amazing!"

- "Librarians will co-teach with us to help students learn important skills like research, data collection, using resources, etc."
- "I learned that school librarians do a lot more than I had ever thought. I didn't know they were certified teachers."

In their presentations and post-project interviews, PSL participants also described how their group members' perceptions of the school librarian changed over the course of the project. Despite an initial focus on resource provision, PSL participants stated that their PST group members were enthusiastic and open-minded, willing to expand their initial perceptions of the school librarian's instructional role. Jane expressed this when she stated that her group members "accepted it really quickly that I wasn't just there for resource lists…. they definitely jumped more to a 'what lessons are we going to do,' more than 'what books are you going to give me?'"

8.5.2 Preservice librarians.

8.5.2.1 Pre-project expectations. In the pre-project interviews, PSL participants discussed their initial expectations of the collaborative lesson plan project and enumerated the understandings they felt they would need to develop in the school library course to have a successful experience with the project. Each PSL participant had a unique set of expectations for the project:

- Ellen expected to gain a greater understanding of what the education students could bring to the project and how they approach lesson planning.
- Gina expressed excitement at the project's applied, authentic nature: "I feel good about this program because they're willing to let us go out and collaborate with other students and really... dig our teeth into what we're going to be doing. So I'm really

excited about it. Just because, as of now, of all my classes it's the closest to what I want to do in my career."

- Jane expected the project to help her shift her perspective from that of a classroom teacher to that of a school librarian. She hoped to be able to work on an inquiry-based astronomy lesson.
- Megan hoped she could work on a lesson that was more than simple resource provision.
- Meredith hoped that there would be clear expectations for the PSTs and the PSL.
- Shelby expressed excitement about the project and expected it to be very practical. She also hoped to develop an understanding of the lesson planning process and how school librarians can support that process.

In order to fulfill these hopes and positive expectations, participants expressed the need to learn a variety of skills and to acquire new knowledge in a number of domains. Among the skills listed as important to learn were writing lesson plans; knowing when to "step in" and when to "step back" in collaborative partnerships; how to address information literacy standards and content area standards in the same lesson; how to approach and communicate with teachers; and how to find resources that align with standards and are age-appropriate. PSL participants also expressed the need to gain knowledge related to curriculum, theories and models of teaching and learning, day-to-day school procedures, and teacher-librarian collaboration (specifically, participants felt they needed to see specific examples of collaborative lesson and unit plans).

8.5.2.2 Changes in understanding. As discussed above in the results presented for Research Question 2, at the beginning of the project PSL participants described their

understanding of the school librarian's job as 1) focused on the Information Specialist role, particularly the selection and provision of traditional (print) resources for literacy instruction, and 2) distinct from classroom teaching in ways that minimized the school librarian's active participation in lesson planning and instruction. Over the course of the project, PSL participants maintained their conviction that resources are central to the school librarian's job, however their understanding of the role that resources play in the school library program and how school librarians mediate those resources shifted in ways that illustrate a broadened understanding of the school librarian's instructional roles. Similarly, while PSL participants still viewed the jobs of school librarian and classroom teacher as distinct at the end of the project, their delineations between these two professions changed to reflect new understandings of the school librarian as an instructional leader within the school (see Appendix B, Coding Table, for codes that related to these changes in understanding).

Whereas before the project, PSL students discussed library resources predominantly in the sense of "just getting to give [students] a book" (Gina, pre-project interview), in their final reflective in-class presentations and post-project interviews these students demonstrated a nuanced understanding of how library resources can be catalysts for professional development, advocacy tools, and segues into deeper practice of the instructional partner role. Gina described how a discussion about resources in her group became an opportunity for her to provide impromptu professional development for her group members via dialogue about how multimedia resources (in this case, a video) can provide differentiation and scaffolding for students who might not understand the spoken narration if presented in text form, but could understand it with the aid of sound and images. Gina also discussed how the process of searching for instructional resources for one of her lesson plans improved her own

understanding of the backward design model in that she needed to consistently compare the resources she was finding with the student learning goals she and her group members had identified in the first work session. Megan described how one of the resources she created for her lesson plans – a student assessment rubric – was unfamiliar to her PST group members and how she felt like that was one instance where she was able to contribute to their learning: "that was something that my teachers weren't really familiar with either and they thought it was really cool when I talked about it and introduced it to them." Similarly, Meredith reported that both she and her group members were able to learn about Smart Board technology during one of the work sessions when Meredith was able to find tutorials and a free software download from the Smart Board website to share with her group members. Jane reported that in addition to student resources, she found some high-quality resources for the teachers that might improve their background knowledge related to the science content they were teaching.

Interestingly, no PSTs mentioned anything related to professional development in their post-project surveys or the focus group interview. For example, no PSTs mentioned learning about rubrics, SmartBoards, or primary sources, despite the fact that PSLs reported using resources to teach them about these topics and I observed such teaching taking place, and no PST mentioned PD as an outcome or goal of collaboration. In the school library course, the instructor emphasized to PSL students that effective professional development is often "seamless" and "immediate, tied to what [the teachers] are doing" in the moment. She acknowledged that such professional development "doesn't even look like PD, but it is." PSL participants reported success in delivering such seamless and subtle PD, but it seems that the PD may have been so subtle that PSTs were not aware of it at all.

Several PSL participants also discussed the function of resources and resource provision in advocating for the school library program and initiating deeper practice of the school librarian's instructional role. For example, Megan described how her provision of a Venn Diagram for one lesson led to her PST partner asking if the school librarian could "teach that to kids and model it" – in other words, resource provision led to a request for the school librarian to assume a teaching role. The following extended quote from Ellen's in-class presentation elaborates on this idea:

> I thought that there was a really nice partnership when doing resource provision, because the teacher was the content expert; the librarian was an expert at finding and evaluating information. I thought this… emphasized to me that the teacher doesn't just say, I'm doing a unit on weather, and the librarian pulls all of the weather books that they have. There's really a conversation between the two. And because the education students were used to thinking of us as resource providers, I felt like creating book and electronic resource lists are a way to build trust while also nudging them to a broader understanding of what we could offer. And this was a clear way that we could use both of our strengths in the collaboration. I also felt like, kind of jumping off that idea of creating resource lists, that creating tools to facilitate student learning was another great way to sort of get in on the instructional role. And I found that, because creating graphic organizers seemed like a form of resource provision to [the education] students, that was a really great way to sort of push the collaboration forward and become an instructional partner by providing instruction in how to use the resource.

Rather than focusing on resources solely for their importance in students' literacy or subject area content knowledge development, by the end of the project students also viewed resources as critically important to the successful practice of the school librarian's collaborative instructional role. These quotes and examples also demonstrate a changed understanding of school librarian expertise in relation to resources; rather than simply being an expert on finding resources or matching resources to students, PSLs viewed school librarians as experts *in instruction* who leverage resources to communicate and share that expertise. With that said, two students seemed apologetic in their post-project interviews about their continued emphasis on resources as central to the school librarian's job. Megan

said that one of the school librarian's most important roles was that of "resource provider, and that is important and we sometimes push that aside, but I think it is important." Similarly, Ellen said that she felt the most valuable thing she brought to the collaborative partnership in her group was instructional resources, however she then apologized, saying "I know this was, like, not the goal – to provide resources."

PSL students' changed understanding of the scope of school librarians' instructional roles and their domains of expertise is further illustrated by their changed opinions of how the school librarian's job differs from that of a classroom teacher. Shelby demonstrated her new perception of the distinctions between school librarianship and classroom teaching in her presentation, when she said that "the library is not [the school librarian's] classroom" and described her realization during the project that "the school librarian really has the whole school instructional role." Likewise, Ellen described the school librarian as having a bigger picture of teaching and learning in the school than a classroom teacher, explaining that "because the school librarian has a broader view of the curriculum and is a little bit more distant from the content, they can focus on the instructional design process more and make sure that the learning goals are identified first." Megan echoed this idea by explaining how the school librarian is uniquely positioned to support the entire curriculum by teaching information literacy, which overlaps with and supports all other content area standards. Jane summed up her new understanding of the school librarian's instructional role by stating "I feel like I'm still going to be a teacher, just not so much in the classroom sense."

When asked in their post-project interviews what they felt the most important part of the school librarian's job was, all participants' responses focused on the Instructional Partner role (in contrast to the pre-project interviews, in which most responses to this question

focused on the Information Specialist role). Shelby noted explicitly that her understanding of what was most important had shifted over the course of the semester from resource provision to "making the curriculum more robust and meaningful for students." Megan and Meredith's responses to this question also included a mention of student learning as the ultimate goal of school librarians' work. Gina's response highlighted her new understanding of the school librarian as not only an instructional partner, but a leader in the school; she said that school librarians should be "that kind of beacon that all the teachers know that they can come to if they need to know something about how to write a better lesson plan or how to improve as a teacher."

8.5.2.3 Project features that contributed to changed understandings. Students were asked directly which features of the project they found particularly helpful; in addition, data related to this question was obtained from answers to other interview questions, PSL presentations, and observations. Project features that were identified as contributing to observed changes in PSL students' understanding of school librarians' expertise and the collaborative instructional role can be divided into three categories: tools, models and frameworks; emotional support and realistic expectations; and student grouping.

Tools, models, and frameworks. A number of physical and digital tools contributed to PSL students' developing understanding during the project. As discussed above, instructional resources that PSL students located for their group members (including books, websites, and videos) played a critical role in the initiation of instructional partnerships and provided entry points to professional development for both PSL and PST participants. PSL students noted that collaborative planning worksheets, particularly the backward design planning sheet that the school library instructor suggested they use with their group members to structure the

first in-class work session, were not only helpful in facilitating the work session but were also helpful in terms of extending their own understanding of how, specifically, the collaborative instructional role might be implemented. In addition, several PSL participants noted that the model lesson plans and other specific instructional resources provided or discussed in the school library course were helpful in terms of improving their understanding of what TLC (specifically, science-focused TLC) might look like in practice. Ellen and Meredith also reported that they shared these sample plans with their PST group members as a way to provide their group members with concrete ideas. The examples specifically cited by the PSL students as helpful included:

- one student work sample from the Fall 2013 iteration of this project,
- Model Curriculum Units (MCUs) created using backward design principles by the Massachusetts Department of Elementary and Secondary Education (http://www.doe.mass.edu/candi/model/), and
- the National Science Digital Library website (https://nsdl.oercommons.org/).

PSL students described the backward design lesson planning framework (Wiggins & McTighe, 1998), taught to students in a class session on instructional design, as particularly helpful to them in terms of developing their own understanding of the collaborative instructional role, facilitating their personal progress through the assignment, and navigating the in-class work sessions with their group members. In her presentation, Gina said "The most important thing I learned about instructional design is this – the monster of backwards design." She went on to explain how the backward design framework was challenging to carry out in practice because she found herself wanting to adjust the student learning goals as she found interesting resources that didn't align with the original goals, but she felt that her

persistence in sticking to the original goals was rewarded by a superior product. I observed Meredith explaining backward design to her group members, and she hewed closely to the planning sheet to focus her group meetings, referring back to the student learning goals her group had identified repeatedly throughout both work sessions. Megan discussed the value of the backward design framework and the focus it provided to her group's first work session:

> I thought it went really well to start with the question "what is it that we want to do with this unit," and in fact I thought it was pretty easy…. If I asked them, "What do you actually want to accomplish with this? What are we actually teaching?" they reeled off the standard, and I was like "OK, so what question is that actually asking students to learn – what's the big idea we're going for?" And they were able to do that, I think because they had no ideas previously about activities that they wanted to do…. I was surprised at how easy it was to use backwards design starting from scratch.

Shared mental models of best practices for instructional design between the two groups of participants can also be considered a tool that was helpful for them in navigating the project. As mentioned in Chapter 7, both courses teach the backward design framework and emphasize inquiry-based teaching and learning as a way to focus students and educators on the "so what" of instruction. This shared course content created an initial pool of common language and understanding for the participants to draw on during the first work session (although this shared vocabulary did not extend to all elements of the project; a lack of common language in other components of the assignment created some challenges for participants – see the discussion of results for Research Question 4, below). During the debriefing session for the first work session, several students explicitly mentioned observing areas of overlap in what they had learned so far in their course and what the PST students were learning or had learned. For example, Gina mentioned that her group members were already thinking beyond the standards to the "so what" of instruction (how will their instruction matter to the elementary students outside of school?). (After she said this,

however, several other students noted that their group members were not focusing on these broader implications, so Gina's experience should not be seen as typical). Jane noted that her students seemed to have a good grasp of inquiry-based instruction, although the instructional ideas they suggested were not always inquiry-based.

Emotional support & realistic expectations. In the first (Fall 2013) iteration of this assignment, one theme that emerged from interviews with and observations of PSL students was stress and frustration related to the project. Specifically, school library students who participated in the first implementation of the project reported frustration related to their PST group members being unprepared to engage in productive work during the first work session (in most cases because they did not yet have all of the necessary information from their supervising teachers about the content they would be focusing on for their unit plan). One PSL student explained,

> I think the school librarian needs to know that they're – when we went in with those, what were they called, the planning sheets? That you're not gonna get all your questions answered…. You're not gonna be able to ask them, they're just gonna be like "I don't know, I don't know." But be like – "Hey, tell me what you do know and I'm gonna write that down and we're gonna go from there. (Participant 2, Post-Project Interview, Fall 2013)

Similarly, another participant said that future iterations of the assignment should include a "disclaimer that you know, you can't predict how much your partner's going to help you. And some may have better experiences than others" (Participant 7, Post-Project Interview, Fall 2013). In the debriefing session with PSL students following the first work session in Fall 2013, I noted that the students expressed anxiety related to how little they felt they had accomplished in the first work session.

To attempt to lessen students' stress and frustration in the second iteration of the project, a number of changes were made to the design. The first work session was pushed

back two weeks so that PST students might be more likely to have received the requisite information from their supervising teachers before the groups met. Instead of having PSL students choose any collaborative planning sheet to structure their work sessions, we required them to use the backward design planning template (Appendix C), in part because this was the instructional design method taught to PSL students in the school library course and in part because we felt that groups should be able to identify relevant standards and create student learning goals even if the PST students didn't yet know all of the details about their unit (e.g. how many days they would be asked to spend on the unit, what instructional technology would be available to them, or whether there were existing curricular materials they would be expected to integrate).

Using the backward design planning template as a guide, the school library instructor encouraged PSL students to only focus on identifying student learning goals and relevant standards during the first work session. Based on the experiences of students in the Fall 2013 course, the instructor and I also warned students prior to the first work session that their group members may not have thought about the assignment yet and may not have all the necessary information to engage in planning student activities during their first meeting. As a class, the students discussed strategies for how to deal with those possibilities, including:

- asking questions to elicit the information their group members did know (e.g., how is science typically taught in your classroom?),
- focusing the session on student learning goals rather than activities,
- spending some time discussing in general terms the potential forms that teacher-librarian collaboration could take and what the school librarian might contribute to a lesson or unit plan, and

- jointly developing a list of questions that PSTs could answer between the two work sessions (e.g., what instructional technology might be available for my students?).

In addition to the structural changes made to the assignment, the instructor of the school library course and I also provided explicit emotional support and encouragement to students throughout the project. For example, during her pre-project interview, Shelby expressed anxiety related to the age difference between herself and her group members and how she felt her group members may be disappointed to be grouped with an older PSL. I related to her that another second-career PSL student had expressed the same anxieties last year but had an excellent experience with her group members, who appreciated her experience and professionalism. When introducing the assignment during the first class session, the instructor of the school library course made sure to emphasize the support and scaffolding that students would receive to help them be successful with the project. Students noted that this support was particularly helpful to them; Ellen noted in her pre-project interview that "[the school library instructor] did a good job of making it feel like we were all a team… So that made me feel better." Megan concurred, saying "I think I was really encouraged after talking about it with [the school library course instructor]. I mean, when I looked first at the syllabus I was a little bit horrified. But after talking about it with her, she made it seem like it was really a plausible thing, and something that the students who we're gonna be working with would hopefully want our help and want to work with us, rather than think it was annoying that they had to."

Emotional support and scaffolding were also provided during the debriefing sessions following each face-to-face work session. During these sessions, PSL students were given an opportunity to share their concerns, challenges, and questions with their classmates, the

instructor, and me, and we worked collectively to address those items as they arose. For example, in the first debriefing session, Ellen reported that she "kind of failed at the big level thing" (maintaining her group's focus on student learning goals versus specific activities). Jane responded that she was dealing with the same challenges, and the course instructor suggested some specific strategies that PSLs might take to help refocus their group members on student learning outcomes.

A final factor that contributed to changed participant understanding was student grouping. Megan noted that grouping the PST students by topic area allowed each PSL to experience writing plans for different age groups and emphasized the cyclical nature of the science standards. In the first work session, Shelby's group spent time reading the relevant standards for each PST's unit plan and comparing the force and motion standards between grade levels. At one point in that process, Shelby realized that the standards were connected from grade to grade, and she said "Each year the standards build on each other – I love that!" Gina discussed how her realization that the science standards are cyclical helped to relieve some stress for her because it reminded her that the students would be exposed to this content again, and that therefore she didn't need to push her group members to extend their instruction beyond the confines of the specific standard they were addressing in their lesson. This practical exposure to the scaffolded, cyclical nature of the elementary science curriculum, attained by grouping PST students by topic area, contributed to the librarians' developing understanding of the school librarian as a "big picture" thinker who is able to see connections across curricula in ways that an individual teacher might not.

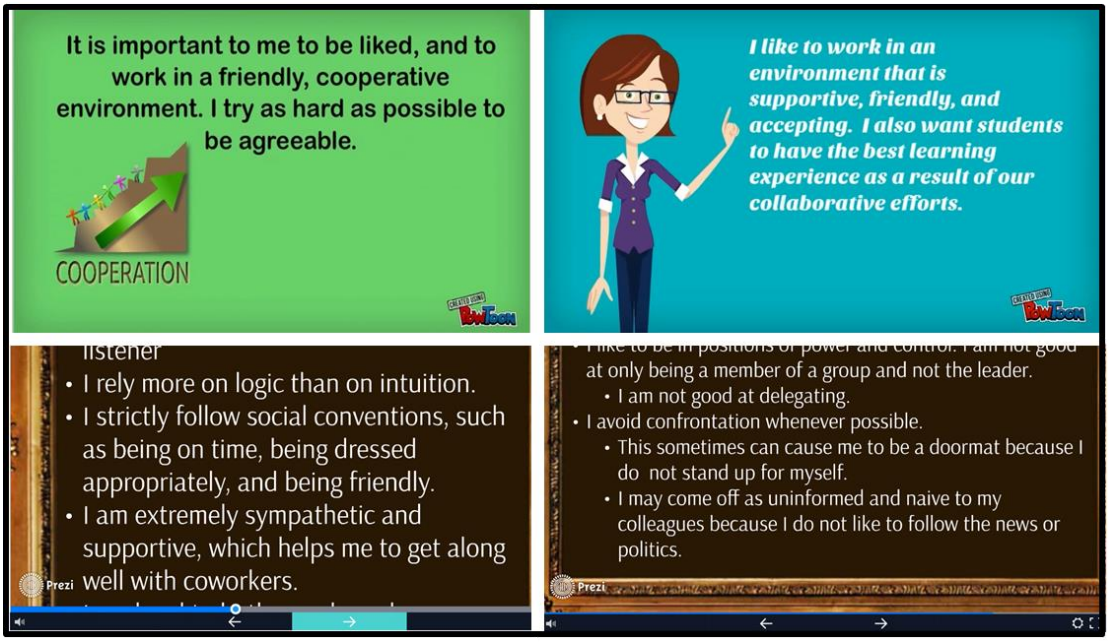
8.6 Research Question 4. What issues emerge during the collaborative process, and how do the students address those issues?

In their in-class presentations and post-project interviews (for PSL students) and focus group and post-project surveys (for PST students), and through observational and work sample data, four main themes were identified as points of tension or obstacles experienced by students as they progressed through the project: conflict avoidance and social norms; communication and feedback; confusion; and contextual factors. There was significant overlap in issues identified or discussed by PSL and PST participants, so rather than dividing this section by participant group as above, I will instead discuss the impact of each issue on both sets of participants together. Before discussing each of these themes, it is important to note that while in some ways these issues represented obstacles to successful and efficient completion of the project, in other ways they served as catalysts for deeper learning among participants (consistent with the constructivist approach to teaching and learning and the idea of cognitive dissonance, discussed in Chapter 5). The role of these tensions in driving the entire project forward and helping to generate understanding among participants is discussed in more detail in Chapter 9.

8.6.1 Conflict avoidance and social norms. In pre-project interviews, PSL participants were asked if they had any concerns related to the project; they were also asked what they felt their weaknesses were related to collaboration. In addition, PSL students completed an individual "Portrait of a Collaborator" assignment (Moreillon, 2015) at the beginning of the semester to identify their personal strengths and weaknesses related to collaboration as well as their work preferences when working with others (the instructions for this assignment can be found in the course syllabus, Appendix C). A strong theme that emerged from these data sources was participants' social anxiety related to conflict, as well as their desires to be liked by their collaborative partners. In the pre-project interview, Ellen

said “I think my anxiety comes in, in that everyone’s so busy, I hope I’m not being annoying and pushing myself on people.” She went on to state that she’s “not very good with conflict.” Gina, Megan, and Shelby all expressed similar concerns in the pre-project interview. PSLs also stressed conflict avoidance, adherence to social norms, and the importance of working in a “friendly” collaborative environment in their Portrait of a Collaborator assignment (see Figure 9, below). In this assignment, Meredith expressed her preference for working in a “supportive, friendly, and accepting” environment. Megan agreed, saying that “it is important for [her] to be liked, and to work in a friendly, cooperative environment.” She added that she tries “as hard as possible to be agreeable.” Gina described how she “strictly follow[s] social conventions, such as being on time, being dressed appropriately, and being friendly,” and how she “avoid[s] confrontation whenever possible.”

Figure 9 Conflict Avoidance in *Portrait of a Collaborator* Assignments. Figure depicts excerpts from Megan (top left), Meredith (top right), and Gina’s (bottom) *Portrait of a Collaborator* assignments.



This preference for conflict avoidance and adherence to social norms of politeness is in line with the idea that collaboration among educators is about "feeling good and liking others," one of the pervasive myths about collaboration as described by Marilyn Friend (2000, p. 131). This played itself out in the project in a number of ways, and is represented in the synthesized model of students' progress through the project (Figure 7) as an obstacle in the "Questioning / Clarifying" and "Negotiation / Division of Labor" phases. Several PSL participants indicated that their desire to avoid conflict made them reluctant to critique their group members' lesson ideas or to "nudge" those ideas toward inquiry-based instruction, as the instructor had emphasized in the school library course. For example, Shelby explained that "wanting to be positive in the relationships made it sometimes harder to remember to come back and go, 'well that is an awesome idea, but it doesn't maybe work to answer this….' Helping others is great, and I realized that my desire to help these students sometimes actually interfered with me nudging them and pushing them." Similarly, Ellen noted, "I have high expectations for myself and others, but I felt like this was bound by my desire to avoid conflict and not impose, and so sometimes I think my fear of being controlling can prevent me from sharing my ideas fully."

Gina avoided conflict in the project as well, failing to nudge group members who were reluctant to incorporate technology into their lesson in one case and teachers who she felt were misinterpreting their science standard in another case. The group members who didn't want to incorporate technology stated that they didn't want to lose the class time to teaching the technology skills. In her in-class presentation, Gina said that "because I was nervous about the whole experience, I kind of was just like, 'yeah, that might take too much time.'" Later, in her interview, she elaborated that she felt like her lack of experience with

lesson planning, teaching, and collaboration resulted in a lack of confidence advocating for her ideas; however, in hindsight, "I definitely think I could have – not pushed, but you know, nudged or explained how it could work, instead of just agreeing that, oh yeah, that's not a good idea." In a nearly identical circumstance, one of Jane's group members rejected a lesson plan idea that involved students working with Microsoft Word: "one of my teachers e-mailed back and said that [her students] probably didn't know how to use Word yet. And, you know, because I was kind of nervous I was like, 'oh, we can change that,' when I probably should have said, like 'well we need to teach them how to use Word, because they'll need to learn how to do that.'" Lack of confidence and lack of experience are represented as obstacles in Figure 7 (the synthesized model) in the Questioning / Clarifying and Negotiation / Division of Labor phases.

Megan did not report experiencing any conflict in her group, however she attributed this to conflict avoidance not only on her part but also on the part of her PST group members. In her post-project interview, she described the face-to-face work sessions as follows: "Even in that first meeting when they didn't really know what was going on, they were trying really hard to accommodate me, to the point where I almost felt bad… They didn't question anything, there was no, like, 'what's the point of this, how are you writing the lesson?' – some of the comments that the other people in our class said about being questioned didn't happen to me." Notes taken in the school library course during the debriefing session following the first work session provide additional evidence that conflict avoidance may have been practiced by PST students as well as PSL students. In the debriefing, Shelby and Ellen discussed how their group members kept apologizing for not being more prepared and not knowing the answers to questions; they both mentioned that this got in the way of progress

during their first session by taking up time that could be spent working on the project. Shelby also mentioned that some of her PST group members discussed how they felt bad about "interrupting" their supervising teachers to ask them for the information they needed to complete the assignment, suggesting that participants' conflict avoidance had implications beyond the immediate context of the project.

8.6.1.1 How students addressed the issue. In most cases, rather than taking steps to gain comfort with providing constructive critique to their group members or standing up for their own lesson plan ideas, participants simply fell back on their preferences for conflict avoidance and agreed with whatever their group members suggested. Megan, Shelby, Gina, and Ellen acknowledged this explicitly in their post-project presentations and interviews and noted it as an area where they would need to improve in the future. Jane and Meredith, however, were able to either overcome (in Jane's case) or leverage (in Meredith's case) their own and their group members' preferences for conflict avoidance and friendliness to improve the collaborative experience.

Jane was the only PSL participant who reported and was observed "nudging" her group members away from less inquiry-based or less rigorous lesson ideas. Although Jane did not report concerns about social anxiety or conflict avoidance in her pre-project interview or her Portrait of a Collaborator, she did express nervousness about group work in general. Despite this, when her group members suggested a plan to teach moon phases using Oreo cookies, Jane asked them gentle probing questions to refocus them on the student learning goals they had set using the backward design template, including "how is this going to help us reach our goals?" Similarly, when another of Jane's PST group members suggested using a story about constellation myths as a lead-in to a writing assignment in which students

would create their own constellation stories, Jane stated "We want to be careful not to make students confuse mythology with science." In her post-project presentation, Jane stressed the importance of "stick[ing] to what you know are best practices," even if it means needing to nudge teachers away from other ideas. However, she clarified the importance of doing this "in a polite way," indicating that she felt it was possible to adhere to social norms of friendliness and politeness while still providing professional critique during a collaborative experience.

Meredith, who described how she "just wanted the experience to be pleasant for the students," was able to leverage, rather than overcome, social norms to move her group's progress forward through the project. She did this by re-phrasing her requests to emphasize how her group members could do her a favor or help her, versus explaining to them what she could do to help them. In her words:

> Everyone was super nice…. I noticed about halfway through the second session, one of the students asked me 'well, this is great – all of these things you can do for us, but what is it we can do for you?' And I said, 'well if you could do this, and if you could do this, or this, that would be great!' And after I said that, I had this barrage of information, and so I think in the future… I thinking of just wording, phrasing certain requests in a different way. Like, could you do me a favor? That would really help me out…. I think that would encourage some collaboration.

In the class discussion following the in-class presentations, several PSL students noted their continued discomfort with conflict and their awareness of the need to find ways to provide constructive criticism to teachers despite this discomfort. The course instructor encouraged them to continue working on this issue in their careers: "You want to have… a positive relationship, but you don't have to like [the teachers] and they don't have to like you. And so getting over that… some of you might have more of a struggle with that." She suggested gaining comfort with asking clarifying questions as a gentle way to nudge, while

also recognizing that at some point school librarians may just have to "let it be" if teachers are strongly committed to a particular idea.

8.6.2 Communication and feedback. In her pre-project interview, Meredith expressed a hope that her experience would be characterized by "nice, open dialogue and discussion." Jane and Ellen, in their Portrait of a Collaborator assignments, articulated their need for feedback from collaborative partners (see Figure 10, below). Data show, however, that communication and feedback among project group members outside of the face-to-face work sessions was inconsistent at best and virtually absent for some groups. These challenges are represented as obstacles in the synthesized model of students' progress through the project (Figure 7) in the Independent Work and Joint Finalization / Implementation stages.

Figure 10 Communication and Feedback in *Portrait of a Collaborator* Assignments. This figure depicts excerpts from Jane's (top) and Ellen's (bottom) *Portrait of a Collaborator* assignments.

In their post-project surveys, PST participants were asked to describe any barriers to effective collaboration experienced by their group and if/how their group overcame those barriers. Several students mentioned communication as a barrier in their responses to this question, specifically the shortage of face-to-face time and the resulting need to rely upon digital tools for communication (the wiki site and e-mail were specifically noted). For example, one PST responded that "communication was sometimes a barrier. It would have been easier if we could have met in person more often."

The project wiki site, intended to provide a digital space for groups to share materials and communicate between work sessions and between the second work session and the due date, was set up as a separate area of the wiki site already in use for the education course. Although student groups did not take advantage of this wiki site in the pilot implementation of the project, the instructors and I thought that with more encouragement from instructors the site might improve communication issues that were reported in the first iteration of the project.[7] However, despite repeated reminders from instructors about the wiki site and specific recommendations from the school library instructor to PSL students about what to upload to the site, communication on the wiki site was almost entirely one-sided:

- Ellen contributed extensively to the wiki site, uploading work session notes, relevant content standards, drafts of her lesson plans, links to resources, and task lists for all participants. However, while she described the wiki site as personally useful as a centralized place to upload and store resources, Ellen said that "it wasn't all that great as far as being a collaborative tool." None of Ellen's group members contributed in any way to the site.

[7] Additional comparisons to the pilot project will be made in Chapter 9.

- Gina, Megan, Meredith, and Jane also used the wiki site to post work session notes, task reminders, resources, and other documents; however, like Ellen, none of their PST group members contributed to the wiki at all.
- One of Shelby's PST group members used the wiki site to post a brief comment, which read "[Shelby,] I will be working diligently this week to get you a started/completed lesson plan by Wednesday. I have discussed with my cooperating teacher more about exactly the things I'll be teaching so I have a better idea of the things I will need help with." This was the only instance of PST contribution to the group wiki sites.

In a class discussion following the in-class presentations, Meredith said that the wiki site may have had some advantages over email:

> I feel like the wikispaces… would have been great, had we utilized it correctly, because all of our work would have been centralized…. When I was emailing my students the resources, I felt like I was just throwing a bunch of resources at them, when in reality what happened is that we had been going over these in chunks, in more manageable chunks."

Meredith speculated that the PST students may have been hesitant to use the wiki site because of its public nature (anyone enrolled in either course could see the posts made to this site). During the post-project PST focus group, Bree explained her lack of contribution to the wiki site by stating, "I kinda forgot that we had the wiki, but I know that [the PSL] had put things on there, so that's my fault, I just forgot that was there." Gina commented that although her group members did not contribute to the wiki, she did think they had read through the material she posted there, based on comments made by her group members in face-to-face work sessions. There is limited supporting evidence from post-project surveys that this may have been the case; two PST students reported using the wiki site to overcome

communication difficulties during the project. However, one PST participant also said that she "didn't like using the wiki, so we e-mailed."

Based on post-project interviews, presentations, and surveys, e-mail seems to have been the preferred mode of communication for both sets of participants. All PSL participants discussed e-mail as the primary way they communicated with their PST participants outside of the face-to-face work sessions. For example, in her post-project presentation, Megan explained how e-mail facilitated "constantly going back-and-forth" with one of her participants to discuss and revise their lesson plan. Similarly, Meredith stated that toward the end of the project, she had trouble keeping track of the "e-mails flying back and forth" between herself and her group members. However, e-mail was not a perfect mode of communication in any group. Ellen reported that although she tried to use e-mail to communicate with her group members, she only got responses from two students, and those responses were not helpful to her (they each consisted of only "this looks great," in Ellen's words). Jane, Shelby, Megan, and Gina each reported that only one of their group members responded in a substantive way (with revisions, suggestions, or additions) to the draft lesson plans they sent out via e-mail.

Only two PSL participants – Shelby and Jane – reported difficulties with face-to-face communication during the project. Jane shared that the face-to-face communication demands of the project were intimidating for her, however she also felt that the project improved her verbal communication skills by forcing her to practice them. Shelby discussed her initial difficulties establishing a comfortable and productive verbal communication style with her students because she felt "much older than them, and yet at the same time… not that much

further along than they are in the teaching process." These issues are represented in Figure 7 (the synthesized model) as "Social Anxiety."

Related to the difficulties participants reported in establishing open lines of communication outside of the in-class work sessions was the lack of feedback PSL students received on their lesson plan drafts from their PST group members before the project due date. Ellen, who had specifically mentioned a need for feedback in her Portrait of a Collaborator assignment, expressed frustration at the lack of response she received from her PST group members after sending them resources and draft lesson plans, explaining that in the absence of their feedback it was difficult to know whether what she was sending them was at all valuable for their needs. Meredith agreed, stating that because her primary goal was to add value to what her teachers were doing, operating without feedback from most of her group members was a challenge.

