Learners in the Learning Commons
Papers of the Treasure Mountain Research Retreat # 19

November 13-14
Hartford, CT

Edited by
David V. Loertscher

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Table of Contents

Introduction
Learners in the Learning Commons
A Resource Treasury

David V. Loertscher and Robyn Richardson

The theme for the 19th Treasure Mountain Research Retreat in Hartford, Connecticut, 2013 was purposely chosen to cast a light on the continuing changes in children and teens in an expanding information and technology environment. Many have noted from experience and from research that habits and behavior of young people are often quite different than the adults who are their educational mentors.

All teacher librarians with any extensive experience recognize the usual clientele of the traditional library:

- The scheduled student who comes with a class regularly or is brought by the teacher for a research assignment.
- The socialite student who comes to the library to socialize with friends as their primary reason for being there.
- The project-oriented student who is trying to complete some sort of assignment either as an individual or as a group.
- The dedicated student who wants a quiet place to study.
- The reader who is interested in a specific part of the collection such as science fiction or graphic novels.

However, there seems to be an emerging clientele that requires a shift in how the traditional library operates. We refer to the layout of the

physical space, the function of the traditional library website, the ambience of the place, and the traditional behavior rule set that reinforces a stereotype of the "library" that desperately needs rethinking as the entire concept moves toward a learning commons.

With the publication of the first book about the learning commons concept by Loertscher and Koechlin in 2008,[1] and then attendance at the first high school learning commons in December that year[2] in Chelmsford, MA, we began to notice that every transformation to a learning commons either in Canada or the U.S. resulted in a major shift of the culture alongside the programmatic change, whether in physical or virtual space. Students who had known the traditional program and then experienced the transformation raved about the improvements, their interest in, their enthusiasm about, and contribution to a very exciting experience that had transformed their entire concept of a library. Suddenly, the new environment attracted a different clientele with different needs and quite different ideas about the "ownership" of the space. This change was also apparent as we talked to numerous members of the faculty and administration. It was as if the change matched the emerging interests, tech expertise, and phenomenon that researchers were noticing in their reports about the digital natives and social networked generation.

Teacher librarians who were rethinking the idea of "commons" and making "learning" the central focus of their program expressed their excitement and realization that they were making a major step into a

[1] David V. Loertscher, Carol Koechlin, and Sandi Zwaan. *The New Learning Commons: Where Learners Win*. Hi Willow, 2008. A second edition followed in 2011.
[2] Chelmsford High School, Chelmsford, MA. Valerie Diggs, teacher librarian. Ross Todd as keynote speaker at that event.

new concept of the role of a library from the storage of knowledge to the creation of knowledge. They also began to realize that the learning commons could be the major bridge in the school between formal and informal learning.

We are anxious that the change in both clientele, the adult mentors in the school, and the reinvention of the library into the learning commons might be the focus of the various presentations and discussions at the Treasure Mt. conference.

Who are these young people who thrive in a learning commons environment? What are their characteristics? What are their expectations? What types of learners are they?

To every participant's advantage at Treasure Mt., we will all be able to interview and study in real time both elementary and secondary students. Thus, while we will be able to study together what we know from both research and experience, we will encounter real young people who may influence what we know about the directions traditional libraries need to move if we are to keep up with the current generation.

To prepare for this experience, the authors have assembled a variety of articles and videos discussing the needs of the current generation of learners. We hope that sampling the list below by the participants before they come will provide ideas for the directions of the conversation.

A Different Kind of Learner

- *If Students Designed Their Own Schools* by Charles Tsai. These kids actually create their own curriculum and learn various skills as they solve their unique essential questions: http://vimeo.com/60919251

- Scott McCloud's great *Extracurricular Empowerment* TED talk about learners: http://youtu.be/GyIl4y_MRbU

- *Why Every Student Needs a Teacher Champion* by Rita Pierson. She makes the case for caring teachers, and I say teacher librarians, in this stirring TED Talk: http://goo.gl/kFRnKL

- TED talk: *My Invention That Made Peace with the Lions* by Richard Turere. Richard is a 13-year-old Maasai boy who developed an invention to help his family and then others deal with the threat of lions, and he speaks here at a TED conference. Inspiring! http://goo.gl/dsPl2h

Examples of Working With These Types of Learners

- *Allergic or Not? Middle School Students Design App that Tells You* by Katrina Schwartz via Mindshift. This article discusses the ideas from the Obama administration to increase STEM education in school and the schools that have begun adopting these practices. In one middle school, eighth graders designed an app themselves: http://goo.gl/ykVU7I