In some cases, the lack of feedback from PST group members may have been a result of PSL participants' failure to send lesson materials to their group members far enough in advance of the project due date. On the post-project survey, one PST participant commented that, "My INLS collaborator did not send her information about the unit until the very last minute, so I did not get any chance to review or provide input on the material." In her in-class presentation, Megan acknowledge that she was guilty of this (since PSTs were anonymous, it is impossible to tell whether the PST respondent was in Megan's group):

> I think in part it was my fault that they didn't all give [feedback] to me because I didn't give them enough time. I ended up finishing both my lesson plans yesterday - or Saturday - and so they had Sunday to get back to me with their comments…. I think that's my fault, because I gave her Sunday and that's it. And I think that's something that, if you don't give yourself enough time to do what's expected of yourself in a collaboration, you can't really be upset when other people can't work on your schedule to get that done.

Megan and Meredith also noted that they wished the instructor of the school library course had provided them with formalized feedback on their lesson plans before they sent them to their PST group members. Megan said that she felt this would have been particularly helpful given the emphasis placed on the assignment in the course as a whole: "I feel like we did spend so much time on it and then it's just sort of, done, moving on, next assignment." While both the instructor and I offered to consult with PSL students on their lesson plans as they were being developed, none of the PSL participants sent us their plan(s) before the project due date. Informal feedback was provided in the form of individual discussions with students during the post-work session debriefings, which both consisted of approximately 15 minutes of whole-class discussion followed by time for individual PSLs to work on their plans as the course instructor and I circulated throughout the classroom. Based on PSL comments, however, more formalized feedback from instructors would have been appreciated.

8.6.2.1 How students addressed the issue. In most cases, participants reported that they simply did the best they could given the shortage of face-to-face time with their group members, and that PSLs ultimately turned in whatever materials and lesson plans they had developed at the end of the project regardless of whether those plans had been commented upon by their PST group members. Gina was the only PSL participant who met with her group members individually and in person outside of the two in-class work sessions. As a result, she relied much less on digital forms of communication than her PSL classmates, saying in the post-project interview: "I sent a total of four emails. I sent a group email reminding them of our second meeting. And then I asked them for when they could meet individually, and then just sent them the final product. Everything else was done face-to-

face." However, she also acknowledged that in a school setting, teachers may not always have time to meet face-to-face. She stated, "a lot of the work that we did in our individual meetings could have been accomplished over e-mail, I think I just wasn't as comfortable with that form of communication. So, yeah, I need to work on that." Similarly, Meredith noted her realization over the course of the project that as a practicing school librarian, she would need to customize her use of collaborative tools – both digital and physical – depending on the preferences and needs of her collaborative partner and the goals and nature of the collaborative project.

In the absence of feedback from their group members and from the instructor in advance of the lesson plan due date, some PSL participants relied on self-reflection as a means to assess their contributions to the lessons. In her presentation, Jane listed three questions that she journaled about throughout the project: "How am I doing? What can I change? And did I provide what was needed?" She explained that this was a habit she had developed during her student teaching experience as an undergraduate education major, "so that way, if you're – the person you're working with doesn't necessarily get back to you, you can give yourself some feedback." Ellen agreed and added that during collaborative partnerships as a practicing school librarian, busy teachers may not always get back to you either, making self-reflection a skill that she felt would be helpful in the future as well as for this project.

8.6.3 Confusion. Confusion related to assignment requirements, division of labor, domain-specific language, and content proved to be an obstacle for many groups, particularly in the beginning of the project. Content-related confusion will be discussed with results for Sub-Question 1 (Section 8.7), as it relates to students' experiences with the science aspect of

the project. In the synthesized model (Figure 7), this issue is represented by the obstacles titled “Confusion,” “Unfamiliar Vocabulary,” and “Lack of Awareness of School Librarian Roles.”

Many students expressed or reported confusion regarding the assignment requirements and division of labor at the beginning of the project. This confusion was concentrated primarily among PST students and was a significant obstacle for group progress in the first work session. Jane reported that in the first work session, her group members weren’t sure whether she would be contributing to only one lesson plan within their larger units or to all five. Shelby’s group was observed talking about the assignment requirements, at which point one of Shelby’s PSTs said, “we’re still so unsure what we’re supposed to be doing.” Megan discussed how, in the first work session, her own lack of lesson planning experience combined with her teachers’ confusion about the assignment combined to create a stressful situation in which no one “really knew what was going on,” which resulted in a lot of wasted time. She elaborated, “I had a lot of trouble with this project initially because I wasn’t really sure what I was doing, and I came to the [first work session] hoping that [my group members] would clarify what we were doing, and they… had no idea what was going on.” Similarly, Shelby described her group’s experiences in the first work session by saying: “my own feelings of not really being secure in lesson planning made it very hard for me to take any kind of lead. And I think they didn’t know enough about lesson planning either, so it was a little bit of the blind leading the blind, which meant we didn’t get a lot done.” Some of this confusion persisted into the second work session. For example, in this work session I observed Gina’s PST group members asking her whether she would actually be co-teaching the lesson with them, or whether she was just there to help them plan.

In the PST focus group, Bree confirmed that confusion regarding the assignment expectations was a barrier for her:

> I think we were a little bit confused, like, what was expected of each of us…. I would have liked to have it clearly stated what we were supposed to provide and what [our PSL] was supposed to provide. And then in the end, what our final project should look like. Basically just what each of us were supposed to contribute. And then I think throughout, I would have known more what to give her and what to ask from her.

Abby agreed, saying that she would have appreciated more clarity regarding:

> what was expected of us, or what was expected of the librarians. Like, what our roles were I guess, because none of us were really sure going in the first day we met, we were kind of like 'what are we supposed to do here?' And even a little bit the second day, because we didn't know if they were helping us make a lesson plan, if they were making a lesson plan, or what.

Four PST participants noted confusion as a barrier in the post-project survey, although each response described this confusion somewhat differently. One participant noted confusion with the assignment itself, saying: "our only problem was the lack of clarity on the assignment in our first meeting." Two participants noted confusion related to what the school librarian could do for them and/or their lesson plans; these responses read, "I was just lost on how I could utilize my librarian," and "unsure what they should do for us." The remaining response that I coded as "confusion" noted uncertainty about group member roles: "At the time of our first meeting, we weren't aware of what our work together should look like, so we didn't know what each of our roles should be."

Domain-specific language also proved confusing for some of the PSL participants. Shelby and Gina both reported that the unfamiliar terms in the lesson planning template were confusing for them and caused them to spend a good deal of time simply determining what was being requested in each section of the plan. One PST student confirmed that this was an issue for her group, saying that her PSL group member "had never seen our lesson plan

before, so [we] kind of had to teach that."[8] However, Shelby and Gina also reported that this was one area in which their PST group members were particularly helpful, in that they were happy to explain unfamiliar terms. Not all PSL participants experienced this form of confusion. Jane discussed how her background in education created a shared vocabulary that was helpful for her in terms of her group's productivity as well as for helping to establish her credibility with group members. She explained:

> It kind of felt like I was back in undergrad with my education cohort people. I think [my group members] felt like I kind of knew where they were coming from, so that was helpful… having some of the same lingo and vocabulary, like with the different parts of the lesson plan… the vocabulary types and assessment and learning objectives – they didn't have to explain too much. I mean, I double-checked that we were talking about the same thing, but we typically were.

8.6.3.1 How students addressed the issue. PSL students spent class time the week before the project going over the assignment requirements and various possibilities for how to divide the work tasks within their groups based on how many unique unit plans they would be working with. Although some confusion about the assignment persisted after this in-class discussion, PSL students were able to answer many of the PSTs' basic questions about the assignment (for example, how many lesson plans they would be collaborating on, what types of contributions each group member could make, etc.). Instructors answered specific questions about the assignment from PSLs and PSTs during the in-class work sessions.

Many groups were observed spending much of their initial work session clarifying the assignment and discussing potential forms their collaborations might take. This primarily took the form of back-and-forth questioning, where both PSLs and PSTs would sometimes ask and sometimes answer questions about the assignment, student learning goals, PSTs'

[8] PSL students had been provided with the lesson plan template in the school library course prior to the first work session, and this template was discussed in class. However, Shelby and Gina's comments suggest that the time spent in the school library course looking over the lesson plan template was perhaps insufficient for them to gain a full understanding of the document and its associated terminology.

placement schools, and other topics. When the answer to a question was unknown within the group, some groups developed task lists, or lists of questions, that each group member could work on between the first and second work sessions (in some cases, PSLs posted these lists to the group wiki sites). In her presentation, Megan described how the establishment of shared goals allowed her and her group members to move past their initial confusion and into productive work, stating "I think that it is really important to have that clear goal from the start, or you are kind of wasting your time."

8.6.4 Contextual Factors. In some cases, the elementary context of the project and/or contextual factors related to the students' other coursework or PSTs' student teaching placement schools created challenges for groups. These are collectively represented in the synthesized model (Figure 7) as "Contextual Difficulties."

Some PSLs had difficulty with the elementary focus of the project. Ellen said that because she had primarily worked with high school students in the past, she lacked knowledge of elementary school students' needs and knowledge about what resources (especially digital resources since they lack clear reading levels) were age-appropriate for them. Jane, whose prior educational experience was with middle school students, agreed that the age level was difficult in terms of "figuring out how to take some of those really big concepts and make it understandable for a first grader;" she reported that most of the resources she found were either "too technical or oversimplified" for the age group. Meredith, Shelby, and Gina also reported that they had difficulty finding age-appropriate resources for elementary students.

Related to the elementary context, some PSL participants described the difficulty of planning a lesson for students without a clear sense of those students' prior knowledge. Jane

described how her PST group members knew a little bit about what their students had already learned, but some parts of their background knowledge were unclear (like whether they knew how to write an informational text). Megan agreed, stating that "it was hard to plan my lessons when I didn't know a lot about what students knew already or where they were. My teachers were able to share some, but they didn't actually know a lot either because they haven't started their [student teaching], although they're observing." Gina also identified this as a challenge, saying,

> you need the background knowledge of the students and their age group. I would find this source and I would think it was great but I'd have to double check with the teachers to see if that was appropriate for a 5th grader because I couldn't really remember what I was able to understand in 5th grade.

In addition to issues related to the elementary context of the project, students also reported obstacles and challenges related to the other coursework PST students had to complete. The PSL instructor placed a high degree of emphasis on the collaborative lesson plan project for PSL students, frequently discussing the project in class throughout the semester and devoting multiple hours of in-class time to the project. However, in the education course, the unit plan assignment was one of several large projects the students were responsible for in the science methods course alone; these students were also taking Language Arts and Mathematics methods courses during the same semester, for each of which they had additional lesson/unit plans and other assignments due throughout the semester. As a result, PST and PSL participants reported placing different levels of emphasis on the assignment and having different personal timelines for its completion. Ellen described how these different timelines led to a lack of progress in the first work session; her group members had another assignment due just after the first work session, so they were focused on that instead of on the unit plan assignment (not due until the end of the semester). Megan

agreed, saying that the different timelines led to the two groups of students having different priorities. Shelby also reported experiencing this obstacle, saying that her group members kept putting off work on this project because they had other, more pressing, assignments. In the post-project survey, one PST noted that the first work session "was very early and we had hardly anything to talk about yet." This is represented in Figure 7 (the synthesized model) by the obstacle "Remote Due Date."

In some cases, contextual issues related to PSTs' student teaching placement assignments also created obstacles to progression through the project. In many cases this was due to the nature of the methods course unit plan assignment. In the ideal timeline for this assignment, PSTs' supervising teachers in their student teaching placement classrooms would tell the PSTs in September which science content standards they would be responsible for teaching in the Spring semester, how many days of instruction they would have in which to teach those standards, and how long each individual lesson would be. PSTs could then conduct prior conceptions interviews with elementary students in their classrooms to assess their prior knowledge related to the science topic. In that scenario, PSTs would come into the first work session for this project in October with a clear understanding of what they were being asked to teach and the current knowledge base of their students related to that topic. In some cases, this was indeed what students experienced. Gina reported that all of her group members "seemed to fully grasp what was going on in their classroom," and she relayed a discussion she had with one group member about the prior conceptions interview that group member had conducted with her students: "she found with her students that they had a very strong misconception on really what an ecosystem is. They were thinking of ecosystems as, like, over there in the desert. And over at the beach, and not where they live." Jane also

reported that her group members knew the focus areas for their units and had conducted prior conceptions interviews with their students before the first work session.

However, some PST students had not received all relevant information from their supervising teachers before the first work session, and in at least two cases, PSTs did not get a final decision from their supervising teachers about the content of their unit plans until after the PSL components of the project were due. Several PST participants noted this in their post-project survey when they were asked to report any barriers to effective collaboration experienced in their group. For example, one PST noted that "The barriers were not knowing exactly what the unit would be because we will use a science kit. We ended up just thinking about goals of the unit in a more broad sense." Another PST said that "our CTs [supervising teachers] have little knowledge of our unit this far in advance, so in a sense we had to aim in the dark." In the post-project focus group (which took place the day before the unit plans were due to the education course instructor, and several days after PSL students had sent their lesson plan components to the PSTs), Abby discussed how the contributions her PSL group member (Gina) made to her and her partner's unit plan ended up not being helpful, but this was due to lack of information from their supervising teacher rather than any failure on Gina's part:

> We weren't – at the beginning, the first time we met, [my PST partner] and I weren't exactly clear on what was going to be in our unit, and so we kind of had a vague idea. And so that meeting was just, "well this is our unit topic," and we didn't even know how long we were going to have to teach it…. [Gina] came back the next meeting and had resources that she found for the actual – we were doing life cycles, and she had some good lesson plans and unit plans that had already been made, and resources that I really liked. And that we talked about. So that was helpful. But then we went and met with our actual cooperating teachers at the school and basically had to go in a completely different direction… We have a Foss Kit for butterflies, for the life cycle, and so I'm trying to design lessons around that to go with it. But I don't know – [our supervising teacher] said that the [school system] puts out a unit map for each unit that they want you to teach in each grade, but the one for life cycles hasn't been put

> out yet, and that's mostly what she uses. And so we don't really have anything to go on, we're just kind of making it up…. All of unit plans are, like, 30 pages each. And we are making this whole thing, and then we're gonna get to next semester and our [supervising teachers] are gonna be like, actually we're not there yet – you're gonna teach this. And then, it's just a mess.

In the post-project survey, one PST summarized the issues related to their difficulties getting information about the unit plan from their supervising teachers by saying, "It was a challenge to collaborate [with PSLs] in part because it was not our classroom to make lessons for so it also required collaborating with cooperating teachers."

Megan experienced another issue related to placement school context, in that she had begun planning a lesson that included student use of Glogster and then found out in the second work session that the school for which she was planning the lesson didn't actually have access to Glogster. During the second work session, Megan's group was observed talking about student access to technology and whether it would even be possible to get student laptop access for this project at all. One PST also mentioned differences in placement classroom contexts, specifically availability of classroom technology, as an issue for her group, saying, "as a group, we had very different classroom communities and access to technology."

8.6.4.1 How students addressed this issue. Students reported using various approaches to address the issue of the elementary context and the associated difficulty in finding appropriate resources for students. Several students reported relying on sample lesson plans and existing resources to gauge age-appropriateness. Gina addressed this issue through simple persistence, keeping up her search until finally (after several hours) she found what she felt was the perfect source. Jane addressed this through persistence in one case and settling for the best available resource in another case, although she noted that in the future she will try to revise materials so that they are appropriate for the age and purpose. Ellen said

that in some ways, her lack of knowledge regarding elementary needs was actually helpful because it allowed her to serve as a clarifier: "I was asking a lot of kind of naïve questions about the way the lessons would be run and what they were going to be focusing on, and I think ultimately I could tell that was helping the students think through the process themselves. And so, although that was a struggle for me, it did have some benefits."

To address the issues related to student teaching placement classrooms, some groups developed lists of questions that PSTs could ask their supervising teachers between the first and second work sessions. In some cases, participants just waited until they (or their PST group members) received the necessary information from their supervising teachers to move forward. The passage of time also helped address the issue of participants' different timelines and priorities for the project; as the due date approached, PST students became more focused on this project. Only one PST student commented explicitly on how issues of varying classroom contexts and access to technology were addressed in her group, saying "we overcame this through the use of differentiation techniques and through coming up with alternatives to technology for those who did not have access to it."

8.6.5 Overall satisfaction with the project. Despite the issues and obstacles discussed above, both sets of participants reported high levels of overall satisfaction with the project. Over four-fifths (83.9%) of PST participants agreed or strongly agreed with the post-project survey statement "Overall, the collaborative lesson plan design project was a success for my group." A similar percentage (88.2%) agreed or strongly agreed that they learned "a great deal" about TLC by participating in the project, although fewer (56.3%) agreed that they learned a great deal about the school librarian's job. Of the two PSTs who participated in the focus group, Bree reported an overall positive experience with the project, while Abby

reported a less positive experience because she did not get the required information from her supervising teacher until after Gina's component of the unit plan was due.

All of the PSL participants reported overall positive experiences with and outcomes of the project, particularly related to its practical nature. Gina summarized many of the PSLs overall thoughts about the project in her post-project interview:

> I really enjoyed the project overall. It was such a good challenge. It was, you know, the perfect level, where it was really challenging but not something that I couldn't handle. I really loved that it was just so well grounded, because you got to work on not only your technical skills as a librarian but also those soft skills, like making meetings, communicating, listening, and those kind of things that are kind of hard to get practice in, that you can't really get in other kinds of projects.

Megan, while noting that she was ultimately "really pleased" with the project, did also say that the main word she would use to describe the project was "stressful:"

> It was stressful. And I think a big part of that wasn't even the collaboration aspect, it was that I've never had to write a lesson plan before and I didn't know what I was doing. I think it was difficult that the education students weren't really able to help me because they didn't really know what was going on with this assignment for a while, and that was probably what caused the most stress, that for a while I was floundering and didn't really know what was going on. I was really pleased with it by the time it was over, although I wish I had had more time, that I'd figured out everything earlier and had more time to actually work on things. But otherwise I was pleased with the results I think.

8.7 Research Question 4a: Do any issues emerge during the collaborative process that are specifically related to the science content focus of the assignment, and how do the students address those issues?

As with Research Question 4, there was significant overlap in the issues expressed by or observed within each set of project participants (PSTs and PSLs), so data related to this question will be discussed thematically, integrating findings from all participants.

8.7.1 Lack of science content knowledge. Two themes emerged from analysis of data relevant to this research question: lack of science content knowledge and contextual

factors (represented in the synthesized model as "Lack of Science Knowledge" and "Contextual Difficulties," respectively). As previously mentioned, none of the PSL participants had any academic or professional background related to science. In their pre-project interviews, Ellen, Shelby, and Meredith expressed some apprehension about working with science teachers on the project, based on their own lack of experience with science. However, Ellen also said that she thought certain topics in the elementary science curriculum sounded "fun," and Jane said that she was excited to work with science teachers because she has a personal (though novice) interest in science topics. Before the project began, most PSL participants felt that their lack of science content knowledge would not be a serious barrier for them, however they also expressed uncertainty about what science-focused TLC might look like in practice (see results for Research Question 5 and Subquestion 2 for more discussion of this).

In the pre-project survey, PST participants were asked to describe their strengths and weaknesses as science teachers. Many PSTs responded that their enthusiasm for inquiry-based learning and/or hands-on instruction was a strength, but roughly half mentioned that their lack of personal knowledge or understanding of science concepts was a weakness. For example, one respondent said: "My weakness is knowledge of science facts, while my strengths are my ideas for experiments and creative lessons and my enthusiasm to get kids involved in science." Another PST described a silver lining to her lack of science content knowledge: "I'm not an expert (weakness), but this means I am motivated to be extra prepared and to find engaging activities / lessons (strength)."

Lack of science content knowledge among both sets of project participants created some obstacles for groups as they worked their way through the project. One such obstacle

was the difficulty of settling on student learning goals and brainstorming lesson activities when neither the PSL nor PST group members had a firm grasp of the science content. Shelby's group, which contained all of the PST students working on unit plans related to Force and Motion, particularly struggled with this issue. Shelby described how one of her group members looked at the science content standard for her unit (which focused on static electricity) during the first work session and said, "I don't know what that means at all." Shelby's group spent much of the time in both work sessions simply trying to make sense of the science content standards. During the second work session, I observed one of her students exclaiming, "I don't know whether to cover, like, one Newton's law each day, or start with what is a force?" The education instructor spent a good deal of time working with two students in this group who were confused about what a force is and how it relates to the concept of magnetic energy. Later, I observed Shelby asking the group, "Does anyone have one lesson plan you know you want to start with?" However, no students responded – they all seemed confused. When describing this experience in her post-project presentation, Shelby attributed at least some of her group's struggles to their "fear of science," a fear which she shared:

> Part of that is my fear of science. But the students… said the same thing. They're scared of science, and I said, 'well, if they're scared of science and I'm scared of science then these kids are in trouble, and the future of the United States is in trouble.'

Megan and Gina also reported that their group members struggled somewhat with the science content. Two of Gina's students had been assigned a content standard focusing on animal life cycles, however the students chose to focus their unit plan on plants instead of animals. Gina attributed this to the PST students' lack of confidence in their ability to handle animals in the classroom. Megan said that while her group members did seem to know "what

it was they were supposed to teach," they did not know how to go about teaching it. Jane, who expressed excitement about astronomy in her pre-project interview, reported in her post-project interview that the content was "more challenging than [she] thought it would be." As discussed above, Jane's group members may have struggled with the content as well, as evidenced by their suggestions for lesson activities that were focused on mythology versus science.

Not all PSL participants struggled with the science content. In her post-project interview, Ellen said that "it wasn't like the [elementary] content was really hard to grasp." However, she also noted that she was "still nervous about working with science teachers in high school" due to the higher complexity of the science material. Gina, who worked with the ecosystems group, also pointed out that some science topics might have been easier for PSLs to handle than others: "I think I got lucky, I had some of the more mainstream topics…. I probably would have had more difficulty with the magnets and forces and motions."

8.7.2 Contextual issues. A second issue encountered by some student groups related to the different ways that science is taught in PSTs' student teaching placement classrooms. Many PSL participants went into the project assuming that science was taught daily in the elementary classrooms to which PSTs were assigned, and that answering the basic question of how long each lesson could take (for example, 30 minutes or 60 minutes) would be straightforward. However, discussion among group members in both work sessions revealed significant differences in the structure of science instruction from school to school and class to class. PST students shared that in many of their classrooms, time for science was cut short or was shared with other subject areas. In Ellen's group, one student stated "My classroom only gets 20 minutes of science per day every other month." She also said that science was

sometimes taught in conjunction with writing. Another of Ellen's students said that in her classroom, science instruction normally took the form of a read-aloud followed by independent or group work. Two other PSTs said that their school had a science specials teacher who came in for 30 minutes of the day, leaving these PSTs unsure as to whether they would even have an opportunity to teach their unit plan. In Jane's group, PSTs said that science was typically taught with read-alouds or in conjunction with writing. Two other students said that in their classrooms, science was taught at the very end of the school day and was thus plagued with classroom management issues.

Another context issue appeared in Shelby's group, where a supervising teacher working with two of the PSTs had asked them to teach electricity and magnetism in the context of moon phases. The education instructor told these PSTs that electricity and magnetism is unrelated to moon phases, and sat down with them to discuss the science behind each of these distinct topics. The students seemed unsure how to proceed since it appeared that their supervising teacher had an inaccurate understanding of the science content she was asking them to teach.

8.7.3 How students addressed these issues. Participants utilized a variety of strategies to bypass, leverage, or overcome their lack of science content knowledge over the course of the project. Megan bypassed the issue of her own lack of science content knowledge by focusing her contributions to the unit entirely on information literacy and "bookending" the students' content lessons (Megan also noted that "the subjects that they were doing weren't intimidating at all, and if I had done something with it I think it would have been fine."). Similarly, Meredith said she felt like the lesson she developed was fairly traditional in that it was literacy-focused even though it would be taught in a science context.

This lesson, based on a sample plan obtained from Florida's CPALMS toolkit (http://www.cpalms.org/Public/), focused on the information literacy standard "print books are a source of information, and graphic organizers are a tool for organizing information and displaying learning;" the science content that students would include in the books they created was incidental to the lesson and would have been previously taught by the classroom teacher.

Ellen and Shelby described how they leveraged their lack of science content knowledge to help create clear divisions of labor within the project. Like Meredith and Megan, they also bypassed much of the science content material, however Ellen and Shelby explicitly connected this strategy to role separation within their groups. In her presentation, Ellen discussed how she ultimately viewed her personal lack of science content knowledge as a good thing:

> because I'm not the expert in elementary science, I was able to focus more on the standards and learning goals just because that's what I know and that's what I could work from. And so I think that ultimately helped focus our collaboration on our common goals rather than on specific activities they were planning in the classroom.

Similarly, Shelby's discomfort with the science content led her to see where school librarians

> can build in…. I focused on what I knew, like [another participant] said, I don't know physics. But I do know how to organize, I know how to find things, and I was able to help them with their instruction by finding…. resources not only for the students, but for the teachers…. I think my favorite part was doing this thing that's so outside of my comfort zone, and yet then feeling successful at it…. I feel like I can do this, I can be an instructional partner when it comes to science or the other things I'm just not as comfortable with.

Instead of bypassing the science content, some students also or alternatively chose to try to learn the content on their own to improve their ability to find and evaluate resources and come up with lesson activity ideas. For example, Shelby talked about how she "had to school [herself] a little bit," saying that she "had to learn it before [she] could focus on a

lesson plan." To her surprise, she found that some of this science content "was actually fun to learn, so it didn't feel like work." Jane also reported that she engaged in background research to prepare her portions of the lesson plans. Ellen reported that while searching for resources related to her group members' science topics, she found some good online resources that she felt her teachers could use to brush up on their own science content knowledge. She shared these resources with her group members via the wiki site and in the second work session.

Data are less clear regarding PST participants' responses to their lack of science content expertise. Based on observational data and PSL reports in the debriefing session that followed the second in-class work session, it seems that most PST participants had a firm understanding of their science content that would be taught in their unit plans by the second work session (two exceptions were Shelby's force and motion group members, discussed above, and two of Gina's students who continued to focus their lesson planning efforts on plants even though their science content standard was about animals). However, the exact mechanisms by which they gained this science understanding are largely unclear. In the post-project focus group, Bree did discuss the impact of the unit plan assignment on her own science content knowledge:

> I feel more confident - I still don't feel as confident with it as I do with, say, math or literature, but having to go through all the resources and look up things for teaching this unit, I feel a lot more comfortable with misconceptions that I had, and I feel like I know more ways that I can make a variety of lessons that appeal to all of my different students.

However, Bree also stated that even at the end of the semester, "I'd probably say that [science is] one of my weaker subjects of the ones I'll be teaching." While Bree's feelings may not be representative of the rest of her classmates, this statement does suggest that lack of science content knowledge (or lack of confidence related to science content knowledge) may have persisted as an issue for some PST students, even though by the end of the project, they

generally seemed to have a firm grasp on the specific science content being taught in their unit.

One question on the post-project survey was aimed at collecting data related to the impact of the project on PSTs' confidence related to science teaching and gave some minimal insight into how these participants responded to their own lack of science content knowledge.[9] This question asked, "Has this project affected your confidence level for teaching science in any way? If so, how?" Responses that pertain to this research question mostly focused on the PST participants' utilization of library resources, or their realizations that library resources are available to help them plan and teach. For example, one respondent said, "Yes! The project introduced me to an abundance of resources and ways in which to implement and incorporate these in my planning." Responses like this one suggest that at least some PST participants were able to use resources provided by the PSL participants to help address their own lack of science content knowledge.

Students did not actively address the contextual issues (for example, differences in how often science is taught in PSTs' placement classrooms), however they did attempt to identify and account for these factors when writing their lesson plans. For example, in the first work session, several groups created lists of questions that PST students could ask their supervising teachers to help pin down details about the length and total time that would be allotted to them for their units.

8.8 Research Question 5: How Does Participants' Understanding of Teacher-Librarian Collaboration (TLC) Change Over the Course of This Project?

I consulted all data sources to explore this research question. Results are presented below by participant group and then thematically within each group. As discussed above

[9] Responses to this question will also be discussed in section 8.9 (Research Question 5a).

(section 8.4), this question is similar to Research Question 3, which deals with changes in participants' understanding of the instructional role and expertise of the school librarian. Considered broadly, many of the results presented below may also address Research Question 3 (and conversely, some of the results already presented for Research Question 3 may be pertinent to this question). However, for clarity's sake, this section will deal only with participants' changing understanding of the *process and definition* of teacher-librarian collaboration, including the key components and goals of TLC, while results related to participants' conceptual understanding of the school librarian as a collaborator were addressed in Research Question 3.

8.8.1 Preservice teachers. Data related to this question focused on either PST participants' conceptions / mental models of TLC or their motivation to participate in TLC in the future. At the end of this section, I will present a diagram (Figure 11) that summarizes the changes in PST participants' understanding of TLC and the instructional roles of the school librarian, synthesizing results related to Research Questions 3 and 5.

8.8.1.1 Pre-project conceptions and mental models of TLC. PST participants were asked in the pre-project survey "How would you define collaboration between a classroom teacher and a school librarian, and what would the roles of each collaborative partner be?" Nearly all responses (27 out of 32) focused on library resources, particularly books, as central to TLC. For example, one typical response stated the teacher and the school librarian "work together to make sure each student has the right books to read. The teacher provides information about the student and the librarian helps the teacher determine what they should be reading." Only nine responses mentioned an explicit teaching role for school librarians, and in most cases the teaching role described was either non-specific ("co-teaching") or

limited; for example, one response suggested that the librarian could "show students how to search for books." Most responses described TLC at the Facet B level, in which both partners share some responsibility for instruction, but contributions are unequal. However, some responses did describe more involved collaboration, and three respondents indicated that collaboration could take multiple forms. For example, one respondent said that "classroom teachers and school librarians can collaborate in many ways. They can plan lessons and read alouds together to coteach. The librarian can teach lessons in the library to the class, and the librarian can offer reading suggestions to classroom teachers. There are tons of ways that collaboration could look like." Only one respondent described TLC as an equal partnership, stating that the roles of each partner "should be equally important and shared."

Although the question did not specifically ask participants to articulate the purpose or goals of TLC, most respondents did include this in their answers. PSTs said that school librarians and classroom teachers might engage in TLC to:

- find resources for students; specifically, most respondents mentioned books (mentioned by 7 respondents);
- enrich student learning or classroom instruction (4 respondents);
- plan lessons (4 respondents);
- supplement classroom instruction via resource provision (2 respondents);
- teach lessons (2 respondents);
- implement a classroom project (2 respondents);
- reach students' interests, engage them in literature, and increase their reading independence (1 respondent); and
- incorporate literature in the classroom (1 respondent).

Respondents' focus on resource provision is evident in this analysis, but this list also shows that many PSTs already viewed TLC as oriented toward student achievement and the improvement of classroom instruction. For example, one response to this question read, "I see it as a partnership to ensure exposure to students of library resources as supplements to aid their knowledge on classroom topics." Nearly all of these conceptions belong to the *pedagogical* category identified by Riordan and daCosta (1996) as one of the primary reasons that teachers collaborate (the other reasons they identified were professional development, micropolitical, and support / relationship management).

8.8.1.2 Post-project conceptions and mental models of TLC. In post-project survey responses to the question "How would you define collaboration between a classroom teacher and a school librarian, and what would the roles of each collaborative partner be," PSTs maintained their focus on resource provision as the primary contribution of school librarians to TLC, and, as in the pre-project questionnaire, very few responses mentioned a teaching role for the school librarian. Of 22 responses that articulated a clear role for the school librarian in TLC, 16 focused on resource provision. Other school librarian roles mentioned more rarely included reinforcing the curriculum (2 responses), integrating information literacy standards (2), lesson planning (4), teaching or co-teaching (2), research expertise (1), sharing new or innovative ideas (2), attending PLC meetings (1), and providing general support to teachers (2).

Some responses also articulated specific roles for the classroom teacher in a collaborative partnership. These roles varied widely, with no one dominant response, and included: stating or informing the school librarian of student learning goals (mentioned in 5 responses), asking for assistance from the school librarian (4), communicating specific

student needs and personal knowledge of students (4), teaching (2), sharing ideas (2), lesson planning (1), incorporating library resources into instruction (1), content knowledge (1), and bringing students to the library (1).

As in the pre-project survey, most respondents articulated some purpose or goal of TLC even though this was not explicitly requested by the question text. In their post-project responses, PSTs said that school librarians and classroom teachers might engage in TLC to:

- enrich student learning or classroom instruction (7 respondents);
- find resources for students; unlike in pre-project surveys, no particular type of resource was specified (4 respondents);
- engage students in the content area subject matter (3 respondents);
- plan lessons (2 respondents);
- provide mutual support (1 respondent); and
- develop curriculum (1 respondent).

In comparison to participants' pre-project responses to this question, PSTs demonstrated a somewhat lower focus on resource provision as the ultimate goal of TLC, although as stated above, many responses still discussed resource provision as the school librarian's primary role within the collaborative partnership. Instead, most respondents who articulated a purpose for TLC focused on the goals of enriching student learning or better engaging students in the subject matter. This focus on student achievement as the ultimate goal of TLC was also evident in the pre-project survey, but to a lesser extent; in the post-project survey, six additional PSTs articulated this goal compared to the pre-project survey. Again, nearly all responses to this question focused on pedagogical reasons for collaboration as opposed to

professional development, micropolitical, or personal support motives (Riordan & da Costa, 1996).

Overall, only one response to this question indicated that TLC could take multiple forms, and only eight responses included either a co-planning or teaching/ co-teaching role for the school librarian. In comparison, nine pre-project responses to this question mentioned a teaching role for school librarians. Based on these results, it would be difficult to claim that PST participants' understanding of teacher-librarian collaboration changed in meaningful ways over the course of the project. Although there is limited evidence that PSTs were made more aware of TLC's focus on student achievement, their conceptions of the roles that each partner might play in the process and of the forms that TLC might take were largely unchanged. This conclusion is largely supported by PST responses to another item on the questionnaire – "What was the most important thing you learned from the collaborative lesson plan design project?" Only five responses to this question noted a gain in knowledge related to the school librarian's ability to teach or co-teach. For example, one response read, "Librarians will coteach with us to help students learn important skills like research, data collection, using resources, etc." As discussed above (Section 8.4.2), most responses to this question focused on the school librarian's role as resource provider and/or the school librarian herself as a resource. While this represents a marked shift in specific vocabulary (from words like "books" and "databases" in pre-project questionnaires to "resources" in post-project questionnaires – discussed in Section 8.4.2), it seems from this data that this change in language was not accompanied by a deep shift in participant's conceptual understanding of TLC.

One potential explanation for the persistence of PSTs' pre-project conceptions of TLC relates to the structure of the assignment and the imbalance in class enrollment between the two courses. As discussed in previous sections of this chapter, PSL participants felt that they were able to bring an advocacy focus to the collaborative partnership, and assumed responsibility for teaching their PST group members about the collaborative instructional role of the school librarian and teacher-librarian collaboration. PSL students accomplished this directly (through telling their students about the school library and school librarians and sharing TLC models with them) and indirectly (for example, by creating lessons that spanned across various levels of TLC). However, because one PSL student was working with multiple (3-6) PSTs, PSLs were encouraged to choose only one lesson plan to collaborate on at a higher level (for example, by including a teaching role for the school librarian within the plan), and create annotated resource lists for the remaining plans (the main content of which would be developed by the PSTs). As a result, most PST participants received suggested resource lists from their PSL group member (in some cases these were accompanied by ideas for incorporating the resources into instruction, for example via read-alouds or writing exercises). A smaller number of PST participants received plans written almost entirely by PSLs – plans which exemplified higher-intensity TLC in terms of the librarian's (hypothetical) involvement in teaching the lesson and the PSL's (actual) involvement in writing the plan. Because these higher-intensity plans were written outside of class following the second work session, the remaining group members never saw these written plans. Furthermore, in at least one group, there was a miscommunication regarding what each PST would be receiving from their PSL group member.[10] Bree (a PST) described this issue in the post-project focus group:

[10] This PSL is not named because she did not participate in the research project.

> I was the only one in our group that got a lesson sent to me. The other three people just got resource lists. So one of our group mates e-mailed [our PSL] about it and she said she was supposed to pick one of our lessons and she picked mine because of whichever resources I said was going to use in it. So it was like my lesson was supposed to be for the group, but then we each had individual resource lists, but we didn't know that. So my friends were waiting for their lessons, and they thought they were going to get lessons. So we just didn't know.

The fact that most lesson plans sent to PST students by their PSL group members focused only on resource provision seems to have outweighed the direct instruction some PSLs gave to their group members about the potential for school librarians to take an active role in instruction.

8.8.1.3 Motivation and intention to collaborate. While there is little evidence of substantive change in PST participants' conceptual understanding of TLC, data does suggest that PSTs' motivation to collaborate with school librarians was increased as a result of the project. On the post-project survey, PSTs were asked to indicate their level of agreement or disagreement with the following statement: "As a result of this project, I am more likely to collaborate with the school librarian once I am a classroom teacher." The large majority of respondents (93.7%) indicated that they agreed or strongly agreed with this statement, with the remaining two respondents indicating that they were undecided about this statement. Although this level of agreement could be attributed to social desirability bias, this seems less likely as levels of agreement varied fairly widely among the five items in this section of the survey (each of which are discussed in other sections of this chapter). In the post-project PST focus group, both Bree and Abby reported that the project increased their motivation to collaborate with a school librarian once they are classroom teachers. Abby explained:

> [Gina] was very open to, like, "what do you guys need? Let me go and find all these resources." And as a teacher, I know that time is going to be a limitation, and so if I could partner with the school librarian to be like, "listen, coming up in a month or two I have this unit, is there anything that you can provide me?" That would save me some time, and just have more options for the students, so I like that. I think the old-

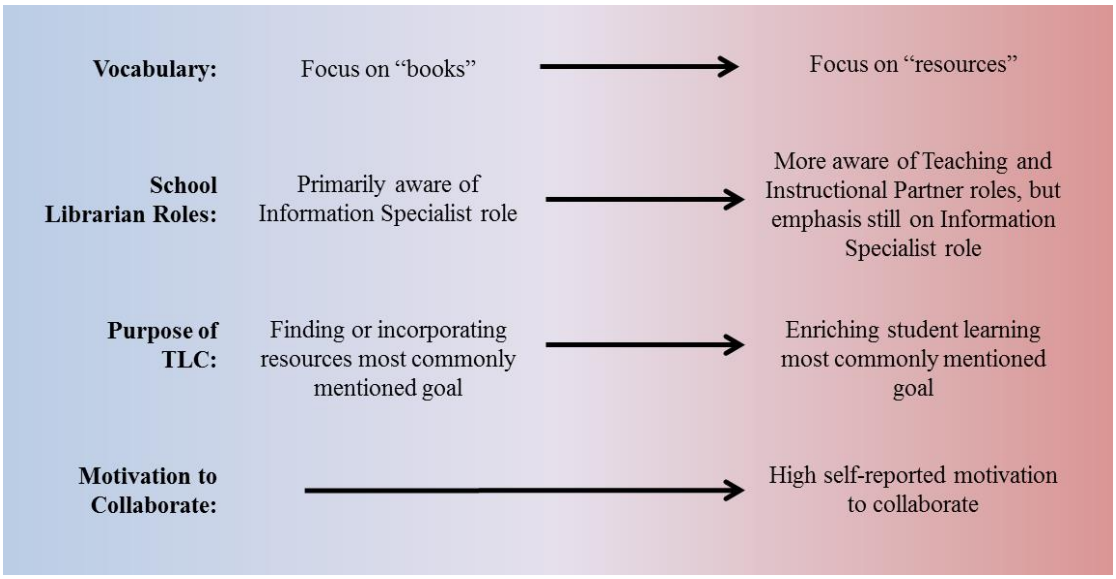
> school way of thinking about it's just, like, librarians are just in the library and you just go visit them for books. But now with technology, there's a whole different world that they know, probably more than we know. So to partner with them would be good.

While results of the student teaching survey sent to PST participants cannot be assumed to be representative of all PST participants given the low response rate, this data also suggests that the project may have been effective at increasing the likelihood that participants would participate in TLC in their careers. Of the nine respondents, eight reported that they collaborated with their school librarian during their student teaching semester. These collaborations had a variety of content area foci including social studies, ELA, and science. The school librarian had an active teaching role in at least three of these collaborations and supplied resources in at least seven (for one collaboration, the role of the school librarian was unclear). When asked what factors accounted for their involvement in a collaborative partnership with the school librarian, only one respondent specifically mentioned the collaborative assignment. However, other responses to this question referenced knowledge about the school library or school librarian that PSTs may have gained by participating in the project, such as the librarian's "wealth of knowledge and resources" and experience with technology. The one respondent who did not participate in TLC during her student teaching experience attributed this to the fact that her supervising teacher did not work with the librarian, the PST didn't officially meet the school librarian until the final weeks of her student teaching, and the PST was already familiar with how to find library resources because of her own previous work experience in a library.

8.8.1.4 Dimensions of change in PST participants' understanding. Figure 11 (next page) summarizes the dimensions along which PST participants' understanding of teacher-librarian collaboration and the instructional role of the school librarian changed over the

course of the project. This diagram summarizes the primary results discussed for Research Questions 3 and 5.

Figure 11 Dimensions of Change in PST Participants' Understanding.



These dimensions of change include:

- Vocabulary: While PSTs maintained and perhaps even strengthened their focus on resource provision as central to TLC over the course of the project, there was a marked shift in their vocabulary from use of the terms "books" and "databases" in the pre-project survey to the term "resources" in post-project surveys and the focus group. This may reflect a broadened understanding of the types of resources school librarians can provide, or may be an example of shared professional vocabulary developed via collaborative experiences.
- School Librarian Roles: Overall, evidence suggests that PSTs remained most focused on the school librarian's role as an Information Specialist throughout the project. Some data (such as quantitative survey results) suggests their awareness of the teaching and instructional partner roles was improved, however the structure of the

assignment and the division of labor in most groups meant that most PSTs received only resource lists from their PSL partners, reinforcing their conceptions of the school librarian as principally a resource provider.

- Purpose of TLC: Based on their answers to pre- and post-survey questions about the definition of TLC, there was a moderate shift in PST participants' understanding of the purpose and goals of TLC. Before the project, most participants who articulated an overall purpose for TLC focused on finding or sharing resources, with fewer participants focusing on enrichment of student learning. At the end of the project, this balance had shifted, with more participants focusing on student achievement as the ultimate goal of TLC.
- Motivation to collaborate: Nearly all PST participants reported that their participation in the project had increased the likelihood of their participation in TLC as a classroom teacher. Results from the post-student teaching survey confirm that the PSTs' motivation to collaborate with school librarians might have increased as a result of this project, with eight out of nine respondents reporting participation in TLC during their student teaching semesters.

8.8.2 Preservice school librarians. The following sections will describe PSL participants' pre- and post-project conceptions of teacher-librarian collaboration, discuss the elements of the TLC process as conceptualized by PSL participants at the end of the project, and summarize the dimensions of change in PSL participants' understanding of TLC and the instructional roles of the school librarian over the course of the project.

8.8.2.1 Pre-project conceptions of TLC. All of the PSL participants reported (in pre-project interviews) that they had some prior experience with collaborative work, although

none of them had participated in teacher-librarian collaboration in either role. This prior experience included working in professional teams in the workplace (Meredith and Shelby), completing group assignments in various courses (Gina, Jane, and Megan), working with a supervising teacher as a teaching assistant or student teacher (Ellen and Jane, respectively), and participating on sports teams (Gina).

In their pre-project interviews, participants varied in terms of their existing mental models of and definitions for TLC. In general, participants defined TLC in vague terms (for example, Meredith defined it as "nice, open dialogue and discussion"), did not indicate that TLC might take multiple forms or levels, and did not yet have clear conceptions of what TLC might look like in practice or what specific roles each partner might take. For example, Megan described her pre-project understanding of TLC by stating:

> I think that I do also have very narrow ideas right now, just of what collaboration – like, what specifically librarians can do. I only have a few examples in my head, like they can find resources of they can teach about how to do the research you need…. I know we can do more, but I don't actually – if you asked me to list examples, I couldn't come up with any.

However, there were some notable exceptions to the generally vague and nonspecific responses to this question. Ellen, for example (who, along with Megan, was a second-year MSLS student at the time of the project), described TLC as taking various forms, ranging from informal hallway conversations to a "hands-on" approach in which the school librarian and the classroom teacher "have miraculous time to sit down together and talk about the assignment they're working on." Ellen was also able to describe specific contributions of each collaborative partner, saying that the school librarian would bring expertise in resources, technology, and information literacy, while the classroom teacher would contribute expertise in his or her content area, students, and the specific assignment. Shelby was also able to describe specific roles for the school librarian, stating that he or she might serve as a listener,

resource provider, and a critical evaluator of teachers' ideas; however, Shelby was unsure what the teacher's role might be in the TLC process.

Participants' understanding of resources as central to TLC was evident in their pre-project descriptions of TLC. For example, in Ellen's description of "hands-on" TLC, she stated that after discussing the assignment with the classroom teacher, "the librarian can decide what resources they can offer." Gina also emphasized the role of resources, specifically books, in her definition of TLC, and later, when explaining her discomfort collaborating with math teachers, stated that she "couldn't think of a single thing in the library that helps with math…. And not that, you know, libraries are only books – it's just that, when you really come down to it, it's just like, well I always might have a book for that."

8.8.2.2 Post-project conceptions of TLC. In post project interviews, PSL participants were again asked to define TLC and describe the role of each collaborative partner. Their responses to this question, as well as descriptions of TLC provided in PSL participants' in-class presentations, reveal several changes in their understanding of TLC over the course of the semester.[11]

First, all PSL participants described TLC as having multiple forms or levels at the end of the project. For example, Ellen described "all the different levels that collaboration can exist on," from sitting down with teachers and working "from beginning to end" on the instructional design, implementation, and assessment practice down to more basic resource provision, which she still saw as "a form of collaboration, just not at that higher level." Similarly, Gina said that collaboration can take a variety of forms, from informal resource

[11] Note, I am not arguing that the collaborative lesson plan project was solely responsible for these observed changes. See Section 8.10 for a description of other course experiences that might have contributed to changed understanding.

provision and being "another pair of eyes" to look over a lesson all the way up to co-planning and co-teaching. Participants said that ultimately, TLC was a process of "working together to teach students" (Megan).

In contrast to the pre-project interview, in the post-project interview all PSL participants were able to clearly articulate roles and domains of expertise for both school librarians and classroom teachers in a collaborative partnership (although there was also an acknowledgement that roles may vary based on the level of collaboration). PSL participants stated that school librarians bring the following expertise to collaborative partnerships:

- Teaching information literacy and technology skills as well as knowledge of those skills,
- Metacognition and teaching metacognition,
- Big picture thinking (making interdisciplinary curriculum connections),
- Meaningful, inquiry-based teaching and learning,
- Knowledge of instructional methods and tools (including instructional technology),
- Resource selection and provision, and
- Advocacy for the school library media program.

PSL participants were also able to describe clear roles for and contributions of classroom teachers to the collaborative partnership. Some of these teacher inputs overlap with those discussed for the school librarian (indicated with a *). PSL participants noted that teachers brought expertise in:

- Teaching,*
- Learning* and differentiation,
- Content knowledge,

- Classroom management,
- Knowledge about their specific students and their capabilities as well as the general capabilities of their age group,
- Realistic expectations and knowledge of day-to-day classroom practice, and
- Instructional design and lesson planning.*

These inputs are represented on the left side of the process model, Figure 7.

PSL participants described TLC as messy, ongoing, continuous, and characterized by back-and-forth "idea spewing and filtering" (Gina). In this process, both partners at times lead and at other times follow. Meredith focused on the ultimate goal of TLC by defining it as a process whose "whole point" is student learning, and characterized TLC as having a "synergistic effect."

In addition to post-project interview questions that specifically asked PSL participants about their conceptions of TLC and the role of each partner, I also examined other data sources for insight into PSLs' understanding of TLC (its definition, steps in the collaborative process, and key elements or facilitators) as it developed over the course of the project. Several themes emerged from this analysis, representing elements that PSLs came to view as central to the process or successful implementation of TLC. In the next sections, which are organized according to the steps of the synthesized process model depicted in Figure 7, I will discuss these elements and their role within TLC as conceptualized by PSL participants.

8.8.2.3 Preparation. Before each face-to-face work session, PSL participants worked independently to prepare, both in terms of finding or developing materials and in terms of mentally preparing for what they might encounter during the work sessions (for example, via class conversations that took place in the school library course the week before

each face-to-face work session). Although I have less direct data related to PST participants' preparation, it is likely that they also worked independently before each session (for example, by completing assigned readings related to school librarians, obtaining necessary information about their unit topic and structure from their supervising teachers, or looking over materials sent to them by their PSL group members). Outcomes of this preparatory work included initial ideas related to specific lesson and unit plans as well as foundational knowledge about TLC, school libraries and librarians, science and information literacy standards, and other related topics covered in class sessions and reading assignments.

In post-project presentations and interviews, PSL participants noted that the collaborations which proceeded most smoothly were those in which the PSL was well prepared, yet flexible. For example, Shelby said: "the collaborations that worked the best were the ones that I had a lot of ideas and I wasn't tied to them.… I was able to bring in a lot of things, and if they didn't like them then that was fine. There was no ego there." Likewise, Meredith stated that she was "glad that [she] had some sort of plan or organization to the meetings, but I wasn't married to that plan. Because I wanted to utilize the session in the best way for them." Jane said that it was important for her to take time to thoughtfully process her own and her group members' ideas, but to still "be flexible in that… being able to let go of ideas if they don't work out the first time, as long as you end up at the same goal."

8.8.2.4 Small talk. PSL participants discussed the importance of small talk for relationship building and the development of active listening skills in their presentations and post-project interviews, and I noted numerous examples of this type of communication in observations of in-class work sessions. Typically, incidences of small talk were concentrated

at the beginning of each face-to-face work session, which is where I have placed this element in the synthesized model (Figure 7).

Most PSL participants described small talk as a facilitator to their progress through the project in that it allowed them to build productive working relationships with their group members, although not all participants felt they were successful at this and at least one participant (Meredith) noted that the relationships built were, by necessity, superficial, given the time constraints of the project. Megan described how she felt that the time she spent engaging in small talk with her group members paid dividends later because it increased her own comfort level within the group and improved her active listening skills. She also noted that since the small talk consisted mostly of her asking questions to her group members, it was easy to then transition into professional talk by simply changing the nature of the questions she was asking. Gina also discussed the function of small talk in her group, which was to "set a tone for open communication," establish trust and camaraderie, and to allow students the opportunity to "get off a sigh, like 'yes, I'm very busy,'" such that they could then put their stress behind them and focus on the meeting.

Shelby reported that she came to understand over the course of the project that her relationships with various teachers may be different depending on their personalities. A self-described introvert, Shelby said that she found it easiest to interact with the two most extroverted students in her group. She also described how, with one group member, her failure to develop a relationship led to her not realizing that this particular woman needed something different than her other group members; in turn, this led to an unsatisfactory collaborative experience for both of them. Ellen was the only participant who reported that she was unsuccessful building relationships with her group members; she attributed this to

how keenly she felt the time constraints of the face-to-face work sessions and her resulting exclusive focus on professional talk.

8.8.2.5 Professional talk. All groups engaged in professional talk for the majority of both face-to-face work sessions. In the first work session, I observed group members engaging in professional talk about:

- teacher-librarian collaboration and the instructional role of the school librarian (for example, Gina, Meredith, and Jane all described TLC to their group members in terms of the leveled models introduced in the school library course and gave verbal examples of TLC at each level),
- clarification of the lesson plan assignment and the lesson planning template used in the School of Education,
- format and duration of science lessons in PST students' placement classrooms,
- instructional design and the backward design lesson planning format,
- prior knowledge and capabilities of elementary students, and
- state standards and specific student learning goals for both science and information literacy.

Participants discussed similar topics in the second work session, with more time devoted in this work session to specific lesson activity ideas. For example, Meredith described her group's second work session in this way:

> We reviewed the concept of backward design and we talked about differentiation strategies…. We talked about the fact that they have stations in their classrooms, and they do different activities at the stations. And so we decided that we would focus on Smart Boards, that's something they all wanted to learn about.

In addition to brainstorming and sharing ideas, negotiation of task assignments (or division of labor) was also a major components of participants' professional talk. Participants

used a variety of techniques to divide the lesson planning and writing tasks within their groups; most participants used multiple strategies within their groups. In general, PSL students took the lead in facilitating and structuring the in-class work sessions. Jane attributed this to the fact that PSTs were undergraduates while PSLs were graduate students, saying, "since I was the grad student, I felt like they kinda looked to me to be the leader." Similarly, Shelby commented that

> I do think that there was some feeling that I knew more than I do, and I don't know if it's because I'm a masters student and they're undergrad, or if it is the age thing, but they in some ways kept deferring to me in ways that I was like, "no no no, we're working together, I'm not an expert either, I'm also a student."

I observed PSL participants taking the lead in other groups as well; for example, Shelby and Gina began the first work session by introducing themselves and then asking their group members to do the same. For the most part, students used the face-to-face work sessions to clarify the assignment, develop student learning goals, brainstorm lesson ideas, and negotiate the division of labor for the project, using collaborative planning sheets as a guide.

Broadly, professional talk in the context of this assignment included goal setting, brainstorming and sharing ideas, questioning and clarifying, and negotiation and division of labor. These elements are each represented in the model of participant's progress through the project (Figure 7).

These periods of professional talk exposed gaps in PSL participants' understanding of certain concepts, project features, and educational terminology.[12] For example, Gina was unfamiliar with many of the terms used in the lesson plan template, so some of the professional talk in her group revolved around clarification of those terms. Gina described

[12] Gaps related to the science content will be discussed in Section 8.9.

her questions about these terms as "naïve" but noted that they served an important function in her group:

> I was constantly asking them, you know, those naïve questions, like 'What is the difference between academic language and key vocabulary?' And they really loved telling me, because they're learning it, so that was their chance to prove that they know what they're talking about, and I think it put us on equal footing, that we both have things to contribute that are equal and we really are partners in this.

Similarly, Gina described her own lack of experience as both a source of additional work and an equalizer that helped alleviate her stress related to the project, noting that her lack of experience "helped [her group members] to see that we were in this together" and that she wasn't some "holy source brought in to fix everything." She also said that viewing herself as a learner in this way helped her personally, noting: "I tend to overstress, and when I know that I'm not going to be perfect and that I'm a learner and that… even if it's not perfect, I'm going to gain something from this experience, that just helps me stay calm and get the work done."

Not all participants reported difficulties related to lack of experience or shared terminology. Jane, who had recently graduated from a bachelor's program in middle grades teaching, noted that her educational background created a shared vocabulary that was helpful for her in terms of her group's productivity as well as for helping to establish her credibility with group members. She explained:

> It kind of felt like I was back in undergrad with my education cohort people. I think [my group members] felt like I kind of knew where they were coming from, so that was helpful… having some of the same lingo and vocabulary, like with the different parts of the lesson plan… the vocabulary types and assessment and learning objectives – they didn't have to explain too much. I mean, I double-checked that we were talking about the same thing, but we typically were.

Through both small and professional talk, students reported gaining an increased sense of the importance of active listening for productive collaboration. Jane and Ellen

discussed how carefully listening to their collaborative partners allowed them to tailor the resources and instructional ideas they provided to the specific needs of each teacher and their students. Shelby discussed the importance of listening as a way to allow teachers to share their expertise, in that her group members "had a lot of good ideas, and it was good for me to just listen to them because they had already thought through this pretty deeply."

In summary, students reported and I observed several possible outcomes of both small and professional talk in the context of this assignment (all of these outcomes are included in the synthesis model, Figure 7). These outcomes included relationship building; communication and listening, or "soft," skills; improved focus, tailored services from the PSL students to their group members, technical skills (for example, the ability to write a lesson plan), shared ownership of lesson plans (in some cases), and shared professional language.

8.8.2.6 Independent work and finalization of the lesson plan. The actual writing of the plans happened outside of the work sessions and was predominantly done by PSL participants. In her post-project interview, Gina expressed that she wished her group could have spent more time "doing the physical hard work" of finding resources and writing the lesson plan during their face-to-face time, but stated that all of their time was spent sharing ideas and clarifying the assignment.

In many cases, PSL participants emailed their completed lesson plan drafts to their collaborative partners and asked for feedback that was only received from one or two group members. Participants described the instances in which they did receive feedback on their lesson as "collaborative" in a way that the other partnerships were not. For example, only two of Shelby's six group members gave her feedback on the draft lesson plan she emailed to

them (Shelby had written one plan for both students). Of that partnership, Shelby said: "that was really the most collaborative. They sent me stuff, I sent them stuff, they sent it back, I added, they added, they took away – it went back and forth." Similarly, only one of Megan's three PST group members provided her with feedback, and Megan described that partnership by saying: "she e-mailed it back, and we e-mailed it back and forth, and that was really collaborative, that one." Megan also stated that she "would have loved more collaboration," illustrating her understanding of collaboration as a process that requires two-way communication. Jane and Gina also reported similar experiences. Ellen, who didn't receive substantive feedback from any of her group members after sending them her draft lessons, discussed how she felt that the face-to-face meetings were collaborative, but she "didn't really feel like [she] got a really collaborative feel from the whole experience." Participants' descriptions of these experiences suggest an emphasis on TLC as a process rather than an end product, and the centrality of two-way communication to TLC. In other words, regardless of the level of collaboration described in the lesson plan document itself, participants based their assessment of how collaborative each partnership was on the extent to which they experienced back-and-forth communication with their partners.

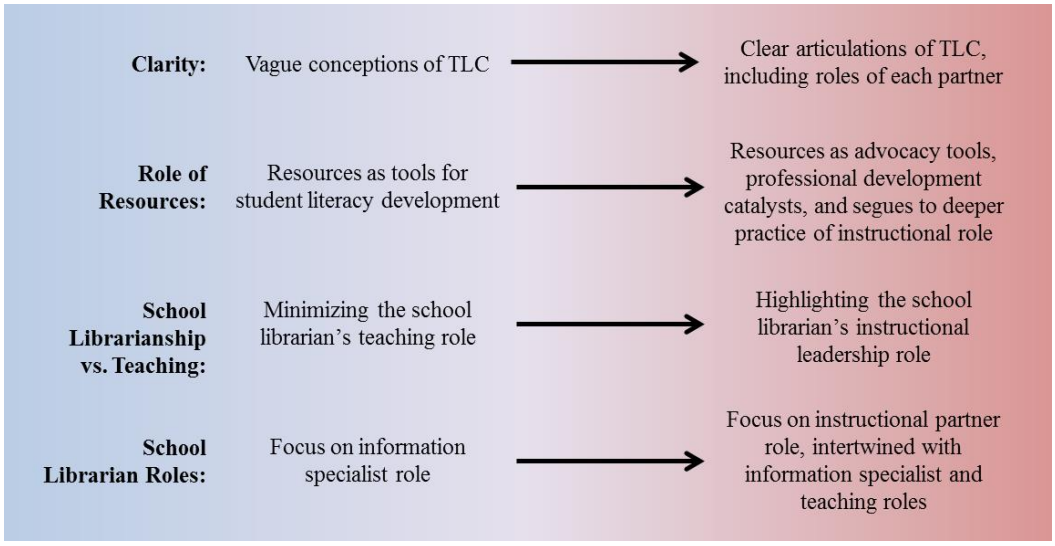
Several participants expressed their desire for more PST input into their plans. For example, when discussing division of labor in her post-project interview, Jane said, "I don't know if I quite did that right. I feel like I kind of just did my own lesson plan, like, with some of their input." Likewise, Megan said that "the collaboration was more my telling them what I was doing and then they helped me do it." She added that when she asked her group members about one of her ideas, they responded "sure, if that's what you want to do – it's

your lesson." Thus, in addition to back-and-forth communication, participants also seemed to view shared ownership of the lesson plan as a hallmark of TLC.

8.8.2.7 Dimensions of change in PSLs' understanding of TLC and the instructional role of the school librarian.

Figure 12 (below) summarizes the dimensions along which PSL participants' understanding of teacher-librarian collaboration and the instructional role of the school librarian changed over the course of the project. This diagram summarizes the primary results discussed for Research Questions 3 and 5.

Figure 12 Dimensions of Change in PSL Participants' Understanding.



These dimensions of change include:

- Clarity: In pre-project interviews, PSL participants had only vague conceptions of TLC and could provide few specifics about how it might look in practice or what the role of each collaborative partner might be. There was also little evidence that PSL participants (other than Ellen) conceived of TLC as having multiple forms or levels. Over the course of the project, these ideas became, as Meredith expressed it, "less muddy," such that by the end of the project all participants were able to provide clear

definitions for TLC and articulate specific roles for both the school librarian and classroom teacher in a collaborative partnership. These post-project definitions of TLC included the idea that TLC could take multiple forms or levels.

- Role of resources: At the beginning of the project, PSL participants were focused on the role that resources play in student literacy development, including encouraging a love of reading. By the end of the project, they also viewed resources as critical tools for library advocacy, catalysts for professional development, and segues into deeper practice of the instructional partner role.
- Differences between school librarianship and teaching: At the beginning of the project, PSL participants viewed school librarianship as distinct from teaching in ways that minimized the librarian's teaching role. By the end of the project, these participants still viewed school librarianship as distinct from teaching, but in ways that highlighted the school librarian's role as an instructional leader within the school.
- School librarians' roles: At the beginning of the project, PSL participants emphasized the importance of the information specialist role. By the end of the project, PSL participants displayed a stronger focus on the instructional partner role with an understanding that the information specialist, teaching, and instructional partner roles are intertwined.

8.9 Research Question 5a: How does participants' understanding of science-focused teacher-librarian collaboration (TLC) change over the course of this project?

Data sources including pre- and post-project interviews and surveys, observations, and PSL in-class presentations provided evidence of changes in participants' understanding

of science-focused TLC over the course of the project. These changes will be discussed by participant group.

8.9.1 Preservice teachers. Pre- and post-project surveys and the focus group interview were the primary data sources used to explore the question of whether and how PSTs' understanding of science-focused TLC changed over the course of the project.

8.9.1.1 Pre-project conceptions. There was little evidence that PST students were resistant to the idea that science-focused TLC is possible, even at the beginning of the project. On their pre-project surveys, PST participants were asked "in which content area would you be most likely to collaborate with your school librarian, and why?" Although English Language Arts (or its component parts such as reading and writing) was the most common response with 18 mentions, science was also a common response (13 mentions), as was social studies (15 mentions) and "all subjects" (8 mentions). PST students gave a variety of answers for why they would want to collaborate with their school librarian for science instruction:

- The library has books about science, which can help students understand abstract science content.
- The participant "could use help" with science or the participant knows less about science than other topics.
- The school librarian could help bring science to life and get students interested in science topics.
- The school librarian could help students find meaningful resources and effectively use technology.

- Science lends itself to interdisciplinary instruction and can especially benefit from integrating literature; there isn't always a set time for science instruction in the day so collaboration could help integrate it with other subjects that have protected time.

PST participants were also asked in which subject area they would be least likely to collaborate with their school librarian. By far the most common response to this question was "math," with nearly all respondents explaining that the library might have fewer resources related to math than to other subjects (again emphasizing these participants' focus on resources as central to TLC). Only two participants said they would be least likely to collaborate in science; one respondent attributed this to the fact that most schools use curriculum kits for science lesson and unit plans, and the other participant (whose answer was "evolution" rather than science in general) said that she wouldn't collaborate on this topic because she does "not like to force ideas" on her students.

8.9.1.2 Post-project conceptions. On their post-project surveys, PST participants were asked, "How do you think this project would have been different if you had collaborated on a Language Arts lesson instead of a science lesson, and why?" Many responses to this question indicated a persistence of the idea that English Language Arts (ELA) is a more natural fit for TLC than science, as well as additional evidence that PSTs continued to view resources as central to TLC at the end of the project (as discussed above, this might be attributable to the fact that most PSTs only received resource lists from their PSL group members). For example, seven participants responded that the school library would have more resources related to ELA, or that these resources would have been easier to find. Another six participants responded that the PSLs or PSTs may have been more familiar and comfortable with ELA-focused collaboration compared to science-focused collaboration.

For example, one response read “I would have felt more comfortable with language arts because I know more about language arts than science, so I would have been able to contribute more to the lesson.” Another response in this category read, “It would have seemed more natural to incorporate the librarian, and it would have seemed like the librarian had more knowledge and resources to offer.”

Several responses to this question suggested differences in PST participants’ understanding of pedagogy in ELA versus science. For example, four PSTs responded to this question by saying that more differentiation would have been necessary for an ELA-focused unit, implying that they believe individual student learning needs are less critical to consider in science than in ELA. For example, one PST said, “With Language Arts, we might have had more specific needs for each student (because reading and writing for each first grader looks so different), and this would have involved more individualized planning.” Another said, “I would have needed more modifications because I have students with IEP's and 504 plans for reading.” Another difference between ELA and science teaching noted by participants in their responses to this question related to classroom technology – specifically, the idea that instructional technology is used less often in ELA instruction than in science instruction (noted by three participants).

Some PSTs concluded that science-focused TLC is not that different from TLC in other subject areas. This was reflected in the responses of seven students who said that their collaborative experience would not have been significantly different if the project had focused on ELA instead of science. For example, one PST said that her experience would have been “not much different - we were able to easily come up with a lesson and text to

support students' learning that I feel it would've been slightly different content and focus but overall the same outcome."

8.9.1.3 Confidence and motivation. Most PST participants reported increased levels of confidence and motivation related to science-focused TLC. PSTs were asked directly on their post-project surveys to rate their level of agreement or disagreement with the statement, "As a result of this project, I am more likely to collaborate with the school librarian on a science-themed lesson or unit once I am a classroom teacher." A large majority of respondents (90.6%) indicated that they agreed or strongly agreed with that statement; the remaining three respondents were undecided. In the focus group, both Bree and Abby said that they hoped to collaborate with their school librarian in science in the future.

The post-project survey also included the question, "Has this project affected your confidence level for teaching science in any way? If so, how?" Only seven (out of 32) respondents said no to this question; most provided no further information, however one PST clarified that she still felt uncomfortable with science, while another explained that she felt she wasn't able to "really utilize" her PSL group member. The remaining students reported that the project positively impacted their confidence level for teaching science. The most common explanation PSTs gave for how the project had this impact was that the project made them realize that the school librarian and school library can be sources of help when it comes to science teaching. For example, one PST said, "I feel like I have a better understanding of collaborating with school professionals. It's cool to know that librarians can help me in all subjects, not just literacy."

8.9.2 Preservice librarians. Preservice librarians demonstrated changes in their understanding of science-focused TLC in three ways: changes in their sense of clarity

regarding the practice of science-focused TLC, changes in their personal confidence with and motivation for science-focused TLC, and changes related to their understanding of how science and information literacy overlap.

8.9.2.1 Clarity. Paralleling PSLs' changes in understanding of TLC in general, these participants' understanding of science-focused TLC also progressed from vagueness and uncertainty in the beginning of the project to clarity at the end of the project. Megan and Meredith both expressed uncertainty about what science-focused TLC might look like in practice. In her pre-project interview, Megan said that she had "no idea how a librarian could help with math or science, beyond giving the spiel of 'these are the databases you can use, and here's how you use them.'" Similarly, Meredith said:

> I think it's easier to think of language arts classes and foreign language classes, it's easier to think of the librarian collaborating with the teacher, because you think of stories, and there are books and there are authors that can easily work into a lesson. But with science, I'm not exactly sure - I mean, I don't know, some worksheets? Would some worksheets be helpful? As assessment for afterwards? Or - because if it's science project - I just, I don't know. I don't know yet.