- *4 Pillars of College Success in Science*, by Freeman Hrabowski, TED talk. Freeman was 12 years old when he walked with Martin Luther King, Jr. In this talk, he discusses how the University of

Maryland helps all students become successful in school. He believes that children can be empowered to take control of their education: http://goo.gl/eyrA0G

- *Combining Robotics with Poetry: Art and Engineering Can Coexist* by Barbara Ray via MindShift. The instructor discusses how the idea began with students' difficulty understanding poetry; she decided to help them by asking them to create 3D models of the poem in dioramas, and this evolved into teaching poetry with robotics: http://goo.gl/r3QEos

- *Students Find an Outlet Through Playwriting*, by Francesca Duffy via Education Week Teacher. This article discusses the educational benefits of playwriting: http://goo.gl/mGTnRy

- *Connected Learning: Tying Student Passions to School Subjects* by Ashley Williams via MindShift. The article begins with the question: "What if your extra curricular activities weren't just extra but part of your academics too?" The idea is to connect student learning experiences to their lives outside the school and to meet students where they are. Case studies included: http://goo.gl/7xMCXc

- *Teaching Design for Change* by Emily Pilloton, TED Talk. This young designer moved to a rural community and began to redesign the town with the help of students at the local high school. She created a makerspace classroom to help kids become empowered to affect change in their community and in their futures: http://goo.gl/71qek1

- *Seeing Curriculum Through a Child's Eyes* by Kim Farris-Berg. This article is a guest post on the Education Week blog from a parent. Her daughter watched a video (included at the link) of students taking control of their learning; students got to choose what to study. Even though the writer believed her daughter's school was a good one, seeing her reaction of longing to be part of that self-directed environment has mom questioning the education system as a whole: http://goo.gl/TDUzpQ

- *Student Mentors: How 6th and 12th Graders Learn From Each Other* by Ian Quillan via MindShift. He talks about middle school / high school collaboration; high school students learn to effectively comment on middle school student writing in a digital environment and teachers are finding kids particularly responsive to student advice: http://goo.gl/wSNmnV

- *Build a School in the Cloud* by Sugata Mitra, TED Talk. He begins by discussing the current school system and how it is not really preparing kids for their futures anymore. What will their future look like? He shows how giving students time and a compelling question can engage them enough to learn on their own. His environment online sounds a bit like the Virtual Learning Commons and Knowledge Building Center in its collaboration component; he also talks about something like a Personal Learning Environment, but he calls it SOLE (Self Organized Learning Environments): http://goo.gl/mZXzU6

Libraries Claim a Piece of the Makerspaces Movement

- See the uTEC Maker Model created by Bill Derry, David V. Loertscher and Leslie Preddy at: http://goo.gl/ptKbFT (Google Draw document)

- Spend 2-3 hours in a professional development module created by Bill Derry, David V. Loertscher, and Leslie Preddy entitled: Makerspaces in School and Public Libraries at: http://makerspace.quickmooc.com Readers here can email David at reader.david@gmail.com for permission to preview this.

Digital Citizenship and Other Behaviors

- *Teach Kids To Be Their Own Filters* by Katrina Schwartz via MindShift: http://goo.gl/jXycZX

- *How Do We Raise Critical Thinkers?* by Ryan Schaaf, at 21st Century Fluency Project: http://goo.gl/GS3bGW

- Adults can help young people develop and build their aspirations for the future in this *MindShift* article: http://goo.gl/QWpsoQ

- *How to Lead When You're Not in Charge* by Gary Hamel and Polly LaBarre, Harvard Business Review Blog. Leadership in the Learning Commons and their characteristics: http://goo.gl/uYO4LT

Other Versions of Inquiry That Are Emerging

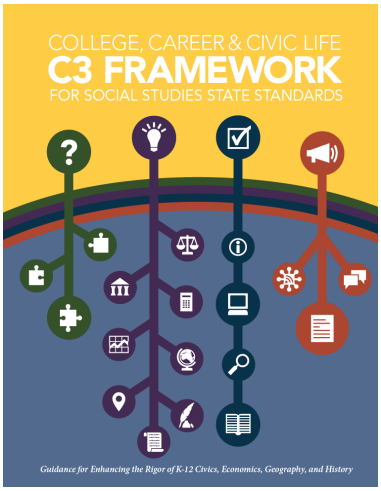
- *Bringing Authenticity to the Classroom* by Andrew Miller via Edutopia. Here is a teacher's version of inquiry: http://goo.gl/ETiS8O

- *Thinking Big About Engagement* by Rob Olazagasti: http://goo.gl/lPZEmh

- *Broadening Pedagogical Practices in a Participatory Culture* by Henry Jenkins. 4 c's (connect, create, collaborate, and circulate) also discussed: http://goo.gl/QuEk8u