Gina explained in her pre-project interview that while she wasn't personally comfortable with science as a subject, she could see how the library could help with science instruction "because there are science books," implying that her conception of science-focused TLC centered on resource provision.

By the end of the project, all PSL participants had been exposed to numerous examples of science-focused collaborative lesson plans, including sample plans provided to them in class as well as the lessons they contributed to writing themselves. As a result, they expressed more clarity about science-focused TLC. For example, in her post-project interview, Gina said, "Now that I've seen it in action, it's just more solidified in my mind, what you can offer to a science teacher." Similarly, Megan stated, "I think I told you in the

first interview that I think information literacy fits with everything, but I don't think that I fully, really believed that myself until this assignment…. I was surprised and pleased with how well I do think that it really does fit. That it made perfect sense to combine information literacy with science." PSL participants were also able to provide more detailed descriptions of the overlap between science and information literacy by the end of the project (see section 8.9.2.3, below).

8.9.2.2 Confidence and motivation. In addition to changes in the clarity of PSL participants' mental models of science-focused TLC, participants also demonstrated changes in their level of comfort with science-focused collaboration and their personal motivation to participate in such partnerships in the future. These changes were related to participants' developing understanding of the complementary, rather than duplicative, nature of skills and expertise brought into a collaborative partnership by school librarians and classroom teachers. At the beginning of the project, Ellen, Gina, Meredith, and Shelby expressed lower levels of comfort with the idea of participating in a science-focused collaboration compared to a humanities-focused collaboration. For example, Ellen said, "Like probably more people, the humanities I would be more comfortable…. I feel like it will be interesting to do this project because science and math I think would be the hardest for me."

These participants attributed their lower level of comfort with science-focused collaboration to both a lack of clarity about what science-focused TLC might look like (discussed above) and a personal lack of science content knowledge (discussed in section 8.7). For example, Shelby explained her lower comfort level with science-focused TLC by saying, "I can't remember the last time I took a science class. It was high school probably. It was like high school chemistry was the last science class, and I didn't love it…. So I have

some fear to get over." Jane and Megan did not express discomfort with the idea of science-focused collaboration in their pre-project interviews (they both mentioned math as the subject area in which they would be least comfortable).

Participants' self-reported anxiety related to their lack of science content knowledge conflicted with their pre-project perceptions of the importance of school librarians' level of subject area content knowledge to successful TLC. When asked to what extent they felt school librarians should be familiar with the subject area content being taught in the collaborative lesson, most participants responded that it was not critical for school librarians to have more than a surface-level understanding of the content – just enough to select resources and "point [kids] in the right direction" (Megan). Ellen elaborated on this idea, saying that ultimately, "the teacher's job is to be the content area expert, and you don't have time to become an expert in all these subjects and that's not really the service you're offering either." This understanding seemed to be at odds with PSL participants' anxiety regarding their own lack of science content knowledge, suggesting that although these students may have been aware of idealized role separation within TLC partnerships at the beginning of the project, they had not yet internalized or clarified for themselves the role they would be fulfilling in this project.

Gina was the only PSL participant who thought that content area knowledge would be critical for school librarians. She explained this opinion in terms of collaborative efficiency and professionalism:

> I would think it would be very important, because one, it's going to be way easier to collaborate with [classroom teachers] if you know what you're looking for without them having to tell you. But also, when it comes to professional environment and respect, a teacher's going to respect you more if you know more about where they're coming from. Because, I mean, they have to teach kids, they don't want to have to teach their librarian about what they teach, that's just extra work.

By the end of the project, PSL participants had a clearer understanding of the school librarian's role in a collaborative partnership; this change in understanding was brought about in part as a result of their lack of science content knowledge. I have already discussed how the PSL participants used naïve questions about the elementary and science context of the assignment and the lesson plan template document as a means of clarifying not only their own understanding, but also the understanding of their group members (Sections 8.6.4.1 and 8.7.3). As discussed in those sections, at the end of the project, PSL participants seemed to have a clear understanding that the school librarian and classroom teacher bring different, rather than duplicative, skills to the collaborative partnership. As Jane summarized in her post-project interview, "I really liked everyone bringing in their own expertise…. I feel like we were able to mesh our different things – our different expertise together."

At the end of the project, all PSL participants reported higher levels of self-confidence related to science-focused TLC and/or increased motivation to work with science teachers in the future. For example, in her post-project interview, Jane said that she "definitely wants to do [science-focused TLC] more. I thought it was really, really beneficial. I think since a lot of people are kind of nervous around science that collaborating can kind of take the pressure off one person." Shelby described her newfound confidence with science-focused TLC by stating, "I think my favorite part was doing this thing that's so outside of my comfort zone, and yet then feeling successful at it…. I feel like I can do this, I can be an instructional partner when it comes to science or the other things I'm just not as comfortable with." In her post-project interview, Shelby also discussed her realization over the course of the project about the importance of school librarians and elementary science teachers collaborating for student success:

> I think I see it as even more important. Part of it stems - you know, I have kids in public schools, and I see that they don't always get the best science education, or not as strong as I would hope, and I guess I've been floating on all these years thinking that the elementary school teachers would be able to do it, and I'm realizing now that a lot of them are gonna come in any not have that ability, and that I think the librarian really is gonna have to work to make sure that that's - the standards are being met, and that they're being met in ways that are really furthering understanding…. I do see it as more - mostly a problem at the elementary level. That if we're getting kids into middle school that can't do these things, are they gonna even have - no matter who their teacher is in middle school or high school, are they gonna be able to succeed?

8.9.2.3 Overlap between science and information literacy. Beyond expressing uncertainty about what specific forms science-focused TLC might take, PSL participants did not show any evidence of resistance to the idea that collaboration between school librarians and science teachers is possible, even at the very beginning of the project. As Gina explained in her post-project interview, "I tend to trust my coach or my teacher in what they say. So I immediately believed that collaboration was possible in science, because you know, [my professor] said so." In the pre-project interviews, all of the PSL participants were able to identify at least one area of overlap between science content or skills and information literacy content or skills, although for the most part these were simply listed and not explained or elaborated upon. Collectively, the students identified the following areas of overlap in the pre-project interviews:

- both science and information literacy share a focus on inquiry; specifically, the research process taught by school librarians is similar to the process of experimentation and hypothesis testing in science;
- both disciplines share an emphasis on teaching not only content knowledge, but dispositions (such as tolerance for ambiguity);
- information literacy skills are a prerequisite for many science research projects; and

- like science, information literacy "has to do with understanding rather than knowledge… not the facts themselves but what you do with the facts" (Megan).

For the most part, PSL participants' provided similar, but more detailed, post-project answers to this question. The following three quotes from PSL participants illustrate this:

- Ellen: "In science, the students are being asked to track data, and do all these things that involve organizational skills and research skills, and I think that's something that the librarian naturally fits into."
- Gina: After the project, Gina saw two additional areas of overlap between science and information literacy instruction: process and content creation. She explains, "I think [science] has a much stronger visible process than other things, and that's really what the library is focused on – making people aware of what they're learning and how they're learning it. Creating new information. And I think science is the place where you can first get kids to understand that they have the ability to create new information."
- Megan: "I think a lot of science is about – this sounds really silly – but, knowing the truth and evaluating the information and the perspectives that you're being given, and experimenting. And those sort of things that you're doing to learn science are things that fit perfectly with information literacy, and what you have to understand about information literacy to do those science things effectively."

As PSL participants gained more clarity about TLC and improved their own understanding of the complementary roles that school librarians and classroom teachers play in collaborative partnerships, some of them ultimately reached the conclusion that

collaboration with a science teacher is not very different from collaboration with any other teacher. As Megan explained in her post-project interview,

> Information literacy is information literacy. If that's what we're gonna be teaching, than that's gonna look somewhat the same… I think initially I would have thought it would be easier to [collaborate in] language arts, but now I don't think that's the case.

Not all participants reached this conclusion, however. When asked how they thought the project might be different had they collaborated on an English Language Arts lesson instead of a science lesson, Jane and Meredith both responded that they thought that the project would have been easier because they might have had more ideas and resources as well as more personal comfort with the content.

8.10 Other Course Experiences Related to TLC.

Other than this assignment, students in the *Curriculum Issues and the School Librarian* course were exposed to several other learning experiences that may have influenced their understanding of the roles and expertise of the school librarian and/or teacher-librarian collaboration. While preservice teachers did not have any other coursework related to school libraries or school librarians within their methods course, some of them may have been exposed to school librarians in their student teaching placement schools and this exposure may have impacted their understanding of the school librarianship as much as or more than their experiences with this project. In addition to their interaction with PSL students and practicing school librarians, PSTs may also have learned about school librarianship from the readings and handouts provided to them as part of the collaborative assignment (for a list of these readings, see Appendix C).

It is impossible to completely separate the influences each individual learning experience or exposure might have had on students' developing understanding of the issues addressed in this chapter, except in cases where participants specifically connected a learning

outcome to the collaborative assignment. Therefore, in this final section of the chapter, I will describe other learning experiences related to collaboration and/or the school librarian's instructional role that were encountered by PSL participants over the course of the semester, so that readers, or library educators hoping to implement similar assignments, may gain a fuller understanding of the instructional context in which this assignment took place. The description below is limited to the school library course, which I observed for nine of the fifteen class meetings (those that dealt most directly with topics germane to this project). As this course was offered at the same time as the science methods course, it was impossible to observe both courses, nor was it possible for me to observe PST students in their student teaching placement schools[13].

8.10.1 Other course assignments. In addition to the collaborative lesson plan project, PSL students had several other course assignments that may have contributed to their developing understanding of the school librarian's collaborative instructional role, school librarian expertise, and/or teacher-librarian collaboration. These assignments included:

- Portrait of a Collaborator: For this assignment, based on an existing assignment designed by Judi Moreillon at Texas Woman's University (Moreillon, 2015), students[14] completed a collaborative needs assessment and personality test, then reflected on their personal strengths and challenges related to collaboration as well as what their needs in a collaborative partnership might be. Students then used Web 2.0 tools to create portraits of themselves as collaborators.

[13] Such observation would have required a significant expansion of the IRB application to include provisions for observing not only the PST participants, but their elementary students and other school staff as well. In addition, I would have been required to get approval for such observation from each school's building-level administration and each school district's research office; this was not feasible given time and resource constraints, nor would it have been possible in many cases to predict when or if PST participants might come into contact with the school librarian at their placement school.

[14] In this section, "students" refers to students in the *Curriculum Issues* (school library) course only.

- Community Analysis: Students completed a community analysis (in PowerPoint format) for one of the six schools in which PST students were completing their student teaching assignments. In addition to the PowerPoint, students also created a one-page summary of their analyses to share with their classmates and with their group members in the education methods course.
- Professional Blog Monitoring: For the duration of the semester, each student monitored two professional blogs – one written by a school librarian and one written by a leader in the field of education. Five times over the course of the semester, students posted something of interest from their blog(s) to a class blog, including a brief summary of the original post followed by connections between the post and class content, questions raised by the post, and reactions to the post.
- Research Model: Each student was assigned one research model (for example, Carol Kuhlthau's Information Search Process model) to learn about and analyze. Students then created a one-page outline of the model and a graphic of the model which they shared with the class.
- Final Paper: For their final assignment, students were tasked with writing a 5-page paper that described the essential components of an ideal instructional program (as they saw it) in either an elementary, middle, or high school setting (for details of this assignment, see Appendix C). Although this assignment was due after the collaborative lesson plan design project, students were aware of the paper requirements and the assignment's emphasis on the instructional role, and were encouraged throughout the semester to pay attention to elements discussed in class that might be good candidates for discussion in this paper.

8.10.2 In-class learning experiences. PSL participants were exposed to in-class activities, media, readings, and discussions that emphasized the school librarian's instructional and collaborative role throughout the course, beginning with the first class session. In preparation for this session, students were assigned readings that focused on the school librarian's instructional role, including material from AASL's *Empowering Learners* (for a full list of readings, topics, and essential questions for each class session, see the course syllabus, Appendix C). In class, students were shown a video focusing on the school librarian's instructional role (Washington Library Media Association, 2013) and worked in small groups to create lists of the "Top 10 Things Librarians Teach." This emphasis on the school librarian as teacher continued in weeks 2-5 of the course, which focused on teaching for understanding and inquiry-based learning; curriculum and standards, including information literacy standards; and traditional (text-based) literacy. The general format of these and all class sessions for the course was based on a mixture of lecture, large- and small-group discussion and activities, and thinking routines or protocols used to encourage critical thinking and deep engagement with class topics. Often, entrance or exit slips were used as formative assessment techniques.

Week 6 of this course was the first to explicitly focus on teacher-librarian collaboration. In preparation for this class session, students were assigned readings about TLC including Marcoux (2007) and Montiel-Overall (2010). When they entered the classroom, students were invited to write their outstanding questions about collaboration on the wall (the classroom had walls painted with dry-erase paint). After everyone had done so, the class session began with a large-group discussion of the questions 1) what is teacher-librarian collaboration, and 2) what are the key concepts of TLC that you (as a school

librarian) want teachers to understand? Through this discussion, three themes emerged and reappeared throughout the remainder of the lesson:

1. TLC has different levels / forms in practice, ranging from simple resource provision to integrated curriculum development on a whole-school level.
2. TLC is student-centered and not just a "library thing."
3. Both collaborative partners bring different and complementary skills to the table.

Following this discussion, students participated in a write-around exercise where they wrote down and shared their ideas about why collaboration is important, benefits of TLC, obstacles to TLC, and ingredients of TLC. Two of the obstacles to TLC mentioned by PSL students in this activity – communication barriers and lack of time – reappeared during the project as barriers to progress or challenges (discussed in section 8.6 above). Several of the ingredients for TLC discussed during this activity were mentioned by participants at the end of the project as critical components of TLC (section 8.8). These include communication, flexibility and open-mindedness, self-reflection, and resources.

The first half of the seventh class session also focused on collaboration. As an entrance ticket, students were asked to respond to the prompt, "Write down five tips for building successful collaborations." Several of these tips were later mentioned by students as facilitating their progress through the collaborative lesson planning project, including utilizing a variety of modes to communicate with teachers, using collaborative tools such as Google docs and collaborative planning sheets, looking outside the school library for relevant resources, developing shared goals and desired student outcomes, building relationships with teachers, and practicing an advocacy role related to school library services.

Following this activity, the instructor led a blended lecture / discussion segment of the class that introduced models of collaboration (including Marcoux's, Loertscher's, and Montiel-Overall's) and asked students to compare and contrast the models and about the practical applications of these models. Several examples of collaboration were then given and students were asked whether the example represented collaboration and if so at which level. This activity revealed that students were still struggling with the idea that something like resource sharing could still be considered collaboration and suggested that students' personal mental models of collaboration were still focused on higher-level activities. Finally, students discussed their Portrait of a Collaborator assignments in light of the question, "What do you see as the characteristics of a successful collaborator?" Again, several of the characteristics they mentioned were later emphasized in PSL participants' in-class presentations and post-project interviews, including being a good listener, having clear goals, flexibility and open-mindedness, and viewing themselves as learners.

The remainder of the seventh class session focused on instructional design, specifically the backward design planning framework (Wiggins & McTighe, 1998). The following week, student groups met for the first in-class work session, which was followed by a debriefing session in the PSL class. Weeks 9 and 10 of the course focused on learner characteristics and assessment and followed a similar format to the beginning weeks of the course, discussed above. The second in-class work session took place during Week 11. The remaining class sessions focused on topics that were less directly relevant to this project, although sometimes the project was discussed for brief periods as students asked questions about it in class or when the instructor checked in with students about their progress.

Chapter 9. Discussion and Conclusions

In this chapter, I will discuss the major findings of this study across all research questions, using activity theory (Engeström, 1987, 1999, 2001) as an analytical lens to explore what and how participants learned during the project. I will also discuss how this study's findings support, extend, and problematize elements of existing TLC models. I will then compare the results of this implementation cycle to the initial (pilot) implementation before presenting design guidelines for cross-class collaborative lesson planning projects, as well as specific suggestions for future implementations of this project, based on findings from both cycles. Finally, I will suggest additional applications for these findings and directions for future research.

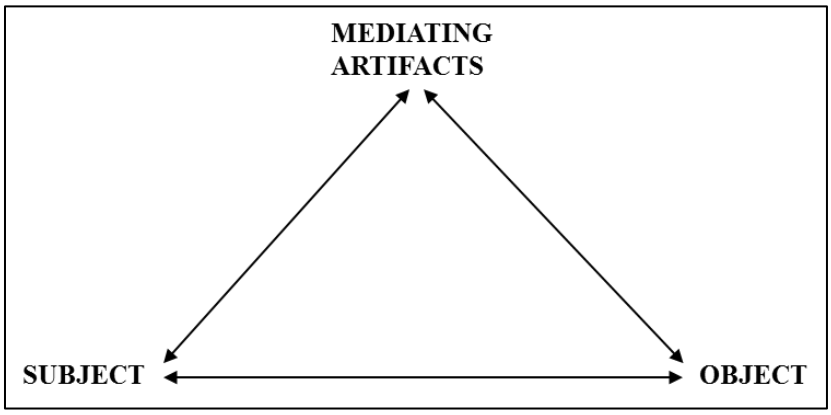
9.1 Activity Theory as an Analytical and Design Lens

Before applying activity theory to this study's results, I will briefly outline its history, major principles, and applications in the field of education.

9.1.1 History and development of activity theory. Activity theory (sometimes referred to as cultural-historical activity theory, or CHAT), is rooted in the psychological work of Lev Vygotsky (1978) and Alexander Luria (1976). In the 1920s and 1930s, Vygotsky developed the concept of mediated action (depicted graphically in Figure 13, next page), which proposed that human action was oriented toward objects and mediated by cultural artifacts. This concept was revolutionary in its insistence that the individual could not be understood outside of a cultural context. However, Vygotsky's model was limited by its focus on a single individual as the unit of analysis. Later work by Aleksei Leont'ev (1978,

1981) expanded Vygotsky's ideas to consider not only individual action but collective activity, however Leont'ev never expanded Vygotsky's visual model to clarify the components of collective activity and the relationships between these components.

Figure 13 Graphic representation of Vygotsky's concept of culturally mediated action.



Yrjö Engeström is credited with the development of modern activity theory. In the late 1980s, Engeström (1987) formulated an expanded activity triangle based primarily on the work of Vygotsky, Luria, and Leont'ev. Integrating concepts and theories from psychology, cognitive science, and education (among others), Engeström (1987) described an activity system as comprised of six interacting and transacting components: subject, object, mediating artifacts, rules, community, and division of labor. Activity theory posits that *the system* comprised by these components is the minimal meaningful context necessary to understand human actions and their outcomes (Engeström, 1993; Engeström & Miettinen, 1999). Engeström (2001) summarized activity theory by enumerating its five central principles:

1. The "collective, artifact-mediated and object-oriented activity system" (p. 136) is the primary unit of analysis. Although researchers may identify individual goal-oriented

actions taken by subjects, these actions are only understandable in the context of the entire system.

2. An activity system is multi-voiced: its participants represent multiple points of view, traditions, interests, and histories, and additional layers of history and points of view may be brought into the system in the form of artifacts (tools) and rules. Networks of interacting activity systems may multiply this multi-voicedness. This diversity is "a source of trouble and a source of innovation" in the system, "demanding actions of translation and negotiation" (p. 136).
3. Activity systems are formed and transformed over time, so the history of the activity (including its component parts) must be part of an activity system analysis. Activity systems are not static, but are constantly changing and shifting as components of the system interact.
4. Contradictions, or "historically accumulating structural tensions within and between activity systems" (p. 137), are the primary sources of change and development within the activity system. This principle will be explored in more detail in Section 9.1.3.
5. As tensions within the system accumulate or intensify, participants may deliberately and collectively deviate from the system's established norms to reconceptualize the object and motive of the system. Engeström described this "expansive transformation" (p. 137) as the outcome of participants' collective journey through the zone of proximal development (ZPD) of the activity. He used this term in a similar fashion to Garrison (1995) in that he described the ZPD as "distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated" in response to tensions that arise

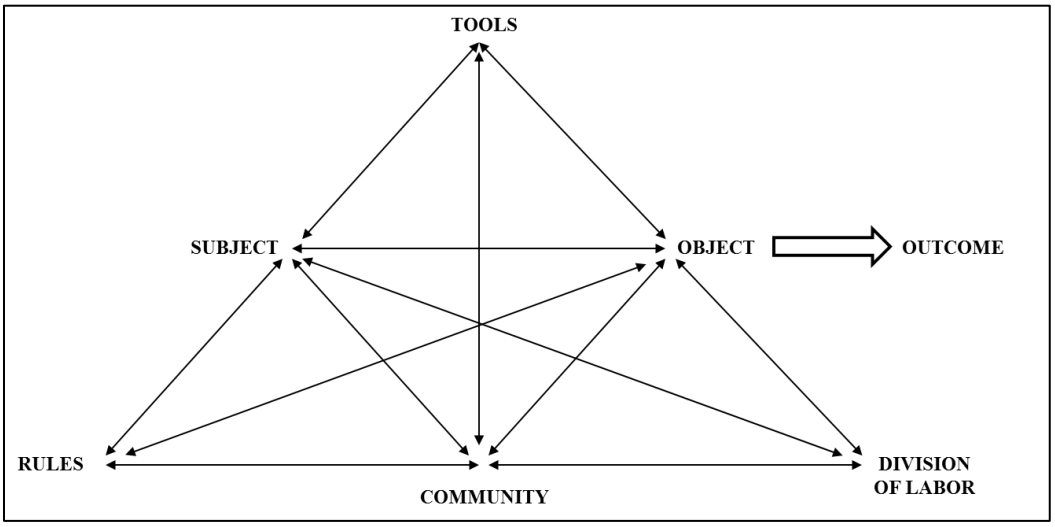
within and between activity systems (Engeström, 1987, p. 164). Engeström, like Garrison, does not view the ZPD as an orderly progression toward a known endpoint, but rather as a zone of possibility brought about by interaction between and among learners, teachers, and their environments.

9.1.2 The activity system. The activity system is a way to conceptualize the relationship between a subject (an individual or group of people) and an object (the material or problem at which the activity is directed). This relationship is mediated by:

- tools (physical, cognitive, and symbolic);
- the implicit and explicit rules that constrain actions and interactions in the system;
- the community of people who share the same object or who have a stake in the activity or its outcomes; and
- the division of labor, including task division among community members as well as power and status divisions (Center for Research on Activity, Development and Learning, 2003).

These components are typically depicted graphically in an activity triangle as shown below.

Figure 14. Generic Activity Triangle. Adapted from Engeström (1987).



The double-headed arrows connecting each component of the activity triangle with all other components represent the bidirectional interaction and transformative effects among system components. Any element of the system may both alter and be altered by other elements. For example, math students (subjects) may use their existing mental model of division (tool) to act on an assignment (object), however completion of the assignment may in turn transform the student's mental model of division. Social norms (rules) may constrain individuals' actions within a community, but individuals may collectively transform those norms over time.

Multiple activity systems may interact with one another simultaneously and over time. For example, one individual might belong to many communities, each of which could be understood in the context of a distinct activity system. A tool (or other component) in one activity system might be the product of another, earlier, activity system (for example, a lesson plan that was the object of one activity system may become a tool in another system that has teaching as its object).

9.1.3 Tensions in the activity system. Activity systems do not proceed in a straightforward and harmonious manner from subject to object to outcome. Rather, these systems are characterized by contradictions or tensions among system components, which Engeström defines as "historically accumulating structural tensions within and between activity systems" (2001, p. 137). Tensions may arise:

- within individual elements of the system (for example, doctors might experience conflict related to their dual roles as efficiency-focused hospital employees and patient-focused healers),

- between elements of the same system (for example, hospital regulations (rules) may conflict with a doctor's mental model of best practices (tools)), or
- across multiple activity systems (for example, disease management may be the object of both a hospital activity system and a home activity system, each of which has unique and potentially contradictory components) (Engeström, 1987, 1993).

Critically, these tensions are not equivalent to conflicts, problems or barriers. Instead, they are the main drivers of development within the system – sources of "disruption, innovation, change, and development of that system, including its individual participants" (Engeström, 1993, p. 65). *In the context of learning, sites of tension can drive students to critically examine prior conceptions and act in ways that deepen their own understanding and potentially the understanding of other system members as well.* This advancement only happens when subjects are able to innovate or otherwise transform the system in response to the tension; unresolved tensions can be obstacles to achievement of desirable outcomes.

An example will help illustrate the role that systemic tensions can play in moving the entire activity system forward in a learning context. Sasha Barab and colleagues (Barab, Barnett, Yamagata-Lynch, Squire, & Keating, 2002) used activity theory to investigate the dynamics of an undergraduate astronomy course that employed three-dimensional (3-D) modeling as a teaching and learning tool. In their analysis, they identified two pervasive tensions that characterized the course; one of these was the tension between learning astronomy and learning how to use the 3-D modeling software. The instructor of the course was concerned that the time students would need to invest in learning the software program would take away from the time they could devote to learning astronomical concepts. Analysis of interview, work sample, and observational data confirmed that students did

experience this tension. In some cases, this tension led to negative learning outcomes. For example, because they wanted their models to be aesthetically pleasing, some students changed the scale of objects in the solar system so that they would be visible in the models, despite the scientific inaccuracy of this choice. These students later expressed confusion regarding the scale of the solar system in post-project interviews. In other cases, however, frustrations that the students encountered related to learning the software actually led to deeper understanding of astronomical concepts. For example, the authors describe how one student's initial inability to correctly model an eclipse using the 3-D software led that student to consult with a classmate, who had managed to successfully represent the eclipse using the software and whose model subsequently served as a new tool for the original student. Using the classmate's successful model as a new tool, the two students discussed eclipses in astronomical terms until they realized where the original student had gone wrong; the original student was then able to use his improved understanding of eclipses (a transformed cognitive tool) to correct his 3-D model.

9.1.4 Activity theory in education. Educational researchers have primarily used activity theory as an analytical lens, as in the Barab et al. study discussed above. Activity theory can help educational researchers answer four key questions:

> (1) Who are the subjects of learning, how are they defined and located?; (2) Why do they learn, what makes them make the effort?; (3) What do they learn, what are the contents and outcomes of learning?; and (4) How do they learn, what are the key actions or processes of learning? (Engeström, 2001, p. 133)

Engeström (1999) contrasted activity theory with traditional educational theories that suggest either that learning is a precursor to doing, or that doing is a precursor to learning. Instead, activity theory posits that learning and doing are inseparable, and that distinctions between practice and understanding, or individuals and their contexts, are impossible to define.

Activity theory also differs from other theories of learning in that it does not assume the presence of a competent teacher or a stable and well-defined learning objective (Engeström, 2001). Traditional theories of learning assume a more-knowledgeable other who will help students acquire predetermined knowledge or skills. The problem with those theories, according to Engeström (2001), "is that much of the most intriguing kinds of learning… violates this presupposition. People and organizations are all the time learning something that is not stable, not even defined or understood ahead of time" (p. 137). Activity theory allows researchers to analyze learning systems regardless of the nature of the learning outcome and regardless of whether there is a competent teacher.

Activity theory has been used as an analytical lens in many educational studies, including studies of the impact of teacher professional development on classroom practice (Beatty & Feldman, 2012; Yamagata-Lynch, 2001), the design and implementation of online learning communities (Barab, Schatz, & Scheckler, 2004), teachers' transitions from preparatory programs to the workforce (Saka, Southerland, & Brooks, 2009), and innovations in teacher education programs (Roth & Tobin, 2002). Levine (2010) argued that activity theory has particular value for studies of teacher learning, since existing theories and models such as Communities of Practice (Lave & Wenger, 1991) and Professional Learning Communities (DuFour, 2004) are either unclear about precisely how teachers learn within those communities or are limited in their application to specific situations or types of teachers.

Although educational activity theory has been used primarily as a descriptive and analytical tool, it has also been employed as an instructional design framework. David Jonassen and Lucia Rohrer-Murphy (1999) outlined a process by which instructional

designers could use activity theory to develop constructivist learning environments. The process involves defining the desired learning outcomes, describing each component of the anticipated or desired activity system to the fullest extent possible, and assessing how those components might interact to create tensions and learning opportunities for participants. By working through this process, instructional designers can gain an understanding of participants' likely needs and possible challenges, and can design tasks with the full activity system context in mind. Similarly, but somewhat outside the educational field, Victor Kaptelinin, Bonnie Nardi, and Catriona Macauley (1999) developed a checklist, based on activity theory, that designers of technological tools and systems can employ to help ensure end users' achievement of their desired outcomes in using the technology.

9.2 Viewing the Collaborative Lesson Plan Project Through the Activity Theory Lens

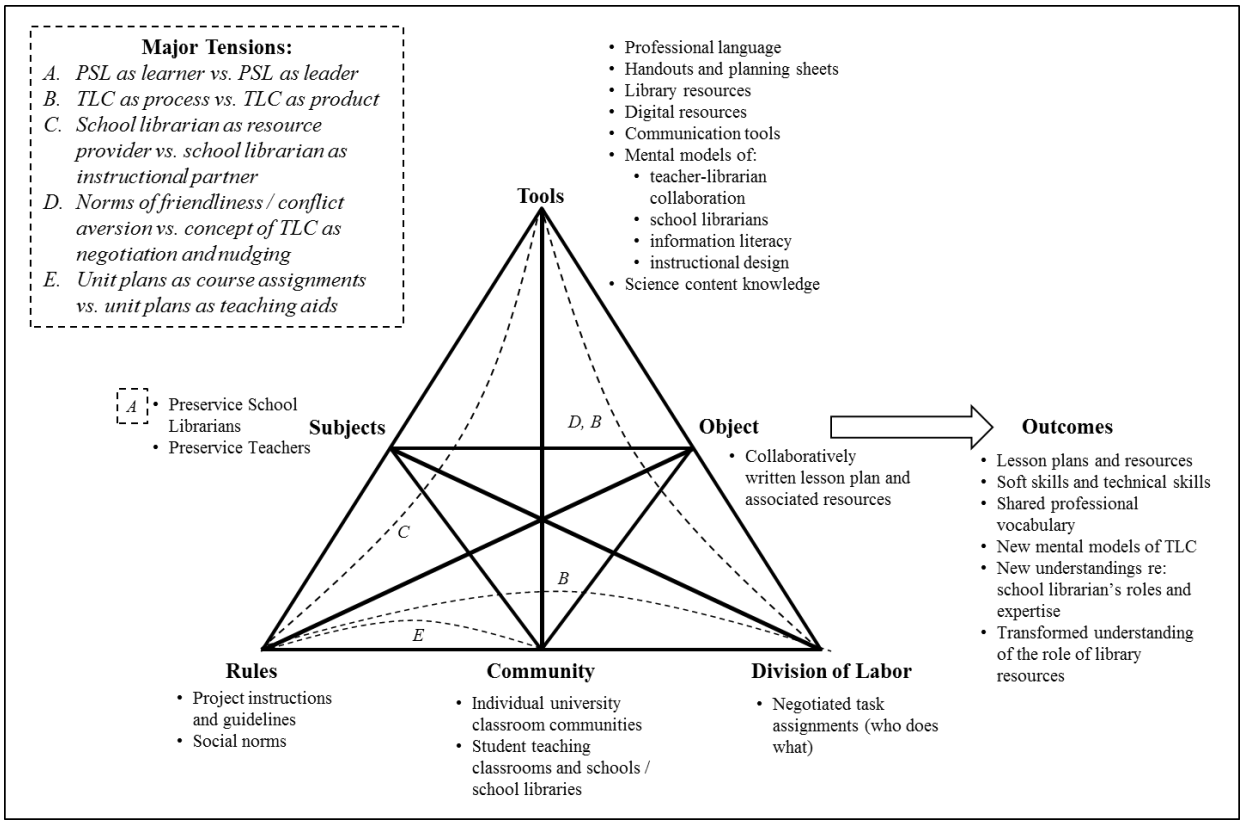
Using activity theory as an analytical lens, and synthesizing data from all project sources, I developed the activity system diagram shown in Figure 15, next page, which summarizes the primary contextual elements of this project. Based on the results presented in Chapter 8, I identified five tensions that were pervasive (although not necessarily universal) in the project. These tensions are listed in the top left corner of Figure 15 and are discussed individually below. In addition to these tensions, the activity system depicted in Figure 15 is comprised of the following elements:

- Subjects: PSL and PST students
- Object: the collaboratively written lesson plan and its associated resources
- Tools: physical, cognitive, and symbolic artifacts that subjects used during the project; these include professional language, handouts and planning sheets, library resources, digital resources, communication tools, science content knowledge, and

mental models of TLC, school librarians, information literacy, and instructional design

- Rules: project instructions and guidelines (including those written in student materials and those communicated verbally to students by instructors) and norms of social behavior
- Community: both (university) classrooms were included as communities, as well as the communities represented by the PST students' student teaching classrooms and schools
- Division of labor: negotiated task assignments within each group.
- Outcomes: tangible and intangible products of the activity system.

Figure 15 Primary Activity System in the Collaborative Project.



The following sections discuss five major and pervasive tensions that characterized participants' progression through the project.

9.2.1 Tension A: School librarian as learner versus school librarian as leader.

PSL participants came into this project focused on what school librarians in general, and themselves in particular, could bring to the collaborative table. From the first class session of the school library course, the school librarian's role as an instructional leader within the school was emphasized. For example, one of the reading assignments for the first class session was a chapter by Violet Harada titled "Librarians as learning leaders: Cultivating cultures of inquiry" (Harada, 2010). In this chapter, Harada drew on multiple theories of leadership to define the ideal form of leadership for school librarians as "servant leadership," which emerges from a desire to help others and involves nurturing others by understanding their personal needs, providing resources for them, actively developing their skills, and listening to and communicating with them (p. 6). This form of leadership is not autocratic but facilitative, and focuses on establishing "a shared vision and mission regarding student learning" among all team members (Harada, 2010, p. 6). Since this definition was the primary one to which PSL participants were exposed before the project began and is consistent with how leadership was discussed in class, it is the definition to which I refer in the following section when I discuss PSL participants assuming a leadership role in their groups. This facilitative, gentle form of leadership is also consistent with participants' desires to avoid conflict and practice friendliness within their groups, discussed further in section 9.2.5.

Perhaps in response to the PSL course's emphasis on the school librarian as an instructional leader, PSL students began the first in-class work session by jumping into the

role of group facilitator. As Jane explained, her graduate student status may have made the PST students automatically defer to her as the de facto group leader, however PSL students also actively assumed this role through such actions as talking their group members through the collaborative planning sheet, posing questions to PSTs, and bringing agendas to the meetings. All of these strategies were recommended both in class and in PSL students' assigned readings for the course. For example, students read one chapter of Jean Donham's textbook (Donham, 2004) before their class session on collaboration. While this chapter never explicitly stated that the school librarian should take the lead in collaborative partnerships, Donham did suggest that the school librarian should "help teamwork proceed" by such actions as posing questions, ensuring all team members are heard, keeping the discussion focused, and ensuring that each meeting begins with an agenda and concludes with a tangible outcome (p. 108).

From the perspective that the school librarian should be the leader in a collaborative partnership, PSL students' lack of knowledge about science content and lack of experience with instructional design, elementary education, and other elements of this project might be expected to cause them stress or anxiety. This is also consistent with findings from Katrina Arndt and Jeffrey Liles' (2010) study of collaboration between preservice classroom teachers and preservice special education teachers, in which both sets of students reported panic and confusion related to their own lack of knowledge of their partner's field.

PSL participants did report some level of discomfort with their own lack of knowledge on these topics. For example, Ellen discussed her "struggle" related to her lack of familiarity with elementary education, Shelby described her "fear of the lesson planning process," and Megan discussed the stress she felt as a result of not knowing how to write a

lesson plan. Discomfort, anxiety, and fear among PSL participants related to their own lack of knowledge or experience were the hallmarks of Tension A: PSL as learner vs. PSL as leader. This was an internal tension within the subject locus of the activity system, reflecting dissonance created by PSL participants' dual roles within the system as both leaders and learners.

PSL participants' sense that they should be leaders in the collaboration, coupled with the fact that PST participants viewed them as leaders (perhaps simply because of their graduate student status), created discomfort for PSL participants when they were confronted with situations in which they could not take a leadership role and instead had to take a learning role. These situations occurred when PSL students did not have the necessary knowledge or experience to address a pressing issue or question, for example, when they were confronted with an unfamiliar term in the lesson plan document during an in-class work session or when their group members were discussing science content with which they were unfamiliar.

When PSL students were forced to take a learning role despite their discomfort, often the result was system progression for both sets of participants. For example, Ellen discussed how in her group, she asked:

> a lot of kind of naïve questions about the way the lessons would be run and what they were going to be focusing on, and I think ultimately I could tell that was helping the students think through the process themselves. And so, although that was a struggle for me, it did have some benefits.

In other words, Ellen's assumption of the learner role helped clarify not only her own understanding, but that of her group members as well. Similarly, Gina discussed how her questions about terms used in the lesson plan template gave her group members a chance to "prove that they know what they're talking about," which ultimately helped equalize Gina's

partnerships within the group. Thus, working through this tension and seeing positive results of stepping back into a learning or following role helped participants come to an understanding of TLC as a back-and-forth process in which both partners are sometimes leaders and sometimes followers. As Shelby explained in her in-class presentation,

> When I was good at leading, it worked…. But then also knowing when to follow. There were two girls who actually, they were doing really great on their own. They were working together and they had a lot of good ideas, and it was good for me to just listen to them because they had already thought through this pretty deeply. And so that was good, when I really just listened to them.

PSL participants' lack of knowledge in some areas also helped to create role separation within their groups, leading all participants to a better understanding of TLC as a process in which both partners bring complementary, rather than duplicative, skills to the venture. Shelby described this best when she said, "I focused on what I knew… I don't know physics. But I do know how to organize, I know how to find things, and I was able to help them with their instruction by finding…. resources not only for the students, but for the teachers." As in Shelby's case, the science content focus of the assignment was one feature that sometimes forced PSL participants to take a learning role. As Jane and Meredith suggested in their post-project interviews when they stated that an ELA-focused collaboration would have been easier, focusing the project on ELA may have meant that PSL participants could have fallen back on their humanities backgrounds in ways that would eliminate opportunities for them to experience this leader vs. learner tension (and thus eliminate some opportunities for systemic progress).

This idea – that lack of knowledge on the part of one collaborative partner may lead to clarification for all partners – is not new to this study (although framing the tensions involved in the learning process in terms of activity theory has not been done before, to my knowledge). Jean Donham (2004; Donham van Deusen, 1996) discussed the dual role that

school librarians play as insiders and outsiders when collaborating with teachers. She explained that "this unique insider-outsider view of the planning process creates an opportunity for raising questions that can be at once naïve and challenging…. [and] that cause the teachers to reflect on their planning, to refocus, or to alter their direction" (Donham, 2004, p.116). What is uncertain in Donham's description of this process is how the subject area focus of the collaboration might impact this process; this project begins to address that question. In addition, this study examined collaborative partnerships among novice collaborators. Participants in this study had many gaps in their knowledge that created rich, natural opportunities for questions, clarification, and discovery. As school librarians and classroom teachers grow in their understanding of TLC and gain knowledge about information literacy and/or subject area content, pedagogy, school and classroom procedures, and specific students, they may need new strategies to enable them to maintain the valuable "outsider" or "clarifier" role when it is no longer necessary for them to ask naïve questions.

9.2.2 Tension B: TLC as process versus TLC as product. Existing leveled models of TLC, including those shared with participants in this project, separate forms of TLC into discrete levels based on both the process and products of the collaborative partnership. For example, Montiel-Overall's TLC model, shared with PSL participants, describes each level of TLC in terms of its products (for example, efficient schedules for Facet A, shared resources for Facet B, collaboratively developed instruction for Facet C, and collaboratively developed curriculum for Facet D). It also describes each level of TLC in terms of the degree of time commitment and the level of trust, friendliness, and communication among participants (elements of process). Thus, PSL participants were exposed to TLC as both a process and a product. However, the lesson plan project may have unintentionally

emphasized the "TLC as product" side of the continuum in ways that caused some tension for participants. This was a tension within the activity system resulting from dissonance among participants' mental models of TLC, the actual division of labor within their groups, and the assignment guidelines provided to participants.

When the project was assigned, PSL participants were confused about the degree to which they were expected to contribute to multiple lesson plans within their groups. Were they supposed to write a full lesson plan for (or with) each of their group members, or were they supposed to merely contribute individual sections of each lesson plan? As in the pilot implementation of this project, the school library course instructor addressed this question by recommending that each PSL student choose the one unit plan among those being developed in their groups with the greatest potential for integration of information literacy content. For that unit, the PSL student would write the majority of one lesson plan, which would fully integrate science and information literacy content. For the remaining unit plans, the PSL students were encouraged to contribute annotated resource lists or similar support at the resource provision level. In other words, PSL students were encouraged to create one work product that represented higher-level collaboration, and additional products that represented lower-level collaboration, *in terms of the written roles included in the plans for the teacher and school librarian.*

While most PSL students did turn in one plan written to represent a higher level of collaboration and additional plans written to represent lower levels of collaboration, the level of TLC described in the plan itself (for example, whether the school librarian would have an active teaching role in the lesson) was not the primary criterion that PSL students used to determine how "collaborative" their partnership with each student was. Instead, PSL

participants described individual partnerships as more or less collaborative based on the degree to which they were characterized by back-and-forth communication (especially e-mail mediated communication outside of class) and shared ownership of the lesson (with both PST and PSL students contributing to writing and editing the plan). In some cases, this disconnect between the written lesson plan product and the participants' perception of the collaborative process caused PSL participants to feel that the project was not as authentic as it perhaps could have been. As Ellen explained, "I didn't really feel like I got a really collaborative feel from the whole experience. I think in the meetings, the meetings definitely felt collaborative but then afterwards I didn't really get anything back." Participants' reports of communication difficulties within their groups (concerns which were raised by both PSLs and PSTs) were related to this tension and also suggest that participants view two-way communication as a hallmark of TLC.

Only one PSL – Gina – went beyond the project requirements by setting up face-to-face meetings with her group members outside of the two in-class work sessions. Gina met with all students in her group except one (who couldn't attend due to scheduling difficulties), regardless of the level of collaboration that would be represented in the written plans she contributed to for each group member. Despite this, Gina still felt that she wasn't able to "do the physical hard work" with her group members – instead, they spent their time together clarifying the assignment and dividing tasks for later independent work.

This tension has implications both for the design of this project (discussed in Section 9.5, below) and for models of TLC. Most existing models of TLC do not acknowledge the possibility that a collaborative partnership at the resource provision level might have a highly collaborative "feel" for participants, and might be characterized by high levels of trust,

communication, and shared goals and responsibilities. On the flip side, these models assume that collaborations in which school librarians and classroom teachers co-plan, co-teach, and co-assess instruction are characterized by high levels of communication, trust, and shared responsibility, which belies the possibility that school librarians and classroom teachers may co-plan, co-teach, and co-assess without much communication at all. Ellen acknowledged this possibility in her post-project interview, when she discussed the likelihood of teachers being too busy to maintain frequent communication throughout a collaborative partnership:

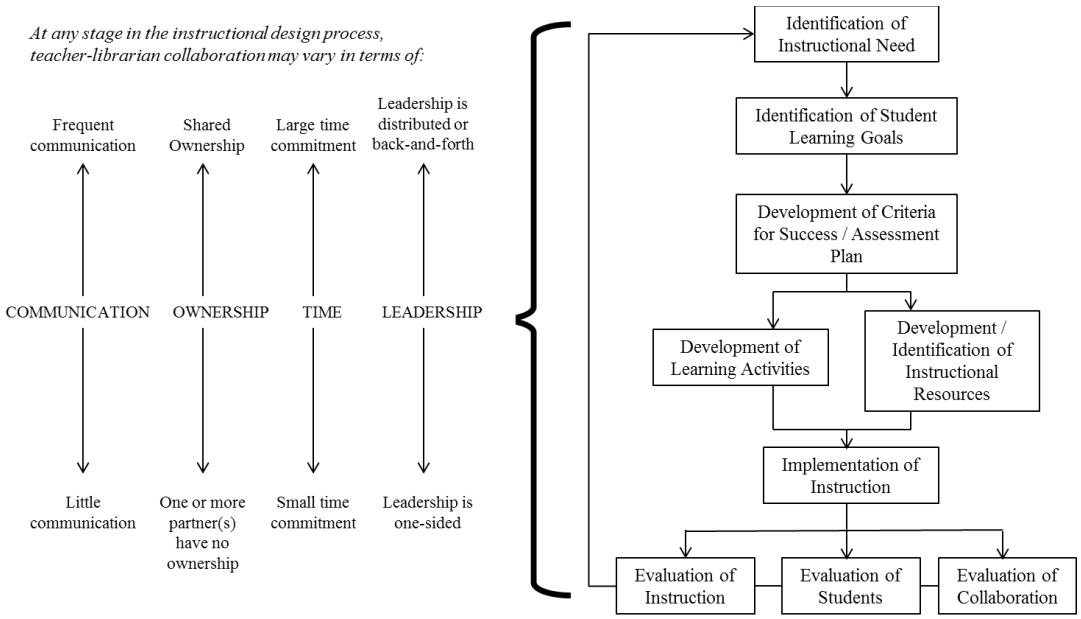
> Not necessarily getting a lot of communication back might be realistic. I think that hopefully [the teachers would] email you back, and obviously – especially if you're gonna come into their classroom and help them teach a lesson, hopefully you'd have a little bit more communication before that happens. But I do think a lot of times that happens kind of quickly and so it's good to know how to sort of roll with that and still try to make a good lesson without too much feedback.

The one model reviewed here that begins to address this issue is Turner and Naumer's (1983) model of school librarian instructional consultation, which maps out the instructional design process and describes various levels of involvement the school librarian might have at any stage of this process. As discussed in Chapter 3, this model focuses on consultation rather than collaboration, and as such positions the school librarian as an expert (or leader) in the partnership, in contradiction to the understanding of TLC as a back-and-forth process of leading and following as described in the previous section. An alternative model, synthesized from Turner and Naumer's model and data from this project, is presented in the following section.

9.2.3 An alternative model of teacher-librarian collaboration. Figure 16 (next page) presents a model of teacher-librarian collaboration that addresses some of the limitations of current models highlighted in this project's findings. This model is similar to Turner and Naumer's in that it allows for various levels of collaboration within and across

individual components of the instructional design process, however it does not assume that the school librarian is "the expert" in the collaborative partnership. As such, it aligns with the understanding of TLC as a back-and-forth process of leading and following (discussed in the previous section) as well as with activity theory and the modern conception of the Zone of Proximal Development, which do not impose a predetermined trajectory on learning or assume that one partner is more knowledgeable than another. While the instructional design process is depicted in a linear fashion in line with Turner and Naumer's model, it is important to note that instructional design may not proceed in a straightforward fashion; this model presents an idealized pathway. The four factors in this model along which TLC might vary in intensity (communication, ownership, time, and leadership) are derived from participants' post-project understanding of TLC.

Figure 16. Proposed Model of Teacher-Librarian Collaboration. This model, synthesized from project data and based on Turner and Naumer's (1983) model of school librarian instructional consultation, allows for various levels of intensity at any or all steps in the instructional design process.



The proposed model accounts for variation in the levels of communication, ownership, time, and leadership, and the combination of these factors would determine the overall intensity of the collaborative partnership regardless of whether the partners worked together on only one or multiple steps of the instructional design process. Variation in the leadership factor reflects the learner/leader interplay discussed above (Section 9.2.1) and students' understanding of ideal TLC as a back-and-forth process of leading and following (compared with one-sided leadership at the bottom of this continuum, representing something closer to a consulting relationship where one partner is the expert or helper and the other partner receives assistance). Variation in the shared ownership factor reflects differences in participants' levels of investment in the process and products of TLC as well as differences in the division of labor among partners.

Unlike existing models of TLC, this model does not reduce TLC to a small number of discrete levels or forms. Instead, the proposed model allows for myriad combinations of intensity levels for each factor as well as variations in those factors over time and across different steps of the instructional design process. For example, a teacher and school librarian might collaborate only on the development and identification of instructional resources, and that partnership might be characterized by frequent communication; shared ownership of the collaborative goals, products, and process; and distributed leadership (with both partners at times leading and at other times following); however, overall, the project might entail a low time commitment. Alternatively, the school librarian and classroom teacher might collaborate at all stages of the instructional design process, and this partnership might be characterized by high levels of communication, unequal distribution of tasks and investment in the process (low shared ownership), one-sided leadership (for example, the school librarian might serve

as the "expert" or "helper" throughout the process), and a high time commitment (for the school librarian, if not for the classroom teacher). It is also possible within this model for levels to vary over time or across steps of the instructional design process; for example, partners might communicate frequently at the "Identification of Instructional Need" and "Identification of Student Learning Goals" phases, but communicate less often during later stages.

Montiel-Overall's TLC model also posits that collaboration at higher levels will be characterized by a greater focus on student achievement (Montiel-Overall, 2005a, b). I have not included student achievement focus as a variable in my model because all student groups demonstrated a focus on student learning throughout this project, regardless of the form their individual collaborative experiences took. I attribute this focus to the strong emphasis on student outcomes in both courses as well as the project's inclusion of the backward design framework for lesson planning and the use of the backward design planning sheet to structure students' in-class work sessions. As multiple PSL students reported, the backward design framework focused participants' attention on student learning goals throughout the project and ensured that emphasis on student achievement was not a variable, but rather a central feature, of the project.

Trust is another variable that Montiel-Overall (2005a, b) posited might be higher in collaborations at higher levels of her model. I have not included trust in this model because no participants discussed this element as playing a role, positive or negative, in their experience with this project. This is perhaps due to the time-limited nature of the partnerships in this case; participants knew that they would only be working with their group members for this one assignment, therefore establishing or assessing trust was not a priority for them.

However, trust may be an important variable in working relationships among inservice school librarians and classroom teachers, and could be added to this model should it ever be used in studies of such partnerships.

One major difference between the proposed model of TLC and existing models of TLC is that the proposed model does not place resource provision at the bottom of a hierarchical structure. By describing resource provision as the lowest level or form of TLC, many existing models assume or imply that resource provision has little impact on student achievement and requires little time, trust, or communication between collaborative partners. This view of resource provision as fundamentally less than other possible forms of collaboration ignores the rich and varied roles that resources can play in collaboration and in instruction, the significant effort that many school librarians expend in finding and creating high-quality resources, and the long history of the information specialist role within school librarianship, as other scholars have noted (e.g., Kimmel, 2012a; Mardis, 2011). Teaching preservice school librarians and teachers about collaboration using existing models that position resource provision in this way might inadvertently send them the message that resource provision is unimportant or "old school," and may contribute to feelings of guilt and defensiveness among school librarians who place resource provision at the center of the profession, as seen in two of the PSLs in this project. This message may be conveyed by these models unintentionally even if the course instructor explicitly discusses the importance of resource provision and the many roles that resources can play within the instructional program of the school library, as the instructor for this course did multiple times over the course of the semester. An alternative model of TLC such as this one that does not characterize resource provision as a lesser form of collaboration might help students to place

resource provision into a broader educational context and to understand the information specialist role as inextricably intertwined with the teacher and instructional partner roles. I will elaborate further on this idea in the next section, which discusses tensions in participants' understanding of the school librarian as a both a resource provider and an instructional partner.

9.2.4 Tension C: School librarian as resource provider versus school librarian as instructional partner. One of the primary goals of this assignment was to improve all participants' understanding of the collaborative instructional role of the school librarian. Evidence suggests that this was partially achieved; PSL participants did report and demonstrate changes in their understanding of this role along several dimensions (discussed in Sections 8.4 and 8.8). However, data also suggests that the project was not as successful at shifting PST students' perceptions of the school librarian: both before and after the project, PST students focused on the school librarian's role as resource provider to the exclusion of the instructional partner role. Even among PSL students, this project only deepened the understanding that resource provision is a critical component – perhaps the critical component – of the school librarian's job. PSL students did transition from an understanding of resource provision as separate from the instructional partner role to an understanding of resource provision as central to the instructional partner role. Over the course of this transition, they experienced a tension between their understanding of "old school" and "new school" librarians (a mental model or tool) and what they were being asked to contribute and could contribute to their group members' lessons (the division of labor within their groups).

PST students were most familiar with school librarians as resource providers, and PSL students felt most comfortable in this role while also feeling that they should bring more

than just resources to the collaborative table. PSLs resolved this tension by transforming their own understanding of the function of resource provision within the school library program and the intertwined nature of school librarians' information specialist, teacher, and instructional partner roles. For example, Gina, Megan, and Meredith discussed how they used resource provision as a catalyst for professional development within their groups, and Ellen reported that resource provision allowed her to advocate for the school library program in general and transition into deeper practice of the instructional partner role, while Megan described how resource provision in one case led to a request for the school librarian to take an active teaching role in the lesson.

I have already discussed the importance of resources to science-focused TLC in particular as well as to TLC in general (Section 4.2). PSL students' descriptions, and my observations, of the various ways they used resources in their collaborative partnerships strongly supports Kimmel's (2012a) description of resources as boundary objects, able to bridge the library and the classroom; and school librarians as not only purveyors but mediators of those resources, able to transform them from objects into instructional tools. Participants' persistent focus on resources throughout the project combined with evidence of the powerful role that resources played in many project groups challenges the positioning of resource provision at the bottom of most existing models of TLC (and, as discussed above, this placement also confuses the process and products of TLC).

Marcia Mardis has warned school librarians and school librarian educators that current efforts to emphasize the instructional partner role at the expense of the information specialist role may work at cross-purposes to what students and classroom teachers actually need from school librarians – namely, a high-quality, current, diverse, and multimodal school

library collection, and a school librarian who can promote that collection and practice leadership through it (Mardis, 2011). She argued that "it may actually be the role of Information Specialist that has and always will be the school librarian's best bet for maintaining influence," and that "without the collection at the core of their activities, [school librarians'] attempts at instructional collaboration can seem rootless and artificial" (p. 46). Rather than emphasizing either the information specialist or the instructional partner role at the expense of the other, the PSL participants in this project suggest a third way – one that acknowledges that all school librarian roles, including those of information specialist and instructional partner, are inextricably intertwined.

At the end of the project, PSL participants described resources as tools for student literacy development and information literacy instruction, catalysts for professional development, and segues into deeper practice of the instructional partnership role. In their view, rich practice of the instructional partnership and teaching roles could not happen without resources; but also, resources alone were not sufficient for effective school librarianship without rich practice of the instructional partner and teaching roles. To use a science metaphor, this project suggests that rather than viewing each role of the school librarian as distinct and somehow in competition with the others, we might instead view them as similar to human body systems. In the human body, each system (skeletal, muscular, cardiovascular, etc.) is critical to the functioning of a healthy person. However, no single system can operate on its own – bones need muscles to hold them together and create movement; muscles need oxygen from the blood and signals from the brain to contract and expand; the brain could not send signals to muscles without chemical energy extracted by the digestive system and transported by the circulatory system. Similarly, school librarian

educators may best serve their students by teaching the five roles of the school librarian as intertwined and interdependent. Collaboration permeates all roles; resources permeate all roles; leadership permeates all roles; teaching permeates all roles; management and administration permeates all roles. Teaching the roles in this manner may help to alleviate the guilt and/or defensiveness some school librarians may feel when they admit to holding an opinion that places resources at the center of the profession. Such guilt and defensiveness were not pervasive among the PSL students studied here, but some evidence did suggest that at least two students (Megan and Ellen) experienced this.

Although there is little evidence to suggest that PSTs' understanding of the school librarian's instructional role was transformed through this project, there is clear evidence that their motivation to collaborate with school librarians in the future did increase. PST participants appreciated the resources provided to them in this project, and also came to see the librarian herself as a resource. Interestingly, it seems that PST participants were not aware of the professional development provided to them by their PSL group members (for example, none of them mentioned learning about rubrics, SmartBoards, or primary sources, despite the fact that PSLs reported using resources to teach them about these topics and I observed such teaching taking place). Professional development in TLC might be "invisible" to participants who see this process as oriented entirely toward student achievement versus teacher and school librarian growth. In the school library course, the instructor emphasized that the most effective professional development is often "seamless" and occurs at a teacher's point of need. Unfortunately, this study suggests that teachers may not always recognize such immediate and subtle professional development as PD; while this does not necessarily lessen its effectiveness, it does lessen its advocacy value (teachers who do not recognize that they

have received PD cannot tell other teachers or administrators that they have received PD). This finding is consistent with several studies that have explored the invisible nature of school library work in general and the difficulties of effectively communicating the skills and roles of the school librarian to classroom teachers and administrators (Hartzell, 1997.; Lawton, 2016; Phillips & Paatsch, 2011).

9.2.5 Tension D: Social norms of politeness versus mental models of collaboration as negotiation and nudging.

PSL students' completion of the Portrait of a Collaborator assignment at the beginning of the semester seemed to focus their attention on their own personalities, needs, and preferences within a collaborative partnership. Questions posed in the pre-project interview (such as "what do you feel are your strengths and weaknesses as a collaborative partner?") may also have contributed to PSL participants' awareness of these components. Most PSL participants identified a preference for conflict aversion and adherence to social norms of friendliness and politeness. When instances of potential conflict arose over the course of the project, participants often recognized their own conflict avoidance behaviors in the moment and experienced tension between their own discomfort with discord on the one hand, and their sense that TLC should involve negotiation and "nudging" on the other. This is a tension between the social norms of politeness (rules, in the terminology of the activity system) and participants' mental models of TLC (a tool).

In the course activities and in their readings for the course, PSL students were exposed to the idea that TLC involves negotiation, and that part of the school librarian's instructional role may involve nudging teachers' existing lesson plans or teaching ideas toward a more inquiry-based approach. For example, when learning about inquiry-based learning, PSL students read an article by Kristin Fontichiaro that discussed the school

librarian's ability to subtly and gradually push teachers toward more inquiry-based instruction while remaining aware of "the teacher's professional pride. A school librarian cannot build a longterm, trusting relationship if she demolishes the teacher's past practice. But a "tweak" might be appreciated, not reviled" (Fontichiaro, 2009, p. 18). In the class session on collaboration, the idea of constructive criticism as central to TLC was raised several times. Yet when PSL participants were confronted with situations in which they felt they should nudge or critique their group members, most chose instead to remain silent due to their anxieties about producing conflict within their groups. Only Jane was able to successfully nudge her group members away from two lesson ideas she felt were unsatisfactory, perhaps because of her previous experience working in collaborative lesson plan design teams or perhaps because Jane was simply not as conflict-averse as the other PSLs (Jane did not explicitly mention conflict avoidance in her pre-project materials). Thus, this tension was largely unresolved for participants, although several PSLs stated that they were more aware of it at the end of the project and would work to address it in future collaborations.

While it is difficult to say with certainty that group outcomes would have been improved if participants had embraced a healthy level of conflict rather than avoiding it, research into the role of conflict in teacher collaboration does support this possibility. For example, Betty Achinstein (2002) conducted ethnographic case study research in two urban middle schools, focusing on the micropolitical conflicts among teachers in the schools. She found that conflict was necessary for organizational learning and change within these schools, and cases in which conflict was suppressed or avoided were marked by stagnation. "In their optimism about caring and supportive communities," Achinstein wrote, "advocates

[of collaboration] often underplay the role of diversity, dissent, and disagreement in community life, leaving practitioners ill-prepared and conceptions of collaboration underexplored" (p. 421).

Though he acknowledged that intense or emotional (affective) conflict may be damaging to schools, Jorge Ávila de Lima (2001) also discussed the benefits of moderate levels of cognitive conflict among educators. These benefits include:

- Conflict may help teachers gain respect for diverse opinions and ideas and a sense of the value of independent thinking.
- Conflict may result in higher-quality group outcomes as a result of negotiation and the incorporation of multiple diverse viewpoints.
- Conflict can help organizations avoid the dangers of groupthink and can improve staff morale by honoring individual voices and opinions.
- Conflict can lead teachers to ask more questions, critically analyze their own and other's arguments, and pursue innovative solutions to problems.

Lima echoed activity theory's focus on tensions as sources of innovation and learning when he summarized his arguments in favor of conflict by stating, "avoidance leaves the conflict issue intact and takes no profit from it. Disclosure of conflicting views, on the other hand, when well managed, leads to tension release and opens new avenues for problem solving" (p. 113). Lima stressed that while professionalism and *friendliness* may facilitate collaboration, *friendship* is not necessary. Instead, what schools need are:

> people from within and from outside who are not concerned with disguising their ability or willingness to look at the school from a different perspective and who do not feel the need to pretend they are friends in order to produce these judgements. These individuals hold a strong potential for promoting a change of frames of reference in schools. (p. 115)

School librarians, in their dual roles as insiders and outsiders (Donham van Deusen, 1996), may be perfectly positioned to bring this "different perspective" to collaboration, but doing so requires them to be able to overcome their preference for conflict aversion and speak their minds; it also requires that they encourage their collaborative partners to do the same. Evidence from this project suggests that preservice education for teachers and school librarians needs to include strategies for increasing students' comfort with professional conflict and constructive criticism.

9.2.6 Tension E: Unit plans as course assignments versus unit plans as teaching aids.

A final pervasive tension that characterized the project was the contradiction created by the fact that PST participants' unit plans were both a course assignment (subject to a particular set of guidelines and requirements) and a teaching aid (to be put into action in PSTs' student teaching placement classrooms in the Spring). This was a tension between the rules of the assignment and the PSTs' student teaching communities.[15] This tension manifested itself in issues related to:

- each set of participants having a different timeline for completion of the project,
- PST students' difficulties in obtaining the required information to complete their plans from their supervising teachers, and
- various models of teaching science in PST participants' placement classrooms that were incompatible with the requirements of the unit plan assignment (for example, science taught using curriculum kits, science taught only in conjunction with literacy, or science taught by a specials teacher).

[15] One might also conceptualize this on a broader scale as a tension between the project activity system and another distinct activity system (the PST participants' student teaching contexts). However, since I have minimal data about the student teaching classrooms, I chose to describe only those elements of this tension that directly impacted, or were observed within, this project's activity system.

Since the PST participants would be the ones actually teaching from these plans, they seemed to be more aware of this tension than the PSL students. For example, the PST students in Megan's group spoke to their supervising teachers after the first work session then raised concerns with Megan related to student technology access in their classrooms. Gina and Jane's group members objected to technology-focused lesson ideas on the grounds that their students lacked prior experience with the tools. Many PST participants expressed frustration with their inability to get specific answers from their supervising teachers about the content and structure of the unit they would be expected to teach. As one PST summarized in the post-project survey, "It was a challenge to collaborate [with PSLs] in part because it was not our classroom to make lessons for so it also required collaborating with cooperating teachers."

PSL participants noted a silver lining to this tension in that it kept their work focused on real classrooms and real students and contributed to the authenticity of the assignment from their perspective. However, in the post-project PST focus group, Bree noted that she wouldn't be able to use her PSL's contribution to the unit plan because her supervising teacher had shifted the emphasis of her unit plan at the last minute. Other PSTs may have experienced similar situations, or may have significantly changed their unit plans between turning them in for this course and teaching them for other reasons. Thus, from the PST perspective, this tension weakened the authenticity of the project. However, this tension seems to be inherent to the unit plan assignment itself rather than the parts of that assignment that required PSTs to collaborate with PSLs. In other words, even if the PSLs had not worked with the PSTs on their unit plans, PSTs still would have experienced difficulty obtaining information from their supervising teachers and creating a unit plan that would satisfy both

the assignment guidelines and the demands and limitations of their student teaching classroom.

9.3 Comparisons to Initial Project Implementation (Cycle 1)

Data analysis from the initial implementation cycle of this project revealed three obstacles to effective collaboration. These included a lack of communication among group members outside of the face-to-face work sessions, a lack of PST preparation for the initial work session (many PST students did not have the requisite information from their supervising teachers as of the first work session), and a lack of knowledge about what the school librarian could do in a collaborative partnership among PST students (Rawson, Anderson, & Hughes-Hassell, 2015). In addition to negatively impacting the quality of the lesson plans produced by student groups, these issues also contributed to significant frustration and stress among PSL participants. In response to these issues, the course instructors and I implemented a number of changes to the assignment for Fall 2014:

- We required PSLs to post on the wiki and gave them suggestions for what to post (including agendas and notes from in-class work sessions and drafts of lesson plans). At the same time, we also encouraged them to explore alternate modes of communication within their groups.
- We moved the first work session back by two weeks with the hope that more PSTs would have the necessary information from their supervising teachers by that time.
- We recommended that all PSLs use the backward design planning sheet to structure their first work session.
- The school library course instructor and I strategized with PSL students about responses to possible scenarios in class before the first and second work sessions.

- We added several brief readings to the PSTs' course pack focused on the instructional role of the school librarian (see Appendix C).

In addition (though not in response to any particular issue or student feedback from the initial project implementation), the school library instructor added the Portrait of a Collaborator assignment and altered an existing community analysis assignment such that PSL students completed a community analysis of one of the PST placement schools and shared those analyses with their group members. As discussed in Chapter 8, participants provided positive feedback about most of these changes.

My use of activity theory to analyze the results in this cycle of the project implementation arose from my perception in the first cycle that there was a disconnect between the written level of plans that students turned in and the reported levels of communication and shared ownership that characterized those plans. As in the second cycle, students' perceptions of the levels of collaboration they experienced within their group seemed to depend more on the degree to which their work on those plans was characterized by back-and-forth communication and feedback with their group members than on the level of collaboration represented by the written words on the page. For example, one PSL in the pilot study described the division of labor in her group by saying, "I had a much better quality of input I guess from [one] student teacher…. We talked a long time about how to split up the groups to make the glogs, … and so she really did have a lot of input…. I'd say it was more of a collaboration with her." In my review of various theories that might help me understand that disconnect and how it might have facilitated or hindered student learning, I found activity theory to be particularly useful. As discussed above, activity theory allowed me to not only explore the process-versus-product tension in this project, but also to identify

and explore other tensions that I did not identify (or did not identify in terms of their place in the overall project context) during the first cycle of data analysis.

Reviewing the data from the initial project implementation in light of the activity theory analysis performed here shows that some of the tensions identified in this project were also present, if not prevalent, in the pilot project.

- School librarian as leader versus school librarian as learner: In the first cycle of the project, PSL students identified lesson planning and science content expertise as two areas where they sometimes needed to rely on their PST group members for clarification or other assistance. For example, one PSL noted that "the student teachers helped [her] navigate the lesson plan sheet." Unlike in this iteration of the project, however, these PSLs did not indicate that their own lack of knowledge about science or instructional design caused them any anxiety or stress, nor did they report asking any "naïve questions" to their group members (I did not observe them asking these questions either). There are a number of possible explanations for this difference. One possibility is that the addition of the Portrait of a Collaborator assignment for the second iteration focused PSL participants' attention on the potential challenges they might face, thereby increasing their anxiety about their own lack of content knowledge and/or pedagogical expertise. Another possibility is that the explicit emotional support provided to PSLs at the beginning of the project coupled with the brainstorming sessions that took place before each work session (during which PSLs directly explored what-if scenarios relevant to the work sessions) could have made PSLs in the second iteration of the project feel more comfortable asking questions and admitting what they didn't know. Finally, this difference might

simply have been related to differences in personalities or other undefined characteristics between PSLs in each iteration of the project.