- *What Does 'Design Thinking' Look Like in School?* by Katrina Schwartz via Mindshift: http://goo.gl/XQ0iAs

- *Social Studies Inquiry Standards, 2013*. See the announcement and download the complete document at: http://www.socialstudies.org/C3

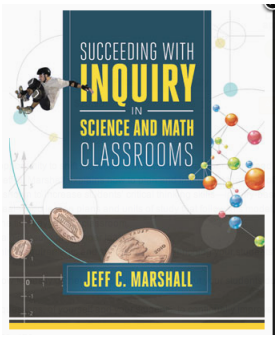


http://www.socialstudies.org/C3 (NCSS), *The College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K-12 Civics, Economics, Geography, and History* (Silver Spring, MD: NCSS, 2013).

About This Book: Overall document organization: The C3 Framework begins with two narrative explanations: the Inquiry Arc, which provides the organizing structure for the document; and the Overview of English Language Arts/Literacy Common Core Connections, which highlights the important relationship between the C3 Framework and the Common Core State Standards for ELA/Literacy. Next, the C3 Framework presents the following four Dimensions: 1. Developing questions

and planning inquiries; 2. Applying disciplinary concepts and tools; 3. Evaluating sources and using evidence, (p. 17)

- *Succeeding with Inquiry in Science and Math Classrooms* by Jeff C. Marshall. ASCD, 2013.



About This Book: Thinking critically. Communicating effectively. Collaborating productively. Students need to develop proficiencies while mastering the practices, concepts, and ideas associated with mathematics and science. Successful students must be able to work with large data sets, design experiments, and apply what they're learning to solve real-world problems.

Research shows that inquiry-based instruction boosts students' critical thinking skills and promotes the kind of creative problem solving that turns the classroom into an energized learning environment. In this book, real-world lesson plans illustrate highly effective inquiry-based instruction as you learn. These plans include:

- How to engage math and science students at all grade levels;
- Why students should explore a subject before you explain it;
- How to meet rigorous standards and expectations through rich, well-aligned classroom experiences;
- How to develop useful formative assessments and gather critical information during every class period; and
- How to create effective questions that guide students' deep learning and your own professional development.

No matter what your experience with inquiry-based instruction, Succeeding with Inquiry in Science and Math Classrooms will help hone your ability to plan and implement high-quality lessons that engage students and improve learning.

Conclusion

After reviewing these and many other recent ideas via the networks, we ask teacher librarians: "So what?" and, "What's Next?" It becomes obvious to us that if teacher librarians don't step up the opportunities, others who see the needs will do so. We cannot understand the idea of serving the same clientele as we always have done. Google has already stolen a huge percentage of young people who expect the "library" to be in the palm of their hand on their own preferred device. But beyond the convenience factor, there seems to be a new kind of learner worthy of major attention. Recently, at least one article touting our possibilities appeared: http://goo.gl/3wQpzM

Perhaps we can create a new vision at Treasure Mountain.

Part I

Learners and Strategies for Working with Them

Collaborative Inquiry In Digital Information Environments Cognitive, Personal And Interpersonal Dynamics[1]

Dr. Ross J. Todd and Punit Dadlani
School of communication & Information
Rutgers, The State University of New Jersey
4 Huntington Street, New Brunswick, NJ USA
rtodd@rutgers.edu
punit123@eden.rutgers.edu

Abstract

This paper presents selected findings from current research being undertaken by the Center for International Scholarship in School Libraries (CISSL) at Rutgers University that examines the research and writing processes of high school students undertaking a group research task in a New Jersey High school library. The purpose of this task was for students to produce a co-constructed product that represents the group's understanding of their chosen curriculum topic. The study involved 42 grade 9 students undertaking an accelerated English Language Arts curriculum unit focusing on examining a wide range of challenging literature in the genres of short story, novel, drama, nonfiction, and poetry. The course includes independent reading assignments, and stresses critical thinking and speaking skills, study skills, and research strategies. The learning environment was supported by a Wiki Google documents digital environment that tracked the group dynamics, student-ta-student interactions, resource use patterns, and knowledge building processes, as well as classroom teacher and school librarian interactions with the students, as groups and as individuals. This paper reports specifically on

[1] This paper originally appears in the proceedings of the 42nd Annual Conference Incorporating the 17th International Forum on Research in School Librarianship Held at Sanur Paradise Plaza Hotel, Sanur, Bali, Indonesia, 26th-30th August, 2013.

cognitive, personal and interpersonal dynamics reported by students as they worked in groups.