- Norms of friendliness and conflict aversion versus mental models of TLC as negotiation and nudging: The addition of the Portrait of a Collaborator assignment for the Fall 2014 iteration of this course seemed to focus PSL participants' attention on their own personalities, preferences, and needs within a collaborative partnership in ways that were not evident in the pilot implementation of this project. In the pilot implementation, none of the participants discussed conflict aversion as an issue that arose in any way during the project. However, there was limited evidence that participants may have practiced conflict avoidance, regardless of whether they recognized it as such. For example, one PSL described the decision-making process in her group by saying, "[the PSTs] were pretty open to things. There were some things they kind of got hung up on, as far as, they really wanted to have this and that, and and I just kind of said "okay" and made sure I could work with that." That same PSL experienced a situation in which her PST's supervising teacher vetoed a lesson plan idea they had developed because the supervising teacher felt that the school librarian should only be involved with teaching research skills (their lesson plan idea had involved technology). When confronted with that, the PSL said that she "didn't try and fight it or anything. In a school setting I might, because I'd actually be in contact with the teacher. I might try and advocate for myself a little more, and actually say, 'I can do these things.'"
- School librarian as resource provider versus school librarian as instructional partner: As in this iteration of the project, evidence from the pilot project supported the idea

that PSL students gained a broader perspective of the school librarian's job, including the intertwined nature of school librarian roles, over the course of the project. At least one PSL participant in the initial project implementation also communicated that she was apologetic about her opinion that resources are central to the school librarian's job; when asked in her pre-project interview to describe the most important part of that job, she said:

> I know we keep learning it's not all about the books but to me a small part of me is like, 'it's all about the books!' still - I feel like a little bit of a throwback. Certainly I know the proper answer is, you know, to teach them how to research and how to think and in some ways how to learn, but for me it's a love of reading forever - you know, a lifelong skill and enjoyment.

Unlike in the current implementation cycle, none of the PSLs in the pilot project discussed their use of resources within the project in terms of professional development catalysts or segues into higher levels of collaboration. However, these participants were not asked specifically about the role that resources played in their collaborative experiences.

- Unit plans as course assignments versus unit plans as teaching aids: This tension was strongly evident in the pilot implementation and primarily resulted from PST students not yet knowing the details of their unit plans as of the first work session date. Because the first work session was earlier in the semester, and because I had not prepared PSL students for the possibility that their group members might not know details of their unit plans yet, many PSL participants in the first cycle reported that the first work session was unproductive, confusing, and/or frustrating. For example, one PSL said that in the first work session, her group members "definitely didn't know what they were doing, besides knowing the topic of their unit plan…. A lot of it was them complaining with each other, 'cause they were like 'your teacher's given

you that? I don't have that! I don't know what's going on!'" As mentioned above, one student experienced a situation in which her PST's supervising teacher nixed a lesson plan idea based on the supervising teacher's understanding of school librarian expertise (which did not include instructional technology). As in the second cycle, PSL participants did appreciate the emotional support that was incorporated into the project, with one PSL saying, "you kept reiterating that it was new for everybody. That that kind of helped because I felt like even though I was feeling a little lost at times, it wasn't the end of the world because we were actually gonna be able to work on it and get some feedback."

9.4 Design Guidelines

Results of this project (both the current and first cycle) suggest guidelines for the design of similar assignments. I have presented them below in no particular order other than that similar guidelines are grouped together. While I have phrased these suggestions in general terms, it is important to note that librarian and teacher educators wishing to design and implement such a project should carefully consider their own context when determining the applicability and importance of each guideline in their own setting.

- Emphasize and explicitly teach collaboration in both the school library course and the education course. Instructors of both courses should plan, implement, and assess this instruction collaboratively to ensure that students in both courses are constructing consistent understandings of collaboration and TLC as they progress through the assignment.
- Set and communicate realistic expectations. Prepare all participants for possible challenges or obstacles. For example, ask PSLs to develop a plan of action to follow

in the event that they receive no feedback on their lesson plan from their group members. Relate these potential challenges to what teachers and school librarians might face on the job (in the case of feedback, for example, it might be that classroom teachers will be too busy to give their school librarian feedback on a collaboratively planned lesson).

- Provide emotional support to students. A project such as this one may be stressful for students, especially those who are uncomfortable with group work in general. Acknowledge that stress and create an atmosphere of camaraderie and optimism.
- Teach students about the critical role of cognitive dissonance and tension in learning; this instruction could be part of a larger discussion of constructivism as an educational philosophy.
- Help students in both courses attune themselves to their personal strengths and needs related to collaboration, perhaps through the addition of an assignment similar to the Portrait of a Collaborator task given to PSL students here.
- Scaffold the project and provide structure, while still allowing for flexibility and creativity. Especially if the project will stretch over a long time period, check in regularly with students to assess their progress and address any concerns or challenges. Provide or recommend tools that will help students structure their work throughout the project (for example, backward design planning sheets, lesson plan templates, sample completed plans, and communication tools).
- Be cautious of imposing too much structure on the project. Acknowledge that collaboration may vary according to partners' personalities, the goals of the

partnership, the subject area, and other factors, and allow students to experiment with different approaches to find ones that work best for them.

- Practice and discuss the social elements of collaboration as well as the technical. Give students a safe space to practice professional ways of providing and accepting constructive criticism and managing conflict, perhaps by using structured feedback procedures such as the Tuning Protocol (McDonald & Allen, 1999). Explicitly discuss the potential benefits of cognitive conflict in collaborative partnerships, while also explaining to students that cognitive conflict does not equate to rudeness or anger. Allow time for both small talk and professional talk among student groups, and discuss the value of small talk and relationship building in the context of TLC.
- Work with students to facilitate open communication among group members throughout the project. Do not assume that any one particular tool will work well for all groups. Consider requiring a certain amount of out-of-class contact (virtual or face-to-face).
- Work with students' focus on resource provision to help them realize that resources are not only tools for student literacy development and subject area content instruction, but also mediators for all other school librarian roles, including that of instructional partner. Stress that in order to provide effective resources for students and teachers, school librarians must be able to place those resources in a broader context that includes the background knowledge and abilities of the learners, the learning goals of the lesson or unit for which the resources will be provided, and the ways in which resources might help to enact the information literacy curriculum. In other words, lead students to an understanding that resources are necessary, but not

sufficient, for a strong school library program – without the school librarian, library resources are just objects. This understanding is important not only for PSL students, but also for PSTs, who may not recognize the ways that resources can be used for their own professional development, to enrich student learning, and to deepen collaboration unless this is explicitly pointed out.

- Attempt to structure the assignment such that all PSTs are exposed to collaboration that involves more than simply receiving a list of resources from their PSL partner, either in terms of the written role described for the school librarian in the lesson plans or in terms of the intensity of the collaborative process itself (communication, shared ownership, time spent on the lesson by both partners, and/or leadership distribution within the group).
- Provide feedback to students throughout the assignment, including formalized feedback before PSL students send their lesson plan components to PSTs. In addition to having the instructor provide feedback, consider incorporating peer feedback (for example, require the PST and PSL students to provide written feedback to each other on their respective lesson plan contributions) and incorporate self-feedback via reflection. In this project, PSL students reflected on the process via the in-class presentations, and PST students reflected on the process via post-project surveys and the focus group interview. Emphasize reflection as not only a critical part of the learning process, but also as a form of feedback that students can always have access to as inservice professionals.
- Emphasize that TLC can be evaluated both in terms of its process and in terms of its products. Encourage students to think critically about existing models of TLC in light

of their experiences with collaborative lesson planning (perhaps have them develop their own model!).

9.5 Conclusions and Recommendations for Future Research

While various preservice interventions have focused on developing future teachers' understanding of the role of the school librarian and on developing leadership and collaborative skills among preservice school librarians, no published project has actually put preservice teachers and preservice school librarians together to collaborate on instructional design. In addition, few studies have addressed the topic of school librarian collaboration with teachers in science content areas, and none have done so via interventions involving preservice teachers at any grade level. This study helps to address two gaps in the education and school library research fields: a lack of empirical research focused on teacher-librarian collaboration in science content areas, and a lack of attention to best practices for teaching school librarian / classroom teacher collaboration within teacher and school librarian education research.

This project's findings have direct implications for school librarian and teacher educators and may also have implications for state and national library associations, school districts, and individual school librarians. The outcomes of this project include practical, societal, and theoretical contributions to scholarship related to science-focused teacher-librarian collaboration and best practices for preservice school librarian and teacher education:

- Practical: The general design principles discussed in the previous section may help instructors of preservice teachers and school librarians to design similar experiences for their own students. Regardless of whether it is possible to implement a similar

collaborative project in their settings, these educators should use the guidelines and other findings from this project to critically examine their students' prior knowledge and conceptions about collaboration, the ways they are teaching collaboration, and the impact of that teaching on students' developing understanding of collaboration and the school librarian's roles. Findings can also assist state or national library associations in advocating for more authentic collaboration experiences such as this one to be integrated into preservice school library programs. In addition, both professional organizations and school district level library supervisors may apply this project's findings to create meaningful professional development opportunities for inservice school librarians. Finally, the findings from this study may help individual school librarians improve their own collaborative practice, specifically as related to science or other STEM subject areas.

- Societal: This project directly impacted the understanding of more than 60 preservice teachers and 15 school librarians who participated in either iteration of the assignment; many more teachers and librarians, along with their students, could potentially be impacted if other preservice programs implement similar projects.
- Theoretical: The study findings contribute to theoretical knowledge by describing students' pre- and post-project mental models of teacher-librarian collaboration; critiquing existing models of TLC in light of project findings and proposing a new model of TLC consistent with these findings; and analyzing the students' learning process over the course of the assignment using activity theory (Engeström, 1987, 1993, 2001), which provided a framework for identifying and discussing the tensions and successes experienced by students as their learning was mediated by the

classroom and community context, tools, and each other. In particular, this study's findings challenge the placement of resource provision at the bottom of most existing models of TLC, where it is posited that such collaboration would have minimal impact on student achievement and minimal investment on the part of the school librarian and classroom teacher. As the participants in this study showed, resource provision, and the resources themselves, may serve a variety of vital functions in the school library's instructional program, and both teachers and school librarians view these resources as critical to the enrichment of student learning.

In addition to these contributions, this study also illustrates the potential of the Design-Based Research approach for the Library and Information Science discipline. As discussed in Chapter 6, LIS has long grappled with both a recalcitrant divide between research and practice (Bowler & Large, 2008; Crowley, 2005; Cruickshank et al., 2011) and a shortage of usable, middle-range theories generated within the discipline (Chatman, 1996; Kim & Jeong, 2006; Kumasi et al., 2013). Design-based research (DBR) offers a promising means of addressing both of these concerns simultaneously by placing research, design, practice, and theory generation into a real-world context, however published examples of DBR methodology in the LIS field are rare. This dissertation, and any published articles that it generates, will provide other LIS researchers interested in the DBR approach with a concrete example of a complex project that has gone through multiple iterations of data analysis and collection.

Finally, this study illustrates the potential of activity theory as an analytical and design framework for LIS studies. This theory could be particularly useful to LIS researchers seeking to understand learning in any context, from students in LIS degree programs to

library patrons in informal educational programs to users learning how to interact with a new software system. As Yrjo Engeström (2001) discussed, activity theory can help researchers answer four key questions about learning and learners: 1) who is learning? 2) why do they learn? 3) what do they learn? and 4) how do they learn? These questions, and the activity system framework itself, are broad enough to be useful to a wide variety of LIS researchers. In addition, guidelines such as those developed by David Jonassen and Lucia Rohrer-Murphy (1999) could help LIS researchers not only analyze learning environments after the fact, but also design effective, constructivist learning environments and identify potential tensions and growth opportunities students may encounter in advance.

9.5.1 Directions for future research. There are several ways in which future studies could build on the design guidelines and theoretical findings of this study. First, researchers may use these findings to design, implement, and assess similar projects in different contexts. Such research could illuminate elements of PSTs' and PSLs' initial and changing perceptions of TLC and the school librarian roles which are constant across settings, and those which might be particular to the programs and students studied here. One particularly interesting context in which to apply these results would be the online (distance education) environment. Many youth services MSLS programs are now offered partially or entirely online, and this shift has impacted not only how but also what LIS educators teach to students in these courses (C. C. Welch, 2013). Designing a cross-class collaborative experience in an online setting would pose unique challenges and opportunities, and many LIS educators may find reports of such projects helpful as more programs decide to offer online coursework.

This project's focus on science collaboration contributed to our knowledge of how PST and PSL students conceptualize collaboration in non-traditional (in other words, non-ELA) subject areas. However, most of the participants in this project always saw science-focused TLC as possible, even before they had specific ideas about what it might entail. In contrast, many participants mentioned math as a collaborative area where they saw no potential at all for TLC. LIS researchers have recently started to explore the potential connections between the school library and math instruction (Kimmel, 2012b; Subramaniam, 2015; Subramaniam & Edwards, 2014), in part because math is a critical component of STEM (Science, Technology, Engineering, and Mathematics), which is strongly emphasized in K-12 education. As with science-focused TLC, if collaboration between school librarians and math teachers is to become the norm, students must be exposed to that possibility in their preservice programs. Implementing a cross-class collaborative assignment such as this one focused on math instead of science would build the research base in this nascent area of study and could also result in a collection of sample collaborative lesson plans integrating math and information literacy, if student plans were published or otherwise shared online.

The elementary context of this assignment also created unique opportunities and challenges for instructors, participants, and myself. Implementing a similar project in which preservice school librarians work with secondary science teachers may deepen our knowledge of how preservice school librarians learn to collaborate with teachers in content areas where they have little or no background knowledge. In her post-project interview, Ellen said that "it wasn't like the [elementary] content was really hard to grasp," but that she was "still nervous about working with science teachers in high school." Working with preservice secondary science teachers who are content experts may accentuate participants'

understanding of role separation within a collaborative partnership and may offer additional opportunities for both partners to ask naïve or clarifying questions, but it may also heighten PSL participants' anxiety. Preservice secondary science teachers may see no connection between their curriculum and the school library, and thus may be more resistant to the idea of collaborating with a school librarian than preservice elementary teachers who may at least be aware of the school librarian's potential to collaborate with them on literacy instruction.

Some research has also pointed to lack of support from school-level administrators, or lack of knowledge about the school librarians' roles among school-level administrators, as a factor contributing to the infrequency of TLC on the ground in schools (e.g., Hartzell, 2002; Lindsay, 2005). A similar cross-class collaborative assignment might be worthwhile to pursue between preservice school librarians and preservice school-level administrators. While a lesson plan might not be an appropriate goal for such an assignment, participants could, for example, collaborate to create a School Improvement Plan or a school / school library budget document.

Both the synthesized model of students' progress through the collaborative project and the proposed conceptual model of TLC might be tested in new contexts, including school settings, to see which elements of those models are consistently observed across contexts and which elements might be helpful to practitioners in terms of their daily collaborative practice. In line with the pragmatist philosophy discussed in Chapter 6, these models could be judged in comparison to alternative models (such as Marcoux's pyramid or Montiel-Overall's faceted model) not in terms of how well they fit with observed reality but in terms of how useful they are to researchers, school librarian and teacher educators, and practitioners themselves. It may also be fruitful to examine the synthesized process model using activity

theory as a lens through which to examine each step in the process (for example, negotiation and division of labor) as the object of its own narrowly defined activity system.

Elementary school teachers and school librarians both face potential roadblocks related to science content instruction. Removing those roadblocks will take the combined efforts of practitioners, educational and school library administrators and policymakers, and preservice programs for school librarians and classroom teachers. It is my hope that this project provides a model that these stakeholders can examine to create other circumstances in which the combined efforts of preservice elementary teachers and preservice school librarians will result in synergy – a product that is greater than the sum of its parts.

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APPENDIX A: DATA COLLECTION INSTRUMENTS

Classroom Teacher / School Librarian Collaboration: Pre-Project Survey for Preservice Teachers

[Note: I have annotated this survey with the following codes to indicate the source of each question. "O" indicates that the question is original to this study; "M" indicates that the question was taken from Moreillon (2008); "C" indicates that the question was taken from Church (2010); "A" indicates that the question or answer stems were adapted / reworded from the original source.]

This survey is designed to gather data about your beginning understandings and prior knowledge of the roles of school librarians in school learning communities and of classroom-library collaborative teaching practices. The survey will take approximately thirty minutes. Thank you for your participation.

Part I. Open-Ended Questions

O
1. In North Carolina, what do you think is necessary for a person to obtain licensure as a School Library Media Coordinator (school librarian)?
2. In what areas would you consider school librarians to be experts?
3. How would you define collaboration between a classroom teacher and a school librarian, and what would the roles of each partner be?
4. How might you personally imagine working with a school librarian once you are a classroom teacher?
5. As an elementary school teacher, you will be responsible for teaching several content areas. In which content area would you be most likely to collaborate with your school librarian, and why?
6. In which content area would you be least likely to collaborate with your school librarian, and why?
7. What do you feel are your strengths and weaknesses as a science teacher?

Part II. Your background related to school libraries and school librarians.

	Never	Rarely	Occasionally	Frequently	Very Frequently
A M 1. In elementary school, I used the school library…	☐	☐	☐	☐	☐
A M 2. In middle school / junior high, I used the school library…	☐	☐	☐	☐	☐

	Never	Rarely	Occasionally	Frequently	Very Frequently
A M 3. In high school, I used the school library…	☐	☐	☐	☐	☐
A M 4. As a college student, I have used the university library…	☐	☐	☐	☐	☐
A M 5. As a K-12 student, my school librarian(s) played a key role in my educational experiences…	☐	☐	☐	☐	☐
A M 6. When I was a K-12 student, I observed my classroom teachers working with our school librarians…	☐	☐	☐	☐	☐
A M 7. As an adult visiting and/or working in K-12 classrooms, I have seen classroom teachers and school librarians collaborating for instruction…	☐	☐	☐	☐	☐
O 8. Once I am a classroom teacher, I expect to collaborate with my school librarian…	☐	☐	☐	☐	☐

	Never	Rarely	Occasionally	Frequently	Very Frequently
O 9. Once I am a classroom teacher, I expect to collaborate with my school librarian <u>on a science-themed lesson or unit</u>…	☐	☐	☐	☐	☐

Part III. Roles of the School Librarian

Mark the answer that corresponds to the extent to which you agree with each of the following statements.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
A C 1. School librarians should help students find print resources for assignments and for leisure reading.	☐	☐	☐	☐	☐
A C 2. School librarians should help students find digital/electronic resources for assignments and for leisure reading.	☐	☐	☐	☐	☐
A M 3. School librarians should help classroom teachers find instructional materials.	☐	☐	☐	☐	☐
A M 4. School librarians should help classroom teachers learn about new technologies.	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
O	5. School librarians should be aware of the newest technologies for teaching and learning.	☐	☐	☐	☐	☐
O	6. School librarians should be knowledgeable about copyright and the ethical use of information.	☐	☐	☐	☐	☐
O	7. School librarians should be knowledgeable about various student research models such as Big 6 / Super 3.	☐	☐	☐	☐	☐
O	8. School librarians should be knowledgeable about electronic subscription databases containing journal articles and other reference material.	☐	☐	☐	☐	☐
C	9. School librarians should be responsible for teaching students how to locate information contained in print and electronic sources.	☐	☐	☐	☐	☐
A M	10. School librarians should teach reading.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
M 11. School librarians should be responsible for teaching research skills.	☐	☐	☐	☐	☐
A M 12. School librarians should provide professional development for classroom teachers.	☐	☐	☐	☐	☐
A M 13. School librarians are educators who are capable of teaching every area of the school curriculum.	☐	☐	☐	☐	☐
A C 14. School librarians should be responsible for teaching students how to evaluate information for accuracy and reliability.	☐	☐	☐	☐	☐
A C 15. School librarians should be responsible for teaching students how to take notes and organize information.	☐	☐	☐	☐	☐
C 16. School librarians should be responsible for teaching students to respect intellectual property (avoid plagiarism, cite sources, respect copyright laws).	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
17. School librarians should collaborate with classroom teachers to teach lessons which integrate information literacy into the curriculum. A C	☐	☐	☐	☐	☐
18. School librarians should help classroom teachers design and plan lessons and units of instruction. M	☐	☐	☐	☐	☐
19. School librarians should co-teach lessons and units of instruction with classroom teachers. M	☐	☐	☐	☐	☐
20. School librarians should assess students' learning on projects in which they have taught some or many components. M	☐	☐	☐	☐	☐
21. School librarians should help classroom teachers implement inquiry-based instruction. O	☐	☐	☐	☐	☐
22. School librarians should attend classroom teachers' planning and/or Professional O	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	Learning Community (PLC) meetings.					
	23. School librarians should collaborate with classroom teachers to integrate technology into the curriculum.	☐	☐	☐	☐	☐
	24. School librarians should play an active role in the school improvement plan / process.	☐	☐	☐	☐	☐

Classroom Teacher / School Librarian Collaboration: Post-Project Survey for Preservice Teachers

This survey is designed to gather data about your developing understandings and knowledge of the roles of school librarians in school learning communities and of classroom-library collaborative teaching practices. The survey will take approximately thirty minutes. Thank you for your participation.

Part I. Open-Ended Questions

1. What was the most important thing you learned from the collaborative lesson plan design project?
2. How would you define collaboration between a classroom teacher and a school librarian, and what would the roles of each collaborative partner be?
3. Did your project group experience any barriers to effective collaboration, and if so, what were those barriers and how did you overcome them?
4. How do you think this project would have been different if you had collaborated on a Language Arts lesson instead of a science lesson, and why?
5. Has this project affected your confidence level for teaching science in any way? If so, how?
6. In what areas would you consider school librarians to be experts?
7. How might you personally imagine working with a school librarian once you are a classroom teacher?

Part II. Impact of the lesson design project.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. Overall, the collaborative lesson plan design project was a success for my group.	☐	☐	☐	☐	☐
2. By participating in this project, I learned a great deal about the job of a school librarian.	☐	☐	☐	☐	☐
3. By participating in this project, I learned a great deal about collaboration between classroom teachers and school librarians.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
4. As a result of this project, I am more likely to collaborate with the school librarian once I am a classroom teacher.	☐	☐	☐	☐	☐
5. As a result of this project, I am more likely to collaborate with the school librarian on a science-themed lesson or unit once I am a classroom teacher.	☐	☐	☐	☐	☐

Part III. Roles of the School Librarian

Mark the answer that corresponds to the extent to which you agree with each of the following statements.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. School librarians should help students find print resources for assignments and for leisure reading.	☐	☐	☐	☐	☐
2. School librarians should help students find digital/electronic resources for assignments and for leisure reading.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
3. School librarians should help classroom teachers find instructional materials.	☐	☐	☐	☐	☐
4. School librarians should help classroom teachers learn about new technologies.	☐	☐	☐	☐	☐
5. School librarians should be aware of the newest technologies for teaching and learning.	☐	☐	☐	☐	☐
6. School librarians should be knowledgeable about copyright and the ethical use of information.	☐	☐	☐	☐	☐
7. School librarians should be knowledgeable about various student research models such as Big 6 / Super 3.	☐	☐	☐	☐	☐
8. School librarians should be knowledgeable about electronic subscription databases containing journal articles and other reference material.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
9. School librarians should be responsible for teaching students how to locate information contained in print and electronic sources.	☐	☐	☐	☐	☐
10. School librarians should teach reading.	☐	☐	☐	☐	☐
11. School librarians should be responsible for teaching research skills.	☐	☐	☐	☐	☐
12. School librarians should provide professional development for classroom teachers.	☐	☐	☐	☐	☐
13. School librarians are educators who are capable of teaching every area of the school curriculum.	☐	☐	☐	☐	☐
14. School librarians should be responsible for teaching students how to evaluate information for accuracy and reliability.	☐	☐	☐	☐	☐
15. School librarians should be responsible for teaching students how to take notes and organize	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
information.					
16. School librarians should be responsible for teaching students to respect intellectual property (avoid plagiarism, cite sources, respect copyright laws).	☐	☐	☐	☐	☐
17. School librarians should collaborate with classroom teachers to teach lessons which integrate information literacy into the curriculum.	☐	☐	☐	☐	☐
18. School librarians should help classroom teachers design and plan lessons and units of instruction.	☐	☐	☐	☐	☐
19. School librarians should co-teach lessons and units of instruction with classroom teachers.	☐	☐	☐	☐	☐
20. School librarians should assess students' learning on projects in which they have taught some or many components.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
21. School librarians should help classroom teachers implement inquiry-based instruction.	☐	☐	☐	☐	☐
22. School librarians should attend classroom teachers' planning and/or Professional Learning Community (PLC) meetings.	☐	☐	☐	☐	☐
23. School librarians should collaborate with classroom teachers to integrate technology into the curriculum.	☐	☐	☐	☐	☐
24. School librarians should play an active role in the school improvement plan / process.	☐	☐	☐	☐	☐

Post-Student Teaching Survey for Preservice Teachers

Preservice Teachers: Student Teaching Survey

Q1 Classroom Teacher / School Librarian Collaboration: Student Teaching Survey for Preservice Teachers

Last Fall, you agreed to participate in a research study investigating the impact of the collaborative lesson plan project you completed in EDUC 513 with a student from the School of Information and Library Science. The final piece of your involvement in that study is a follow-up survey. This two-part survey is designed to gather data about the classroom-library collaboration you observed or participated in during your student teaching experience. The survey will take approximately 10-15 minutes to complete.

Your answers on this survey are anonymous. You may choose not to answer any question for any reason.

If you have any questions about this survey, or if you experience any difficulties while taking the survey, please contact this study's Principal Investigator, Casey Rawson, at crawson@email.unc.edu.

Thank you for your participation.

Q12 Part I. Observations of the School Librarian and School Library Program.

Q13 Please answer the questions below based on what you experienced or observed during your student teaching program. At the school where I completed my student teaching experience...

	Yes (1)	No (2)	Don't Know (3)
the school librarian helped students find print resources for assignments and for leisure reading. (1)	❍	❍	❍
the school librarian helped students find digital/electronic resources for assignments and for leisure reading. (2)	❍	❍	❍
the school librarian helped me find instructional materials. (3)	❍	❍	❍
the school librarian helped other teachers find instructional materials. (4)	❍	❍	❍
the school librarian helped me learn about new technologies. (5)	❍	❍	❍
the school librarian helped other classroom teachers learn about new technologies. (6)	❍	❍	❍
the school librarian was aware of the newest technologies for teaching and learning. (7)	❍	❍	❍
the school librarian was knowledgeable about copyright and the ethical use of information. (8)	❍	❍	❍
the school librarian was knowledgeable about various student research models such	❍	❍	❍

as Big 6 / Super 3. (9)			
the school librarian was knowledgeable about electronic subscription databases containing journal articles and other reference material. (10)	❍	❍	❍
the school librarian taught students how to locate information contained in print and electronic sources. (11)	❍	❍	❍
the school librarian taught reading. (12)	❍	❍	❍
the school librarian taught research skills. (13)	❍	❍	❍
the school librarian provided professional development for classroom teachers. (14)	❍	❍	❍
the school librarian was viewed as an educator capable of teaching every area of the school curriculum. (15)	❍	❍	❍
the school librarian taught students how to evaluate information for accuracy and reliability. (16)	❍	❍	❍
the school librarian taught students how to take notes and organize information. (17)	❍	❍	❍
the school librarian taught students to respect intellectual property (avoid plagiarism, cite	❍	❍	❍

sources, respect copyright laws). (18)			
the school librarian collaborated with me to teach a lesson which integrated information literacy into the curriculum. (19)	❍	❍	❍
the school librarian collaborated with other classroom teachers to teach lessons which integrated information literacy into the curriculum. (20)	❍	❍	❍
the school librarian helped me design and plan lessons and/or units of instruction. (21)	❍	❍	❍
the school librarian helped other classroom teachers design and plan lessons and/or units of instruction. (22)	❍	❍	❍
the school librarian co-taught a lesson and/or unit of instruction with me. (23)	❍	❍	❍
the school librarian co-taught lessons and/or units of instruction with other classroom teachers. (24)	❍	❍	❍
the school librarian assessed my students' learning on projects in which the librarian taught some or many components. (25)	❍	❍	❍
the school librarian assessed other	❍	❍	❍

classroom teachers' students' learning on projects in which the librarian taught some or many components. (26)			
the school librarian helped me implement inquiry-based instruction. (27)	❍	❍	❍
the school librarian helped other classroom teachers implement inquiry-based instruction. (28)	❍	❍	❍
the school librarian attended classroom teachers' planning and/or Professional Learning Community (PLC) meetings. (29)	❍	❍	❍
the school librarian collaborated with me to integrate technology into the curriculum. (30)	❍	❍	❍
the school librarian collaborated with other classroom teachers to integrate technology into the curriculum. (31)	❍	❍	❍
the school librarian played an active role in the school improvement plan / process. (32)	❍	❍	❍

Q15 Part II. Factors Contributing to Your Level of Collaboration with the School Librarian.

Q16 During your student teaching experience, did you collaborate at all with the school librarian?

- ❍ Yes (1)
- ❍ No (2)

Answer If During your student teaching experience, did you collabor... Yes Is Selected

Q17 Please briefly describe this collaboration – what content area was the focus of this collaboration, and what were the roles of each collaborative partner?

Answer If During your student teaching experience, did you collabor... Yes Is Selected

Q18 Please list as many of the factors as possible that account for your involvement in a classroom-library collaboration. Please place an asterisk (*) next to the ONE factor you think was most important.

Answer If During your student teaching experience, did you collabor... No Is Selected

Q19 Please list as many of the factors as possible that account for your lack of a classroom-library collaboration experience. Please place an asterisk (*) next to the ONE factor you think was most important.

Post-Project Focus Group Guide: Questions for Preservice Teachers

1) Please introduce yourself.
2) Do any of you have any background or particular interest in science?
3) Describe your experience with the collaboration project.
    a) Potential probes: What worked particularly well? Did your group experience any difficulties, and if so, how did you get past them? Tell me about your first / second work session.
4) What specific features of this assignment worked well for your group? Which features did not work well?
    a) Potential probes: Was the timing of the two work sessions appropriate? Was the information provided in your course textbook useful to you? Was your group wiki site helpful?
5) Did you learn or experience anything surprising during this project?
    a) Potential probes: Why was this surprising? What did you expect before you started the project?
6) How do you think this project might have been different if you had collaborated on a language arts themed lesson instead of on a science lesson?
    a) Potential probes: How do you think the science content affected your own comfort with the assignment? The librarians' comfort?
7) If you were teaching EDUC 513 next year, how would you modify this assignment?
    a) Potential probes: How would you modify the specific requirements? How would you modify the structure of the assignment?
8) How would you define teacher-librarian collaboration?
    a) Potential probe: What would the role of each partner be?
9) Has this assignment changed your opinions about teacher-librarian collaboration in any way?
    a) Potential probes: Would you say you are more or less likely to collaborate with your school librarians as a result of this project? What specific aspects of the project contributed to this?
10) In what ways are school librarians experts?
    a) Potential probes: What do school librarians know the most about? What unique skills do they have?
11) In what ways are elementary school teachers experts?
    a) Potential probes: What do elementary school teachers know the most about? What unique skills do they have?
12) What do you see as the most important part of a school librarian's job? Why?

Pre-Project Semi-Structured Interview Guide: Questions for Preservice School Librarians

1) What is your academic and professional background?
    a) Potential probes: What did you major in as an undergraduate? What jobs have you held? Do you have any teaching experience? Do you have any science-related professional experience?
2) Why did you decide to become a school librarian?
    a) Potential probes: What interested you about the job? Why?
3) What do you see as the most important part of a school librarian's job? Why?
4) What do you think a typical day might be like as a school librarian?
    a) Potential probes: Where would you spend your time? Who would you interact with? What tasks would you complete?
5) In what ways are school librarians experts?
    a) Potential probes: What do school librarians know the most about? What unique skills do they have?
6) In what ways are elementary school teachers experts?
    a) Potential probes: What do elementary school teachers know the most about? What unique skills do they have?
7) How would you define teacher-librarian collaboration?
    a) Potential probe: What would the role of each partner be?
8) If you were to plan a collaborative lesson or unit with a teacher, is there a particular content area you would feel most comfortable collaborating in? Why?
    a) Potential probe: Would this depend on the grade level? How?
9) Are there any content areas you would not feel comfortable collaborating in? Why?
    a) Potential probe: Would this depend on the grade level? How?
10) When you collaborate with a classroom teacher, how important do you think it is to know the subject matter that teacher is focusing on for the lesson or unit?
    a) Potential probe: Do you think it's important to know as much about the content being taught as the classroom teacher? Why / why not? What do you think might happen if you collaborate on a lesson or unit where you don't know the content?
11) What factors do you think will influence your frequency of collaboration with classroom teachers once you are a school librarian?
    a) Potential probes: What factors might increase your frequency of collaboration? What are some barriers to collaboration you think you might face?
12) Do you see any overlap between information literacy and science? If so, where?
13) You've been introduced to the collaborative lesson plan project in your syllabus and Dr. Hughes-Hassell talked about it a little on the first day of class. What are your expectations for this assignment?
    a) Potential probes: How do you feel about the assignment? What do you think you will discuss with your group members at the work sessions? What type of lesson do you hope to come up with? Do you have any concerns about the project?

Post-Project Interview Guide: Questions for Preservice School Librarians

1. Describe your experience with the collaboration project.
    a. Potential probes: What worked particularly well? Did your group experience any difficulties, and if so, how did you get past them? Tell me about your first / second work session. Tell me about your final product.
2. What specific features of this assignment worked well for your group? Which features did not work well?
    a. Potential probes: Was the timing of the two work sessions appropriate? Was the information provided in your course textbook useful to you? Was your group wiki site helpful?
3. Did you learn or experience anything surprising during this project?
    a. Potential probes: Why was this surprising? What did you expect before you started the project?
4. How well do you feel this project approximated real teacher-librarian collaboration?
    a. Potential probes: What elements of this project seemed most realistic to you? Which elements might be different in a school setting?
5. How do you think the science focus of the students' unit plans impacted your experience with the project?
    a. Potential probes: Did the science focus impact your own comfort level with the assignment? Your group members' comfort level? What might have been different if the focus had been language arts?
6. Has this assignment changed your opinions about science-focused collaborations in any way?
    a. Potential probes: Would you say you are more or less confident about collaborating with science teachers as a result of this project? What specific aspects of the project contributed to this?
7. Do you see any overlap between information literacy and science? Between the goals and expertise of teachers in science content areas and the goals and expertise of school librarians? If so, where?
8. If you were teaching INLS 745 next year, how would you modify this assignment?
    a. Potential probes: How would you modify the specific requirements? How would you modify the structure of the assignment? How might you modify the presentation portion?
9. How would you define teacher-librarian collaboration?
    a. Potential probe: What would the role of each partner be?
10. In what ways are school librarians experts?
    a. Potential probes: What do school librarians know the most about? What unique skills do they have?
11. In what ways are elementary school teachers experts?
    a. Potential probes: What do elementary school teachers know the most about? What unique skills do they have?
12. What do you see as the most important part of a school librarian's job? Why?
13. What do you think a typical day might be like as a school librarian?

    a. Potential probes: Where would you spend your time? Who would you interact with? What tasks would you complete?
14. When you collaborate with a classroom teacher, how important do you think it is to know the subject matter that teacher is focusing on for the lesson or unit?
    a. Potential probe: Do you think it's important to know as much about the content being taught as the classroom teacher? Why / why not? What do you think might happen if you collaborate on a lesson or unit where you don't know the content?
15. If you were hired at a school with no history of teacher-librarian collaboration, what would you do to establish a collaborative culture there?

Observation Guide: In-Class Work Sessions

Group Members (*Pseudonyms*):

Group 1 PSL: _____

Topic Focus:

Group Members:

Group 2 PSL: _____

Topic Focus:

Group Members:

Group 3 PSL: _____

Topic Focus:

Group Members:

Group 4 PSL: _____

Topic Focus:

Group Members:

Group 1 PSL: _____

Topic Focus:

Group Members:

Group 1 PSL: _____

Topic Focus:

Group Members:

Group 1 PSL: _____

Topic Focus:

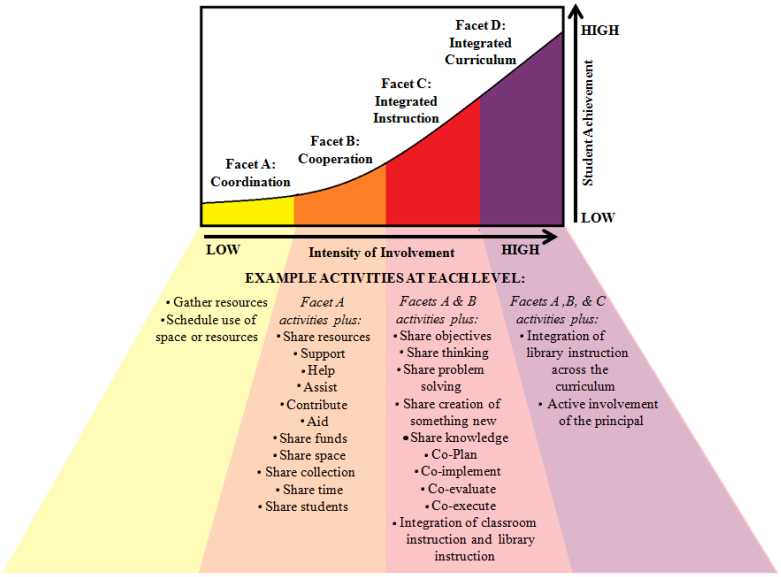
Group Members:

Group 1 PSL: _____

Topic Focus:

Group Members:

Look for evidence of each of the example activities noted below. In addition, take note of any difficulties encountered by each group, or confusion regarding assignment instructions.



Group	Time	Notes

APPENDIX B: CODING TABLE

Theme	Description	Sample Data	Sample Open / Axial Codes Included in This Theme
RQ2: The influence of prior experience with school libraries and librarians	PSL participants' descriptions of personal experiences with school libraries and librarians (mostly as K-12 students), whether positive or negative, and/or how this experience influenced their current understanding of the school librarian's instructional role.	"The things that I remember just all have to do with books." [Megan, pre-project interview] "In elementary school we would go every week, and I got to help check out books, which I thought was the coolest thing." [Jane, pre-project interview]	Memories of school librarians; Previous school library experience – books and reading
RQ2: The primacy of the information specialist role	PSL participants' focus on the information specialist role as the core component of the job.	"I guess, the finding of resources and the constant expansion of resources." [Gina, pre-project interview, when asked to describe the most important part of the school librarian's job]	Reading instruction; Books; Love of reading; School librarian as resource' Traditional resources
RQ2: School librarianship as distinct from teaching	PSL participants' beliefs that school librarianship is distinct from classroom teaching, especially in ways that minimize the instructional role of the school librarian.	"I really loved teaching but… I'm pretty introverted so talking in front of people all day was a lot for me." [Ellen, pre-project interview] "I like school libraries just because it's a little different from classroom teaching – you don't have to be, like, 'on' all the time." [Jane,	School librarian vs. teaching; Surprise (teaching); Different from classroom teaching

		pre-project interview]	
RQ3: PSL Participants' Pre-Project Expectations	PSL participants' expectations regarding the collaborative lesson plan design project	"I feel good about this program because they're willing to let us go out and collaborate with other students and really... dig our teeth into what we're going to be doing. So I'm really excited about it. Just because, as of now, of all my classes it's the closest to what I want to do in my career." [Gina, pre-project interview]	Expectations; Need to learn; Excitement
RQ3: Resources as mediating tools	PSL participants' post-project understanding of the role of resources as mediating tools in instruction and collaboration	"And because the education students were used to thinking of us as resource providers, I felt like creating book and electronic resource lists are a way to build trust while also nudging them to a broader understanding of what we could offer." [Ellen, in-class presentation]	Resources; Educating students via resources
RQ3: School librarian as instructional leader	PSL participants' post-project understanding of the school librarian as an instructional leader within the school	"The library is not [the school librarian's] classroom…. The school librarian really has the whole school instructional role." [Shelby, in-class presentation]	SL as big picture seer; most important – instructional role; Whole school view
RQ3: Project features that contributed to	Specific project features that contributed to	"I was surprised at how easy it was to use backwards	Tools; Emotional support; Reassurance;

observed changes	observed changes in participants' understanding of the school librarian's expertise and collaborative instructional role	design starting from scratch." [Megan, in-class presentation] "[The school library instructor] did a good job of making it feel like we were all a team… So that made me feel better." [Ellen, pre-project interview]	Realistic expectations; Grouping; Sample lesson plans
RQ3: Change in PST participants' language	While PST participants still associated school librarians with the information specialist role at the end of the project, the vocabulary they used to describe this association shifted	The school librarian has expertise in "all subjects because they have to access / evaluate resources, plan and teach lessons, provide insight, etc. in everything in elementary school." [PST participant, post-project survey]	Resources; Information specialist role
RQ3: Librarians have and are resources	Post-project perception that librarians have resources, but also *are* resources for teachers	"Librarians are a great resource that I had never first considered! They can not only teach but introduce me to new resources I had not known before." [PST participant, post-project survey]	Resources; Librarian as resource
RQ4: Conflict avoidance and social norms	Challenges encountered during the project as a result of participants' discomfort with conflict and their desires to maintain a friendly working environment.	Gina described how she "strictly follow[s] social conventions, such as being on time, being dressed appropriately, and being friendly," and how she "avoid[s] confrontation whenever possible." [Portrait of a Collaborator	Conflict aversion; Social anxiety; Concern re: conflict; Nudging

		assignment] "I have high expectations for myself and others, but I felt like this was bound by my desire to avoid conflict and not impose, and so sometimes I think my fear of being controlling can prevent me from sharing my ideas fully." [Ellen, in-class presentation]	
RQ4: Communication and feedback	Challenges and difficulties experienced by project participants related to communication among group members and/or lack of feedback from group members and course instructors.	"I kinda forgot that we had the wiki, but I know that [the PSL] had put things on there, so that's my fault, I just forgot that was there." [Bree, post-project focus group]	Language issues; Lack of feedback; Email; Wiki; Self-reflection
RQ4: Confusion	Confusion about any element of the project, but especially about project requirements / rules and the division of labor within groups.	"We're still so unsure what we're supposed to be doing." [PST participant, observed during first in-class work session]	PST knowledge of assignment; Confusion; Division of labor
RQ4: Contextual factors	Difficulties or challenges experienced by participants as a result of contextual factors including the elementary age level, other course assignments, and features of the PSTs' placement schools	"It was hard to plan my lessons when I didn't know a lot about what students knew already or where they were. My teachers were able to share some, but they didn't actually know a lot either because they haven't started	Timelines; Issue – age level; Not knowing students; Prior knowledge unclear

	and classrooms.	their [student teaching], although they're observing." [Megan, in-class presentation] "Our [supervising teachers] have little knowledge of our unit this far in advance, so in a sense we had to aim in the dark." [PST participant, post-project survey]	
RQ4a: Lack of science content knowledge	At the beginning of the project, both sets of participants reported a personal lack of science content knowledge. This theme also includes data about anticipated and observed effects of this lack of science content knowledge.	"My weakness is knowledge of science facts, while my strengths are my ideas for experiments and creative lessons and my enthusiasm to get kids involved in science." [PST participant, pre-project survey]	Fear of science; Academic background; Science content knowledge; Lack of science content knowledge – both sides
RQ4a: Contextual issues related to science	Participants experienced some difficulties with the project as a result of contextual factors related to how science was taught in the PSTs' placement schools and/or the supervising teachers' understanding of science content standards.	"My classroom only gets 20 minutes of science per day every other month." [PST participant, observed during the first work session]	Context; Time for science
RQ5: Pre-project conceptions	Participants' pre-project conceptions, definitions, and mental models of TLC, including their conceptions of each partner's roles	"I think that I do also have very narrow ideas right now, just of what collaboration – like, what specifically librarians can do. I only have a	Prior experience with collaboration; Defining TLC (Pre); Before – resource focus

		few examples in my head, like they can find resources of they can teach about how to do the research you need." [Megan, pre-project interview]	
RQ5: Division of Labor and Collaborative Feel	Participants' description of the division of labor within their projects and how this division impacted their perception of how "collaborative" the partnership was	"That was really the most collaborative. They sent me stuff, I sent them stuff, they sent it back, I added, they added, they took away – it went back and forth." [Shelby, post-project interview]	Division of labor; collaborative feel; Back and forth; Shared ownership
RQ5: Small talk and professional talk	Participants reports, and my observations, of small talk / relationship building and professional talk during the in-class work sessions, including data that addresses the impact and outcomes of this talk.	"We reviewed the concept of backward design and we talked about differentiation strategies…. We talked about the fact that they have stations in their classrooms, and they do different activities at the stations. And so we decided that we would focus on Smart Boards, that's something they all wanted to learn about." [Meredith, in-class presentation]	Small talk – function; Professional talk; Relationship building
RQ5: Flexible preparation	PSL participants' discussion of the importance of being prepared for the collaborative experience, yet also flexible and open-minded.	Meredith was "glad that [she] had some sort of plan or organization to the meetings, but I wasn't married to that plan. Because I wanted to utilize the session in the best way for them."	Flexibility; Prepared yet flexible

		[Meredith, in-class presentation]	
RQ5a: Pre-project conceptions of science-focused TLC	Participants' pre-project conceptions of science-focused teacher-librarian collaboration	"I have no idea how a librarian could help with math or science, beyond giving the spiel of 'these are the databases you can use, and here's how you use them.'" [Megan, pre-project interview]	Lack of content knowledge;
RQ5a: Importance of content knowledge	PSL participants' views about the extent to which librarians should be knowledgeable about subject area content (for example, science content) during collaborative experiences.	"The teacher's job is to be the content area expert, and you don't have time to become an expert in all these subjects and that's not really the service you're offering either." [Ellen, pre-project interview]	Importance of content knowledge; Role separation
RQ5a: Self-confidence and motivation related to science-focused TLC	Participants' self-reported changes in levels of self-confidence related to science-focused TLC or motivation to participate in science-focused TLC in the future	"I definitely want to do [science-focused TLC] more. I thought it was really, really beneficial. I think since a lot of people are kind of nervous around science that collaborating can kind of take the pressure off one person."	Increased confidence; Motivation

APPENDIX C: STUDENT MATERIALS

School Library Related Readings Assigned to PST Students

Harvey II, C. (2010) The teacher's take, part 2: The instructional role of the school librarian. *School Library Monthly, 26*(5), 45.

Johnson, D. (2003). Top ten things baby teachers should know about school libraries. Retrieved from http://www.doug-johnson.com/dougwri/baby-teachers.html

Valenza, J. (2004). Ten reasons to hug your school librarian. Retrieved from http://www.youblisher.com/p/26393-Ten-Reason-to-Hug-Your-School-Librarian/

Valenza, J., & Jones, G. (2012). What do teacher-librarians teach? Retrieved from http://www.abc-clio.com/uploadedFiles/Content/promo/Linworth_and_LMC_Files/LMC_MayJune12_WhatDoTLsTeach_Corrected_Poster.pdf

Washington Library Media Association. (2013). *Teacher Librarians at the Heart of Student Learning*. Retrieved from https://www.youtube.com/watch?v=z_ybY5O7WvA

Pamphlet Provided to PST Students (created by Casey Rawson)

What IS information literacy?

Information literacy is a set of skills that are all about finding, evaluating, using, and understanding information in an increasingly digital world. In North Carolina, **teaching the information literacy curriculum is the shared responsibility of all teachers**. But don't worry - your school librarian is an expert in information literacy and can help you integrate info lit standards into your existing lessons and units! These skills might include:

- Understanding the research process (from developing a topic to reflecting on the end product)
- Ethical and legal use of copyrighted material
- Taking notes and organizing information
- Evaluating websites for accuracy and reliability
- Using databases to find relevant information
- AND MUCH MORE!

DID YOU KNOW...

- **Your school librarian is a certified teacher** who has a Masters degree and has taken courses in literacy education, child development, classroom technology integration, and more!
- **The school library has a curriculum** focused on information literacy (the ability to find, access, evaluate, and use information).
- **That curriculum is taught through collaboration** with classroom teachers in ALL subject areas.
- **I won't "shush" your students.** I want the library to be an active, vibrant, and welcoming space!
- **You're not bothering me** by asking for help. In fact, if you don't ask me for help, I can't do my job!

Please come visit us soon!

It's not just books!

WHAT YOUR SCHOOL LIBRARY CAN DO FOR YOU

Library Mission Statement: The mission of our library is to create a community of lifelong learners who effectively utilize multiple forms of information and find enjoyment in the printed word.

We're here to help you!

► What can I do for you?

A lot! Here are **33 things** your school library or librarian can do for you this school year - and this is just a sample!

YOUR LIBRARIAN CAN:

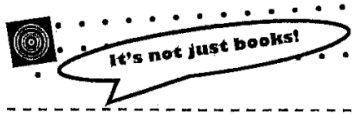
1. help your students find books to read
2. set aside books and/or videos for an upcoming lesson or unit (and deliver them to your room!)
3. provide extra space for lessons where your students need to spread out
4. connect you with professional resources in your field
5. collaborate with you to improve a lesson or unit you dislike
6. collaborate with you to expand, collect data on, or share a lesson or unit you love
7. offer professional development for you, a small group, or the whole school
8. help you decide which technology tool / website is right for you and your students
9. assemble digital resources into an online pathfinder for your students
10. check out technology equipment (headphones, DVD players, etc.) for your classroom
11. provide quiet space for you to work and plan in our teachers' area
12. attend your planning meetings, IEP meetings, and/or parent conferences
13. work with local public libraries to expand the school library's collection - if we don't' have it, I will try to find it for you!
14. connect you to community resources (student mentors and tutors, local businesses, field trip opportunities, etc.)
15. work closely with you to integrate information literacy standards into your existing curriculum in any subject (yes, even math, science, and physical education!)
16. co-teach lessons and/or units with you
17. assess student work for lessons or units where the school librarian helped you plan or teach
18. talk through any problems you are experiencing in the classroom - two heads are better than one!
19. help you reach ALL learners in your classroom
20. help make your lessons more inquiry-based
21. provide or help you develop differentiated classroom materials
22. help you find multicultural literature for your classroom
23. help you apply for grant funding for your classroom

Let us collaborate with you to teach information literacy skills!

I can teach your students...

YES, I will come to your classroom to teach these skills!

24. how to use the library catalog and databases
25. how to take notes and organize their materials
26. how to evaluate webpages and print materials
27. how to summarize and paraphrase
28. how and why to cite sources
29. how to legally and ethically use copyrighted material
30. how to navigate the research process
31. how to use classroom technology tools
32. how to produce and share multimedia projects
33. foundational literacy skills (reading and writing)



YOU are an expert in teaching and learning in your content area and have expert knowledge of your students. I am an expert in information literacy, instructional resources, collaboration, and classroom technology. Together, we can make awesome things happen for our students!

Backward Design Collaborative Planning Sheet

Stage 1: Key Design Elements (Adapted from Wiggins & McTighe, Backward Design)

Unit Topic: _____

Grade Level: _____

Identify Desired Results

Established Goals: Standards

What understandings are desired?

Students will understand that:

What key knowledge and skills will students acquire as a result of this unit?

Students will know:

Students will be able to:

Possible student products

Blank Lesson Plan Template

Lesson Plan

Teacher Candidates:

Grade Level:

Unit/Subject:

Lesson Title/Focus:

Date:

Time:

Lesson Overview/Summary:

Focus Question:

Connection to Other Lessons:

Student Accomplishment:

Common Core Learning Standard(s):

Learning Targets:

Academic Language:

Key Vocabulary (for this lesson in particular):

Classroom Characteristics:

Adaptations for Diverse Learners:

Grouping:

Materials needed:

The Learning Activities Sequence/Organization:
(Includes Guiding Questions and actions/responsibilities of teacher and students)

Engage (Before):

Explore (During):

Expand (During):

Evaluate (After):

Next Steps:

Assessment:

INLS 745
CURRICULUM ISSUES AND THE SCHOOL LIBRARIAN

FALL 2014
MONDAYS, 9:00 – 11:45, MANNING 303

OVERVIEW

In an influential *School Library* Journal article in 2009, Joyce Valenza and Doug Johnson stated the following: "The library, as we once knew it, may no longer be relevant. School librarians, as we once knew them, may no longer be relevant. And, yet, this is undoubtedly the most exciting time in history to be a librarian."[1] This class will explore the critical role and responsibilities of the school librarian in an environment often characterized by change and uncertainty. Specifically, this course focuses on the instructional role of the school librarian by examining state and national standards, curriculum, learner characteristics, instruction design, assessment, and collaboration, among other topics.

INSTRUCTOR

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Office Hours: M: 12:00-1:00; Tuesday 12:00-1:00, and by appointment

REQUIRED TEXTS

- American Association of School Librarians (2009). *Empowering learners: Guidelines for school library media programs.* Chicago, IL: American Library Association.
- American Association of School Librarians (2009). *Standards for the 21st century learner in action.* Chicago, IL: American Library Association.
- Harada, Violet H. and Joan M. Yoshina. 2010. *Assessing Learning: Librarians and Teachers as Partners, 2nd ed.* Libraries Unlimited.
- Donham, J. (2013). *Enhancing teaching and learning: A leadership guide for school library media specialists (Third Edition).* New York: Neal-Schuman.

[1] http://www.schoollibraryjournal.com/article/CA6699357.html

COURSE OBJECTIVES

Students will:

- Demonstrate knowledge of learning theory, instructional design, and assessment techniques and to be able to apply appropriately in specific teaching/learning situations.
- Show knowledge of curricular requirements (as outlined in the Common Core and North Carolina Essential Standards) for each grade and subject area.
- Demonstrate an understanding of information literacy and how it fosters lifelong learning.
- Demonstrate knowledge of learner characteristics in regard to learning and motivation.
- Develop an understanding of the instructional roles and responsibilities of the library media specialist.
- Develop an understanding of the importance of collaboration with classroom teachers across all subject areas and grade levels.
- Develop an understanding of the importance of action research and the collection of library data as means to improve instruction, advocate for the school library program, and promote professional development.
- Become familiar with ways to assess and market the school library and one's professional skills and abilities.

MY TEACHING PHILOSOPHY

As an instructor, I believe that inquiry-focused learning is more effectively achieved in a dynamic environment where there are opportunities for interactive study and application of theory to real practice. I use some of the following strategies to foster this type of learning:

- Discussions with time for synthesis and reflection
- Case studies and scenarios
- Continuing discourse between students and instructor and students with peers
- Peers serving as critical friends
- Guest resource persons serving as mentors and professional colleagues
- Assessment products that challenge students to demonstrate their understanding in authentic contexts
- Instruction that moves from the "What?" and "How?" to the "Why" and "So What"

ASSIGNMENTS

Our overarching goal is to build a professional community in which an exchange of ideas and opinions is respected and welcome. As students, you will be responsible for establishing your own work schedules and internal deadlines. You need to be resourceful in locating and retrieving information to complete your assignments. You are expected to arrive in class having read, considered, and mentally critiqued each of the items and topics listed on the class schedule. Assignments should be completed on time. Since meeting deadlines is an important professional responsibility, grades on late work will be lowered one full letter. The ability to work successfully with your colleagues will be vital to your career as a professional. Consequently, you must be thoughtful in your communication with your peers, instructor, and resource people. Finally, any incidence of plagiarism or other academic dishonesty will result in an F for the course.

#1 PROFESSIONAL BLOG MONITORING (15%)

North Carolina state standards for school librarians state that librarians should:

- participate with classroom teachers in professional learning communities to address student and professional achievement, and
- complete professional development and participate in professional learning communities to explore effective applications and enhancements for improving professional practice.

One way to participate in professional learning communities is online, through blogs and other Web 2.0 technologies. Each person in the class will be assigned **two** of the professional blogs listed below to monitor over the course of the semester – one blog written by a school librarian, and one blog written by a leader in the field of education. Over the course of the semester, you will need to post something of interest from your blogs to the class blog **at least 5** times:

- Two posts must focus on your school library blog. These posts should *briefly* summarize the original post and then connect the post to our class discussions or readings. You may point out questions raised by the original post and/or describe your reaction to the post.
- Two posts must focus on your classroom teacher blog. In these posts, you will address how the school library could add value to what the classroom teacher has described in his or her post. For example, if you are following a social studies blog and the teacher describes a recent lesson, you might post about ways that the lesson might have been improved via collaboration with the school library, or ideas for expanding the lesson into an inquiry-based and/or cross-disciplinary unit. Again, any summary of the original post should be *brief*.
- Your fifth post, and any remaining posts you choose to do, can focus on either blog or connections that you have noticed between your two blogs.

Each of your posts should be around 300-400 words. In each post, please provide a link to the original post so that your classmates and instructor can read the full text if interested. Each person is also expected to respond to **at least 3** of their classmate's postings on the class forum. At least three posts must be written on or before **Monday, October 13** and your last post / response must be written on or before **Monday, November 24.**

Post your responses to: http://inls745.blogspot.com/

Library Leaders
Adventures of Library Girl (K-12): http://www.librarygirl.net/
Joyce Valenza (K-12): http://blog.schoollibraryjournal.com/neverendingsearch/
The Blue Skunk Blog (K-12): http://doug-johnson.squarespace.com/
The Busy Librarian (Elementary): http://www.busylibrarian.com/\
Library Learners in the Centered School Library (Elementary): http://librarylearners.com/
E-literate Librarian (Middle School): http://e-literatelibrarian.blogspot.com/
Wendy on the Web (High School): http://wendyontheweb.blogspot.com/
Venn Librarian (High School): http://lpearle.wordpress.com/
Cathy Jo Nelson's Professional Thoughts (High School): http://blog.cathyjonelson.com/

Education Leaders
Will Richardson: http://willrichardson.com/
José Luis Vilson: http://thejosevilson.com/#sthash.rVew6EhQ.dpbs\
Edutopia: http://www.edutopia.org/
Justin Tarte: http://www.justintarte.com/
Lisa Nielsen: http://theinnovativeeducator.blogspot.com/
Mind Shift: http://blogs.kqed.org/mindshift/
Teachers as Technology Trailblazers, Kristen Swanson: http://www.kristenswanson.org/
Blogging Through the Fourth Dimension: http://pernillesripp.com/
Dangerously Irrelevant: http://dangerouslyirrelevant.org/

#2 PORTRAIT OF A COLLABORATOR (10%)*

This is an individual assignment. The goals of this assignment are to increase your intrapersonal intelligence (to know yourselves better) and to consider and celebrate aspects of your personalities that will influence your work as collaborating school librarians. This assignment will also give you the opportunity to use your creativity and to experiment with Web 2.0 tools.

- Complete "Needs Assessment" (Hartzell, Page 1, Sakai), the Jung Typology Test (JTT), and reflect on these results (Hartzell, Page 2, Sakai and the results of the JTT).
    - What are some of your personality traits that will affect your work as a collaborator?
    - What are your strengths? How might they impact your classroom-library partnerships?
    - What are your highest needs? How might they impact your classroom-library partnerships?
    - What challenges do you anticipate based on your profiles?
    - What words and phrases describe you as a collaborator? (You might want to create a word cloud using Wordle or Tagxedo)
    - What copyright-free or original images and sound(s) represent or symbolize your strengths and weaknesses as a collaborator?
- Select a Web 2.0 tool to create a portrait of yourself as a collaborator (i.e. Wideo, PowToon, Glogster, Prezi, GoAnimate, Animoto, etc). Think about which tool will best communicate your message. Be creative! Keep your portrait to short, but make sure it captures the essence of the collaborative you.

Due October 6th: Post the url for your portrait to Sakai.

*This assignment was adapted from LS5443: Librarians as Instructional Partners, developed and taught by Judi Moreillon, Texas Womens.

#3 RESEARCH MODEL (5%)

Each person in the class will be assigned one of the models listed below to learn about and analyze.

- Big6 / Super 3 - Michael B. Eisenberg and Robert E. Berkowitz
- Information Search Process (ISP) - Carol Kuhlthau
- I-Search - Ken Macrorie, Marilyn Joyce and Julie Tallman
- Pathways to Knowledge - Marjorie Pappas and Ann Tepe
- Research Cycle - Jamie McKenzie
- Building Blocks of Research – Debbie Abilock
- 8 W's – Annette Lamb, Nancy Smith, & Larry Johnson
- Alberta Inquiry Model – Alberta Canada

Investigate the model. Information on each model may be located using the database Library Literature and Information Science and/or the Internet. Here is one website to get you started on your research: http://virtualinquiry.com/inquiry/models.htm. You will prepare a detailed **one-page outline** that indicates how the model: a) Provides a framework for inquiry based instruction; b) Enables success for users in the information search process; and c) Supports the librarian's role as a collaborator in the learning process. You will also develop a **graphic** of the model suitable for presentation to the class. Make sure to identify the model you selected by name and provide citations for any resources you used to prepare your analysis and/or graphic. Be prepared to explain your model to the class.

Due: September 22nd

#4 – COLLABORATIVE PLANNING EXPERIENCE (25%)

Collaboration with classroom teachers is at the heart of the school librarian's job and is the primary way that school librarians implement the information literacy curriculum. In this course, you will have the opportunity to participate in a real collaborative relationship with students in the School of Education. We will be working with Dr. Anderson's senior undergraduate students enrolled in an Elementary Science methods course. The undergraduates are designing a 5-lesson science unit plan that they will teach next semester. They will be grouped according to the science domain (Life Science, Earth Science, Physical Science, etc.) they will be teaching in the Spring semester. Each of you will be paired with a group of Dr. Anderson's students.

These students will be developing a unit plan focusing on a particular aspect of this domain (e.g. weather, magnets, sound) over the course of the semester and will be writing five detailed lesson plans as part of this unit. Within each science domain group, there may be different grade levels and the specific focus for each grade level will be different (e.g. Life Sciences domain - 3rd graders might be studying food chains, 4th graders habitats, and 5th graders cells). This is similar to what you will experience on the job as a school librarian.

Your task is to determine how and where the school library can add value to each unit. What resources or services could you / your library provide to enhance teaching & learning? What information literacy standards and content might be incorporated? You will work with your group members to

choose one lesson for each grade level in the content domain area. You will help write the lesson plan for each grade level, making sure that they include both science & information literacy standards. Your lesson plan may represent any level of teacher-librarian collaboration, from simple resource provision to co-teaching. We will be using the Lesson Plan template provided by the SOE.

Here are some examples:

1. 2nd graders are studying the phases of the moon. The teacher wants the students to keep a journal for one month in which they record the changes they observe. You offer to 1) develop a lesson aimed at activating students' prior knowledge and getting them excited about the unit, and 2) provide a list of age-appropriate nonfiction books, videos, and web resources for him to use.
2. 5th graders are studying how mountains are formed. You realize that "watching" mountains form will be more engaging (and instructionally sound) than just looking at still pictures or reading text. You locate video clips that show the different ways mountains are formed. You also develop a graphic organizer with a set of questions for students to answer as they watch the videos so that they can compare the different formation methods. You teach a lesson on how to use the graphic organizer to take notes from the videos.
3. 4th graders are studying habitats. The teacher wants each student to make a book about a different habitat. You teach a lesson on finding information in a variety of resources and another on selecting copyright-free images.

You will meet with your group during class time twice over the course of the semester: October 20th & November 10th. Each group will be assigned a private Wikispaces site that you will use to share documents and ideas between in-class work sessions. You may also choose to meet on your own time outside of class, but it is our intention that most or all out-of-class work will be accomplished virtually via your Wikispaces site.

In addition to helping write the lesson plan(s), you will also be responsible for developing a ten-minute presentation to be delivered to our class only on December 1st. This presentation should focus on the collaborative process itself and should reflect on your group's outcomes (lesson plans).

#5 – COMMUNITY ANALYSIS (10%)

Dr. Anderson's senior undergraduate students will be working in six schools this semester. For this assignment, you will complete a community analysis for one of the six schools. In your analysis, you will provide information about the school and about the specific community it serves. You will create two deliverables:

1. A Powerpoint slideshow (15-20 slides) that presents key components of the community analysis. This slideshow should emphasize the usefulness of each piece of data to the school library program; in other words, the data that you find is not as important as your explanation of how you might use that data. (Note: you will not actually be presenting your slideshow, merely emailing it to the instructor).
2. A one-page document to share with Dr. Anderson's students at your first meeting that includes key components from your community analysis that you think will be particularly useful to them in their student teaching experience next semester.

Consider the following topics in conducting your community analysis:

Information about the Community:

- Geographic location

- Socioeconomic & demographic makeup of the community
- Key stakeholders
- Recreation & cultural institutions
- Local businesses
- History & its impact on the community
- Social, political, economic issues faced by the community that impact the school
- School district leadership and vision

Information about the School:

- Grade levels
- Socioeconomic & demographic makeup of the school
- Size of student population, retention rate, absenteeism rate, free & reduced lunch rate, etc.
- Scholastic standing (AYP status, EOG test scores) by demographic group
- Information about special populations served: ELLs, students with disabilities, academically gifted students, etc.
- Size of faculty, number of certified teachers
- School mission statement
- School priority goals (based on school's improvement plan)
- Technology available
- Facilities, adequacy of space

Due: October 13th

#6 – THE SCHOOL LIBRARY MEDIA SPECIALIST IN THE SCHOOL LEARNING COMMUNITY (20%)

Published guidelines make the assumption that the school library media specialist is an instructional staff member of a learning community, K through 12, with responsibility for collaborating in developing student information literacy. In job interviews, you will be asked to explain to members of the interviewing team (usually school faculty and key administrators) the content and context of an exemplary and visionary ***instructional*** library information/media program. This assignment is designed to prepare you for this question.

1. Select an instructional level (elementary, middle or high school).
2. In a 5-page single-spaced paper:
   - Describe the components of an ideal instructional program at that level. Include 5-8 major points in your description that reflect current thinking.
   - Select and describe a research model that you believe is functional for planning collaborative instruction leading to information literacy in the ideal instructional program that you described OR develop a model of your own. Provide a rational for why that particular model will work in

the setting you selected; focus on how the process suggested in the model can maximize the learning environment for students and help them become information literate.
    - Provide at least one concrete example of the model in action. Make sure your example reflects the components of an ideal instructional program you identified and demonstrates the utility of the model for working collaboratively with teachers.
3. Use graphic and textual articulation to convey your ideas.
4. Include a bibliography that supports your ideas as a separate item (Note: the bibliography is not a part of the page limitations).
5. Finally, develop a 1-page document (handout, wiki, webpage, etc.) that you will give the school faculty and key administrators at your interview that captures the essence of your explanation.

Due: By Noon, Monday December 8th

#7 – CLASS PARTICIPATION (15%)

The ability to work successfully and communicate effectively with your colleagues will be vital to your career as a professional. Consequently, you must be thoughtful in your interactions with your peers, instructor, and resource people. Your active participation in class is vital not only for your own learning, but for the learning of everyone in the class. I believe that each of you has valuable experiences and contributions that will deepen and extend our understanding of the course content, both during class and online. Therefore, I expect you to be engaged in class and in our blog. This does *not* mean that you need to raise your hand for every question in class - the quality of your participation matters just as much as the quantity, and when a handful of people dominate class discussions it is difficult for other students to fully engage. There are several ways to actively participate in class, and each will factor in to your class participation grade:

- Attendance: **You are expected to attend class each week and to arrive on time**; this is especially important since this class meets only once each week. Missing a class will also significantly compromise your ability to complete assignments. More than one absence or repeated tardiness will result in a lower class participation grade.
- Participation in class activities: In addition to large-group discussion, this class will include individual, pair, and small-group activities, and I will look for your engagement in all of those activities. I understand that it is not always easy to jump into a large-group discussion, so I will often provide opportunities for individual or paired "think time" before such discussions so that everyone can feel comfortable contributing.

TECHNOLOGY POLICY

Research on laptop use in higher education has shown that laptops used for course activities can result in learning gains, but that in-class laptop use also can also lead to distraction and decreased course satisfaction, understanding, and overall performance among students.[2] This course will occasionally

[2] Efaw, J., Hampton, S., Martinez, S., & Smith, S. (2004). Miracle or menace: Teaching and learning with laptop computers in the classroom. *EDUCAUSE Quarterly, 27*(3), 10-18.
Fried, C.B. (2008). In-class laptop use and its effects on student learning. *Computers & Education, 50*(3), 906-914.
Wurst, C., Smarkola, C., & Gaffney, M.A. (2008). Ubiquitous laptop use in higher education: Effects on student achievement, student satisfaction, and constructivist measures in honors and traditional classrooms. *Computers & Education, 51*(4): 1766-1783.

require the use of a laptop computer or tablet for class activities. I will notify you in advance when that is the case. During other weeks, you may bring your laptop or tablet to class if you wish, but **please use it only for taking notes or looking up information related to class discussions and activities**. Other activities such as checking e-mail, social networking, etc. should be restricted to before and after class and break times. Inappropriate use of technology during class time will be reflected in your class participation grade.

GRADING SCALE

H	(95-100) "clear excellence", **above and beyond** what is required
P	(80-94) all requirements satisfied at entirely acceptable level
L	(70-79) low passing
F	(<70) failed

UNIVERSITY HONOR SYSTEM

The University of North Carolina at Chapel Hill has had a student-administered honor system and judicial system for over 100 years. Because academic honesty and the development and nurturing of trust and trustworthiness are important to all of us as individuals, and are encouraged and promoted by the honor system, this is a most significant University tradition. More information is available at http://www.unc.edu/depts/honor/honor.html.

SILS DIVERSITY STATEMENT

In support of the University's diversity goals and the mission of the School of Information and Library Science, SILS embraces diversity as an ethical and societal value. We broadly define diversity to include race, gender, national origin, ethnicity, religion, social class, age, sexual orientation and physical and learning ability. As an academic community committed to preparing our graduates to be leaders in an increasingly multicultural and global society we strive to:

- Ensure inclusive leadership, policies and practices;
- Integrate diversity into the curriculum and research;
- Foster a mutually respectful intellectual environment in which diverse opinions are valued;
- Recruit traditionally underrepresented groups of students, faculty and staff; and
- Participate in outreach to underserved groups in the State.

The statement represents a commitment of resources to the development and maintenance of an academic environment that is open, representative, reflective and committed to the concepts of equity and fairness.

~The faculty of the School of Information and Library Science, Dr. Barbara B. Moran.

STUDENTS WITH DISABILITIES

"The Department of Disability Services (DDS), a part of the Division of Student Affairs, works with departments throughout the University to assure that the programs and facilities of the University are accessible to every student in the University community. Additionally, DDS provides reasonable accommodations so students with disabilities who are otherwise qualified may, as independently as possible, meet the demands of University life." Visit their website at http://disabilityservices.unc.edu/ for more information.

CLASS SCHEDULE AND READINGS

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
8/25	Course Overview Introduction to the Instructional Role of the School Library Media Specialist / Professional Standards Questions to Consider: What role do school librarians play in instruction? What education initiatives (national, state, & local) impact the instructional role of the school librarian? How has the instructional role of the school librarian changed as a result of the adoption of the Common	• *Standard 1*: Align the mission, policies, resources and activities of the school's library media program with the North Carolina Essential Standards and Common Core State Standards, local goals, and priorities for teaching and learning.	*Empowering Learners,* pp. 5-18 Harada, Violet H. "Librarians as Learning Leaders: Cultivating Cultures of Inquiry." [Sakai] Implementing the Common Core State Standards: The Role of the School Library [Sakai] Together for Learning: School Libraries and the Emergence of the Learning Commons. https://www.accessola.org/Documents/OLA/Divisions/OSLA/TogetherforLearning.pdf Common Core Wikipedia article: http://en.wikipedia.org/wiki/Common_Core_State_Standards_Initiative Look over NC Essential Standards for Information and Technology, http://www.ncpublicschools.org/acre/standards/new-standards/ Look over North Carolina School Library Media	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
	Core standards and a more focused attention on developing 21st Century skills?		Coordinators Standards: http://tinyurl.com/ncslmcstandards Look over the Framework for 21st Century Learning http://www.p21.org/our-work/p21-framework	
NO CLASS Martin Luther King Holiday				
9/8	Teaching for Understanding & Inquiry-based Learning Questions to Consider: What do we mean by the term "teaching for understanding?" What is inquiry-based instruction? What motivates students to learn?	• *Standard 3*: Demonstrate best practices in the integration of information and technology skills and resources in all areas of the curriculum while modeling and supporting inquiry-based learning.	*Empowering Learners*, Chapter 2 Barseghian, T. (2012, September 13). How do we define and measure "deeper learning?" MindShift Blog.http://blogs.kqed.org/mindshift/2012/09/how-do-we-define-and-measure-deeper-learning/ Stripling, Barbara S. "Inquiry-Based Learning" [Sakai] Harada, V. H., & Yoshina, J. M. (2004). Moving from rote to inquiry: Creating learning that counts. *Library Media Connection*, *23*(October), 22-25. [Sakai] Harada, V.H. Empowered learning: Fostering thinking across the curriculum. http://www2.hawaii.edu/~vharada/Empowered.pdf Fontichiaro, Kristin. (2009). Nudging toward Inquiry: Re-Envisioning Existing Research Projects. *School Library Monthly*/Volume 26 (1). [Sakai]	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
9/15	Curriculum and Standards Community Analysis <u>Questions to Consider:</u> What is curriculum? What is the relationship between curriculum and standards? What role do librarians play in the development and implementation of curriculum? In addition to understanding the curriculum, you need to understand the community you are serving. What kind of information is important? How does this information potentially inform the library program?	• *Standard 1*: Align the mission, policies, resources and activities of the school's library media program with the North Carolina Essential Standards and Common Core State Standards, local goals, and priorities for teaching and learning. • *Standard 4*: Demonstrate knowledge of curriculum goals across grade levels and subject areas. • *Standard 1*: Establish connections with community agencies and other libraries to strengthen cooperation and increase opportunities for resource sharing. • *Standard 2:* Collaborate with members of the school community in assessing needs and using needs assessment information to inform the school's collection development plan.	McTighe, J., & Wiggins, G. (2012). From Common Core standards to curriculum: Five big ideas. [Sakai] Take a look at some of the curriculum units developed by the Massachusetts Department of Education Model Curriculum Units http://www.doe.mass.edu/candi/model/files.html Information Powered School: Chapter 6 [Sakai] Moreillon, J. (2013). A matrix for school librarians: Aligning standards, inquiry, reading, and instruction. *School Library Monthly, 29*(4), 29-32. [Sakai] Franklin, P., et. al. (2009). Use standards to draw curriculum maps. *School Library Media Activities Monthly, 25*(9) 44-45. [Sakai] Howard, J. K. (2010). Information specialist and leader—Taking on collection and curriculum mapping. *School Library Monthly*, *27*(1), 35-37. [Sakai] Donham, Chapter 4 & 5 Kretzmann, John P. & John L. McKnight. Introduction to "Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets" [Sakai] Sample school library community analysis: http://www.slideshare.net/amytaylor/lswhs-	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
			community-analysis-amy-taylor	
9/22	Information Literacy Standards Research Models Questions to Consider: What is information literacy? What are information literacy skills? How does information literacy relate to student achievement within content areas? What are the some of the most commonly used research models? How can these research models be used to teach for understanding? How can they provide a framework for inquiry-based instruction?	• *Standard 1*: Provide leadership and support for establishing, promoting, and sustaining the effective use of information resources and technology tools. • *Standard 4*: Collaborate, model and promote effective strategies for accessing, evaluating, and synthesizing information resources to support teaching and learning.	Donham, Chapter 11 (3rd edition, Chapter 12) Take the *Information Competency Assessment Instrument* (PDF in Sakai, paper copy handed out 9/15) Skim *Standards for the 21st Century Learner in Action* (all, but pay special attention to pp. 5-16) Thomas, N. Current trends in information research and information skills instruction – Chapter 6 [Sakai] Head, A.J. (2012, December 8). Old-school job skills you won't find on Google. Seattle Times. http://seattletimes.com/html/opinion/2019857185_alisonheadopedxml.html Review North Carolina Information and Technology Standards http://www.ncpublicschools.org/acre/standards/new-standards/ ISTE National Educational Technology Standards for Students http://www.iste.org/standards/nets-for-students.aspx	** **Research Model Analysis due** **Bring Standards for the 21st Century Learner in Action to class**
9/29	Traditional Literacy – Text complexity and close reading Questions to Consider: What reading skills does	• *Standard 4:* Promote reading as a foundational skill for learning.	Donham, Chapter 9 Beginner's Guide to Text Complexity [Sakai] Video: Simplifying Text Complexity:	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
	the 21st century demand? What strategies can school library media specialists use to support 21st century reading?		https://www.teachingchannel.org/videos/simplifying-text-complexity Olga Nesi, Olga. (2012). *The Question of Text Complexity: Reader and task trump traditional* [Sakai] Boyles, Nancy. (2012/2013). Closing in on close reading. Educational Leadership 70(4), 36-41. [Sakai] Cummins, Sunday (2013). Tackling information text. Educational Leadership 71(3), 69-72. [Sakai] Video: Expeditionary Learning: Close Reading Strategies with Informational Text https://www.engageny.org/resource/close-reading-strategies-with-informational-text-by-expeditionary-learning	
10/6	Collaborative Planning & Teaching Questions to Consider: Why is collaboration critical for teaching for understanding? What are the various levels of collaboration and how do you decide which is best for a particular situation?	• *Standard 1*: Foster collaboration with teachers in their school community to facilitate the design, delivery, and assessment of instructional activities that promote learner competence and confidence with 21st century skills. • *Standard 2*: Collaborate with teachers and other specialists to identify students' interests, learning styles, and unique instructional requirements and to design instructional	Donham, Chapter 6 Harada & Yoshina, Chapters 10-12 Montiel-Overall, P. (2010). Further Understanding of Collaboration: A Case Study of How It Works with Teachers and Librarians. *School Libraries Worldwide, 16*(2), 31-54. [Sakai] Kilker, J. (2012). School and community connections for collaboration and coteaching. *Knowledge Quest, 40*(4), 38-45. [Sakai]	**** Portrait of a Collaborator due** ****Bring Standards for the 2st Century Learner in Action to class**

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
		strategies guided by universal design principles	Marcoux, B. L. (2007). Levels of collaboration: Where does your work fit in? *School Library Monthly, 24*(4), 20-24. [Sakai]	
10/13	Designing Instruction (Backward Design) Selecting & Organizing Content <u>Questions to Consider:</u> How do you design instruction for understanding? What are essential questions and how do they guide inquiry-based learning?	• *Standard 4*: Use a variety of instructional strategies, resources, and assessment tools to provide digital-age learning experiences. • *Standard 4*: Collaboratively design, deliver, and assess instructional activities that empower learners to read across multiple formats and media.	Wiggins, Grant & McTighe Jay. "Backward Design" [Sakai] Stripling, B. K., & Harada, V. H. (2012). Designing learning experiences for deeper understanding. *School Library Monthly, 29*(3), 5-12. [Sakai] Kramer, P. K. (2011). Common Core and School Librarians: An Interview with Joyce Karon. *School Library Monthly, 28*(1), 8-10. [Sakai]	****Community analysis due** ****At least three blog posts must be written**
10/20	Designing Instruction (Backward Design) Techniques for Inquiry Teaching & Learning WORK SESSION: #1 with Dr. Anderson's students <u>Questions to Consider:</u> How do you design instruction for understanding? What instructional techniques support inquiry for teaching & learning?	• *Standard 4*: Use a variety of instructional strategies, resources, and assessment tools to provide digital-age learning experiences. • *Standard 4*: Collaboratively design, deliver, and assess instructional activities that empower learners to read across multiple formats and media.	NC Science Standards K2, 3-5 Subramaniam, M., Ahn, J., Fleischmann, K., & Druin,A. (2012). Reimaging the role of school libraries in STEM education: Creating hybrid spaces for exploration. *Library Quarterly*, 82(2), 161-182.[Sakai] Subramaniam, Mega; Ahn, June; Waugh, Amanda; Taylor, Natalie Greene; Druin, Allison; Fleischmann, Kenneth R.; Walsh, Greg. (2013). Crosswalk between the "Framework for K-12 Science Education" and "Standards for the 21st-Century Learner": School Librarians as the Crucial Link. *School Library Research*, 16. [Sakai]	Bring the following items with you to your work session: 1. Community analyses 2. NC Elementary Science Standards Wiggins & McTighe Key Design Elements template [Sakai]

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
			Also: Reread Harada & Yoshina, Chapters 10-12 Review slides from session on Collaborative Planning & Teaching You may also want to look at some elementary science lesson plans. Utah Curriculum Resources (http://www.uen.org/Lessonplan/LPview.cgi?core=1217) Massachusetts Department of Education Model Curriculum Units http://www.doe.mass.edu/candi/model/files.html Virginia Department of Education (http://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/)	
10/27	Students as Learning Audience : Part 1 Learner Characteristics, Differentiated Instruction Questions to Consider: How do learning characteristics shape teaching for understanding? How do learner characteristics impact teaching strategies, resources, student grouping, etc?	• *Standard 4*: Support differentiation of instruction by choosing and modifying learning strategies, tools, and resources to meet the needs of all learners • Demonstrate effective strategies to discover student interests and learning styles and to assist them in finding engaging and appropriate information resources • *Standard 2*: Collaborate with teachers and other specialists to identify students' interests,	*School Reform and the School Library Media Specialist*—Chapters 8 & 9 [Sakai] Armstrong, T. "The Foundations of the Theory of Multiple Intelligences" [Sakai] Felder, R. M. (2011). Are learning styles invalid? (Hint: No!). http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/LS_Validity(On-Course).pdf The Mysterious Workings of the Adolescent Brain http://tinyurl.com/ps56f9z	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
		learning styles, and unique instructional requirements and to design instructional strategies guided by universal design principles •Use technology skills and innovative strategies to support the dynamic participation and engagement of all learners, including those with special needs.	Bush, G. (2006). Differentiated instruction. *School Library Media Activities Monthly, 23*(3), 43-45. [Sakai] Culturally relevant teaching. http://www.learnnc.org/lp/pages/4474 Video: Introduction to Culturally Relevant Pedagogy https://www.youtube.com/watch?v=nGTVjJuRaZ8	
11/3	Assessment Part 1: Questions to Consider: What is assessment? What role does assessment play in teaching for understanding? What are some effective tools for assessment? How do librarians incorporate assessment into their instruction?	• *Standard 4*: Utilize knowledge of appropriate assessment strategies to collaboratively design and facilitate innovative assessment of information and technology skills within content areas • *Standard 5*: School Library Media Coordinators analyze student learning.	Donham, Chapter 12 (3rd edition, Chapter 13) Harada & Yoshina: Chapters 1-9 Wiggins, G. (2014). Final exams vs. projects – nope, false dichotomy: a practical start to the blog year http://grantwiggins.wordpress.com/2014/01/01/final-exams-vs-projects-nope-false-dichotomy-a-practical-start-to-the-blog-year/ Wiggins, G. (2012). 7 keys to effective feedback. *Educational Leadership, 70*(1), 10-16. [Sakai] Louis, P., & Harada, V. H. (2012). Did students get it? Self-assessment as key to learning. *School Library Monthly, 29*(3), 13-16. [Sakai] Harada, V. H., & Yoshina, J. M. (2006). Assessing learning: The missing piece in instruction? *School Library Monthly, 22*(7), 20-23. [Sakai]	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
11/10	Assessment Part 2: WORK SESSION #2 with Dr. Anderson's student	• *Standard 4*: Utilize knowledge of appropriate assessment strategies to collaboratively design and facilitate innovative assessment of information and technology skills within content areas • *Standard 5*: School Library Media Coordinators analyze student learning.		
11/17	Students as Learning Audience: Part 2 Classroom management How do learner characteristics impact classroom management?	• *Standard 4*: Support differentiation of instruction by choosing and modifying learning strategies, tools, and resources to meet the needs of all learners • Demonstrate effective strategies to discover student interests and learning styles and to assist them in finding engaging and appropriate information resources • *Standard 2*: Collaborate with teachers and other specialists to identify students' interests, learning styles, and unique instructional requirements and to design instructional strategies guided by universal design principles • Use technology skills and innovative strategies to support the dynamic participation and	Ten Tips for Classroom Management [Sakai] Culturally responsive classroom management strategies http://steinhardt.nyu.edu/scmsAdmin/uploads/005/121/Culturally%20Responsive%20Classroom%20Mgmt%20Strat2.pdf Watch a few short videos of classroom management practices in action: Tricks of the Trade: Classroom management tips for teachers (video playlist) http://www.edutopia.org/classroom-management-teacher-tips-video Video Playlist: 9 Strategies for Effective Classroom Management https://www.teachingchannel.org/blog/2014/01/24/video-playlist-classroom-management/	

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
		engagement of all learners, including those with special needs.		
11/24	Developing and Leading Effective Professional Development Questions to Consider: What are the characteristics of effective professional development? What role do librarians play in providing professional development for teachers, administrators, and other school staff?	• *Standard 1*: Provide technology-enabled one-on-one and group professional development for classroom teachers. • *Standard 1:* Provide professional development in integrating information and instructional technology skills into all curricular areas. • *Standard 1:* Apply principles of adult learning to provide relevant, engaging and differentiated professional development.	*Empowering Learners*, pp. 43-44 and Chapter 4 Gulamhussein, Allison. (2013). Teaching the Teachers: Effective Professional Development in an Era of High Stakes Accountability (Sakai) Excerpts from Abilock, D., Fontichiaro, K., & Harada, V. (2012). *Growing schools : librarians as professional developers*. Santa Barbara, California: Libraries Unlimited. [Sakai]	****All blog posts must be made**
12/1	Evidence-Based Practice Assessing the Library Program Questions to Consider: What is evidence-based practice? How does it inform teaching for understanding? How can it be used to promote the profession of school librarianship?	• *Standard 5*: Conduct action research to determine the impact of library services on student achievement	*Empowering Learners*, pp. 30-31 Harada & Yoshina, Chapter 13 Donham, Chapter 13 (3rd edition, Chapter 14) *School Reform and the School Library Media Specialist*—Chapter 4 [Sakai] Kaaland, C., et al. (2010). Notes from the bullet train: Communication as a key to administrative support. *School Library Monthly, 26*(8), 45-47. [Sakai]	****Lesson plan due** **** Student Presentations**

Date	Topic	NC SLM Professional Standards Addressed	Readings	Assignments Due & Notes
12/6 **Saturday – 9:00-11:00**	The Nuts and Bolts of Running a School Library Program (School Librarian Panel)	• *Standard 3:* School library media coordinators implement a comprehensive 21st century library media program.	Empowering Learners, pp. 32-42 Donham, Chapters 7, 8, and 14 (3rd edition, 7, 8, 10, 14) Valenza, Joyce Kasman & Johnson, Doug. (2009). "Things That Keep Us Up at Night." *School Library Journal 55*(10), 29-32. http://www2.curriculum.edu.au/scis/connections/things_that_keep_us_up_at_night.html [Sakai] Johnson, Doug. (2009). Head for the edge: Starting off on the right foot. *Library Media Connection, 27*(6), 98. [Sakai]	****The School Library Media Specialist in the School Learning Community due Monday 12/8 by noon**

UNC SCHOOL OF EDUCATION

EDUC 513 Senior Methods Schedule – Science
Fall 2014

Date	Course Topics	Readings and Assignments
August 19th	**TOPIC: INTRODUCTION TO THE COURSE** **SYLLABUS AND SCHEDULE**	**READINGS:** **For Next Class Read:** Ready, Set, Science - Chapter 1 & 2 How Students Learn Science – Chapter 1 iBook Chapter 8 – Sections 1,2 and 3 **REFERENCE GUIDES:** North Carolina State Science Standards – Found at: http://www.ncpublicschools.org/curriculum/science/scos/ North Carolina Grade 5 Science EOG – Found at: http://www.ncpublicschools.org/accountability/testing/releasedforms A framework for K-12 Science – National Research Council – Free download at: http://www.nap.edu/catalog.php?record_id=13165 Next Generation Science Standards: http://www.nextgenscience.org/next-generation-science-standards **SCIENCE UPCOMING ASSIGNMENTS AND DUE DATES:** Science Ning Entry: Science Autobiography Science Ning Entry: Photovoice – what is everyday science? Posted on the Wiki by September 8th

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
September 8th **What is Science? & How do we learn science?**	**TOPIC: WHAT IS SCIENCE AND HOW DO WE LEARN SCIENCE?** • How do children learn science? • Conceptual Understandings	**READINGS:** **For Class you should have read:** Ready, Set, Science - Chapter 1 & 2 How Students Learn Science – Chapter 1 iBook Chapter 9 – Sections 1,2 and 3 **REFERENCE GUIDES:** North Carolina State Science Standards – Found at: http://www.ncpublicschools.org/curriculum/science/scos/ North Carolina Grade 5 Science EOG – Found at: http://www.ncpublicschools.org/accountability/testing/releasedforms A framework for K-12 Science – National Research Council – Free download at: http://www.nap.edu/catalog.php?record_id=13165 Next Generation Science Standards: http://www.nextgenscience.org/next-generation-science-standards **UPCOMING ASSIGNMENT DUE DATES:** Science Wiki Entry: Science Autobiography & Photovoice – what is everyday science? DUE TODAY! (9/8) Science Wiki Entry: Reading Reflection on the Trouble with Textbooks **Due September 22nd** Draft of Prior Conceptions Interview Questions – Bring to Class on **September 15th** (Next Class) **READINGS FOR NEXT CLASS:** Wiggins & McTighe (2005). Understanding by Design (Sakai) iBook Chapter 4 – Section 1 – 5E Model iBook Chapter 5 – Understanding by Design

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
September 15th **Understanding by Design**	**TOPICS: UNDERSTANDING BY DESIGN (UBD)** Understanding by Design The 5E Model of Inquiry	**READINGS:** **For Class you should have read:** Wiggins & McTighe (2005). Understanding by Design (Sakai) iBook Chapter 4 – Section 1 – 5E Model iBook Chapter 5 – Understanding by Design **UPCOMING AND CURRENT ASSIGNMENT DUE DATES:** Reading Reflection #3 on Wiki – Due 9/29 Draft of Prior Conception Questions for review in class Reflection #4 on Wiki Posted by 10/20 **READINGS FOR NEXT CLASS:** iBook Chapter 8 Sections 3 and 4 *Ready, Set, Science* – Chapter 3 – Foundational Knowledge and Conceptual Change *Ready, Set, Science* – Chapter 4 – Organizing Science Education around Core Concepts Both can be downloaded at: http://www.nap.edu/catalog.php?record_id=11882

DATE	COURSE TOPIC	READINGS AND ASSIGNMENTS
September 22nd Standards and Inquiry	**TOPICS: SCIENTIFIC INQUIRY AND SCIENCE STANDARDS, EVALUATING CURICULUM – PART I**	**READINGS:** **For Class you should have read:** iBook Chapter 3 Section 1 *Ready, Set, Science* – Chapter 2 – Four Strands of Science (p. 17-36) *How students learn science* – Chapter 9 – Scientific Inquiry AAAS Article – *The Trouble with Textbooks* Can be found at: http://www.project2061.org/publications/articles/articles/asee.htm **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Science Ning Entry: Reading Reflection on the Trouble with Textbooks **Due Today** Reflection #4 on Wiki – Due October Begin Planning for first and second Field Experience on October 6th and 13th **READINGS FOR NEXT CLASS:** iBook Chapter 8 Sections 3 and 4 *Ready, Set, Science* – Chapter 3 – Foundational Knowledge and Conceptual Change *Ready, Set, Science* – Chapter 4 – Organizing Science Education around Core Concepts Both can be downloaded at: http://www.nap.edu/catalog.php?record_id=11882

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
September 29th Standards and Inquiry	**TOPICS: SCIENTIFIC INQUIRY AND SCIENCE STANDARDS, EVALUATING CURICULUM – PART II**	**READINGS** **For class you should have read:** iBook Chapter 8 Sections 3 and 4 *Ready, Set, Science* – Chapter 3 – Foundational Knowledge and Conceptual Change *Ready, Set, Science* – Chapter 4 – Organizing Science Education around Core Concepts Both can be downloaded at: http://www.nap.edu/catalog.php?record_id=11882 **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Reflection #3 on Wiki – **Due today** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) and your Curriculum Evaluation (**Due October 27th**) Finish Planning for the first Field Experience on October 6th and 13th **READINGS FOR NEXT CLASS:** No Readings – work on lesson plan for October 6 and 13

DATE	TOPICS	READINGS AND ASSIGNMENTS
October 6th Field Experience 1	**FIELD EXPERIENCE 1**	**READINGS FOR NEXT CLASS:** No Readings – work on lesson plan for 13 **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) and your Curriculum Evaluation (**Due October 27th**)

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
October 13th Field Experience 2	**FIELD EXPERIENCE 2**	**READINGS** **For class you should have read:** **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Reflection #4 – The Field Experiences (1&2) - Posted on Wiki – **Due October 20th** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) and your Curriculum Evaluation (**Due October 27th**) **READINGS FOR NEXT CLASS:** iBook Chapter 7 – Universal Design for Learning (UDL)

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
October 20th **Teacher Librarians & Universal Design for Learning (UDL)**	**TOPICS: BEYOND THE BOOKS: WORKING WITH YOUR TEACHER LIBRARIANS** **UNIVERSAL DESIGN FOR LEARNING (UDL)** **CAST BOOKBUILDER**	**READINGS** **For class you should have read:** iBook Chapter 7 – Universal Design for Learning (UDL) **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Reflection #5 – The Field Experience - Posted on Wiki – **Due November 10th** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) and your Curriculum Evaluation (**Due October 27th**) **READINGS FOR NEXT CLASS:** IBOOK CHAPTER 9 – ARGUMENTATION

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
October 27th **Argumentation and Discouse in Science**	**TOPIC: ARGUMENTATION AND DISCOURSE IN SCIENCE**	**READINGS** **For class you should have read:** iBook Chapter 9 – Argumentation **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Plan for Field Experience #3 – November 3rd Curriculum Evaluation – **DUE TODAY** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) Cast Bookbuilder – Due November 24th **READINGS FOR NEXT CLASS:** IBOOK CHAPTER 9 – ARGUMENTATION

DATE	COURSE TOPIC	READINGS AND ASSIGNMENTS
November 3rd Field Experience #3	**TOPIC: FIELD EXPERIENCE #3**	**UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Field Experience Reflection on Wiki – November 10th Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) Cast Bookbuilder – Due November 24th **READINGS FOR NEXT CLASS:** IBOOK CHAPTER 9 – ARGUMENTATION IBOOK CHAPTER 10 – TEACHER LIBRARIANS

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
November 10th **Teacher Librarian Workgroup #2 And Argumentation Part II**	**TOPICS:** **WORKING WITH TEACHER LIBRARIANS IN ELEMENTARY SCIENCE CLASSROOMS** **ARGUMENTATION AND DISCOURSE IN SCIENCE – WHAT'S YOUR EVIDENCE?**	**READINGS** **For class you should have read:** iBook Chapter 9 – Argumentation iBook Chapter 10 – Teacher Librarians **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Field Experience #3 Reflection on Wiki – **DUE TODAY** Continue work on Prior Conception interviews during your Wednesday placements (**Due November 17th**) Cast Bookbuilder – Due November 24th **READINGS FOR NEXT CLASS:** FRADD ET AL – *PROMOTING SCIENCE LITERACY WITH ELL THROUGH INSTRUCTIONAL MATERIALS DEVELOPMENT – A CASE* LAPLANTE, B. , *TEACHING SCIENCE TO LANGUAGE MINORITY STUDENTS IN ELEMENTARY CLASSROOMS* IBOOK CHAPTER 8 SECTION 5

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
November 17th Argumentation and Discourse in Science Part III	**TOPIC: ARGUMENTATION AND DISCOURSE IN SCIENCE – PROMOTING ARGUMENTATION AND SCIENCE LITERACY WITH ELL**	**READINGS** **For class you should have read:** FRADD ET AL – *PROMOTING SCIENCE LITERACY WITH ELL THROUGH INSTRUCTIONAL MATERIALS DEVELOPMENT – A CASE* LAPLANTE, B. , *TEACHING SCIENCE TO LANGUAGE MINORITY STUDENTS IN ELEMENTARY CLASSROOMS* IBOOK CHAPTER 8 SECTION 5 **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Prior Conception interviews during your Wednesday placements - **Due Today** Cast Bookbuilder – Due November 24th **READINGS FOR NEXT CLASS:** IBOOK CHAPTER 4 IBOOK CHAPTER 8 SECTION 6 CLARK, L. (2002). REAL WORLD ROBOTICS. *SCIENCE AND CHILDREN,* OCTOBER 2002 KRAFT, S. & POYNOR, L. (2004). WAS THE GREAT PYRAMID BUILT WITH SIMPLE MACHINES? *SCIENCE AND CHILDREN.*

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
November 24th **PBL, Engineering Design, and Science**	**TOPIC: PROJECT BASED LEARNING, ENGINEERING DESIGN AND SCIENCE**	**READINGS** **For class you should have read:** IBOOK CHAPTER 4 IBOOK CHAPTER 8 SECTION 6 CLARK, L. (2002). REAL WORLD ROBOTICS. *SCIENCE AND CHILDREN,* OCTOBER 2002 KRAFT, S. & POYNOR, L. (2004). WAS THE GREAT PYRAMID BUILT WITH SIMPLE MACHINES? *SCIENCE AND CHILDREN.* **UPCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** Cast Bookbuilder – **Due Today** **READINGS FOR NEXT CLASS:** BIERS, M.U. (2008). BLOCKS TO ROBOTS – CHAPTERS 1 AND 2

DATE	COURSE TOPICS	READINGS AND ASSIGNMENTS
December 1st PBL, Engineering Design & Science And So you want to get a job……	**TOPICS: PBL, ENGINEERING DESIGN AND SCIENCE AND GETTING A JOB IN ELEMENTARY EDUCATION**	**READINGS** **For class you should have read:** BIERS, M.U. (2008). BLOCKS TO ROBOTS – CHAPTERS 1 AND 2 **PCOMING ASSIGNMENT DUE DATES AND EXPERIENCES:** **FINAL SCIENCE UNIT PLAN DUE BY 5:00 ON MONDAY, DECEMBER 8TH !**

Guidelines For Groupwork – PowerPoint Slide Discussed in School Library Course

Work Session #1: Review of Assignment

- Each of you will work with 4-6 preservice teachers
- Teachers are designing a 5-lesson science unit plan that they will teach next semester
- You have two goals:
  - To contribute to the writing of one lesson plan with each student in the group (level of contribution will be negotiated)
  - To integrate information literacy skills instruction into one of the five lessons for at least one student in your group.
- Your contribution may represent any level of collaboration, as long as at least one information literacy standard is thoroughly addressed within one plan
- You may find it possible to develop the same plan or similar plans for multiple students in your group (some students may be in the same grade levels)

APPENDIX D: IRB APPROVAL LETTER

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

OFFICE OF HUMAN RESEARCH ETHICS
Medical School Building 52
Mason Farm Road
CB #7097
Chapel Hill, NC 27599-7097
(919) 966-3113
Web site: ohre.unc.edu
Federalwide Assurance (FWA) #4801

To: Casey Rawson
School of Information and Library Science

From: Non-Biomedical IRB

Approval Date: 8/13/2014
Expiration Date of Approval: 8/12/2015
RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 6.Voice/image research recordings, 7.Surveys/interviews/focus groups
Study #: 14-1806

Study Title: A Collaborative Lesson Plan Assignment for Preservice Elementary School Teachers and Preservice School Librarians, Cycle 2

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

Purpose: This study will investigate the impact of a collaborative lesson plan writing project undertaken by graduate students in the School of Library and Information Science (SILS) and senior undergraduate students in the School of Education (SOE).

Participants: Approximately 8 graduate students enrolled in INLS 745 and approximately 32 undergraduate students enrolled in EDUC 513.

Procedures (methods): This is a mixed methods, design-based study. Data sources for this study will include participant interviews, a post-project focus group, questionnaires, student work samples, and classroom observations, including field notes and audio recordings of student presentations. Data analysis will primarily involve qualitative coding and statistical analysis of survey responses.

Investigator's Responsibilities:

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Your approved consent forms and other documents are available online at http://apps.research.unc.edu/irb/irb_event.cfm?actn=info&irbid=14-1806.

You are required to obtain IRB approval for any changes to any aspect of this study before they can

be implemented. Any unanticipated problem involving risks to subjects or others (including adverse events reportable under UNC-Chapel Hill policy) should be reported to the IRB using the web portal at http://irbis.unc.edu.

Please be aware that additional approvals may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records).

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

CC:
Sandra Hughes-Hassell, School of Information and Library Science

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