Keywords: Collaborative Learning, Cooperative learning, Social justice, Digital Learning Environments

Introduction

This paper presents selected findings from current research that examines the research and writing processes of high school students undertaking a group research task in a New Jersey High school library to produce a co-constructed product that represents the group's understanding of their chosen curriculum topic. In particular, it examined the group dynamics in terms of cognitive, personal and interpersonal attributes, and provides insights into how collaborative learning of a research task can be supported through instructional interventions.

In many subject curriculums in US schools, students are required to produce some form of a research product through engaging with information sources, and to demonstrate capacity to critically examine a range of resources and construct their own deep knowledge of the topic. It is recognized that resource-based inquiry tasks may take different forms depending on the design of the task and specific objectives established by the classroom teacher and the collaborating school librarian. (Kuhlthau, Maniotes & Caspari, 2012; Loertscher, Koechlin, & Zwann, 2005). The focus of the research task was for students to search and use a range of print and digital information sources to construct a product or artifact that represented their knowledge of the topic. Research by Todd (2006) and Kuhlthau, Heinstrom & Todd (2008) shows that the construction of knowledge through research tasks is a complex interaction of task design, instructional interventions, resource use, affective dimensions, and assessment expectations. However, little research to date has investigated how students working in teams or groups learn together through an assigned research task and produce knowledge together, and particularly in a digital learning environment. Understanding the group

process is seen as an important part of this research, and this involves understanding the interactions of the cognitive, personal and interpersonal dimensions of student learning as they work together in a research task to build knowledge.

Literature Review

School libraries have played a central role in developing the research capacity of students for many decades now, both through both the provision of diverse curriculum sources to support student research tasks, and through information literacy instruction to enable students to connect with, interact with, and utilize information to build their topical knowledge. A recent study undertaken by Todd, Gordon & Lu (2010, 2011) based on data from 765 participants, predominantly certified school librarians in public schools across New Jersey, showed that the development of students' research capacity is core work for school librarians. This study identified six key learning outcomes of this core instructional role. These were: contribution to development of curriculum standards and contribution to test score achievement, mastery of a diverse range of information literacy competencies, development of research process and learning management competencies, development of thinking-based competencies in using information, development of positive and ethical values in relation to the use of information, and increased interest in reading increased participation in reading, the development of wider reading interests and becoming more discriminating readers.

Such outcomes are important, particularly in the context of emerging educational concerns about academic integrity, particularly in digital environments. According to McCabe (2005) of the Center for Academic Integrity, plagiarism is a substantial and pervasive problem, especially in high schools and colleges. McCabe cites 2005 research of 50,000 undergraduates at more than 60 colleges that showed that "on most campuses, 70% of students admit to some cheating". In addition, it reported that close to 25% of the participating students admitted to serious test cheating in the past year

and half admitted to one or more instances of serious cheating on written assignments" (McCabe, 2005). Williamson & McGregor (2011) sought to identify teaching strategies that helped students learn to avoid plagiarism. Their review identified a range of teaching strategies as part of the research task process that centred on: "raising awareness of the problem of plagiarism and increasing students' ability to recognize it; teaching students to synthesize information, including through note taking and paraphrasing; and teaching attribution of sources of information (citation and referencing methods) in all contexts (for quotations, paraphrases, and acknowledgement of ideas) Williamson & McGregor (2011, p. 2).

Against this backdrop, there is increasing attention being given to team-based inquiry and project-based learning. In the USA, the Common Core State Standards, now adopted by 45 states, identify collaboration and teamwork as a 21 st century skill to be taught. They give some attention to moving instruction to individual and group-based inquiry and identify the value of shared learning in terms of the integration of diverse expertise to create a richer whole, especially through the application of collaborative tools afforded through social media. Central to this discourse are discussions surrounding "collaborative learning" and "cooperative learning".

The terms "collaborative learning" and "cooperative learning" are often used interchangeably, and often mixed with similar terms such as "problem-based learning", "group learning", "peer-assisted learning", "team learning", and "learning circles". Cooperative and collaborative learning have been conceptualized in the literature in terms of the amount of interdependence each approach provides. Where collaborative learning has been characterized as involving a higher level of interdependence between group members, cooperative learning has been shown to involve a more "divide and conquer" type of approach (Graham & Misanchuk, 2004, p.184). Dillenbourg (1999) makes a further distinction between cooperative and collaborative learning. In collaborative learning, the group works together from start to finish. In cooperative learning, the learning task is divided into a set of subtasks that are

undertaken individually, sometimes based on negotiation of who will complete individual parts, and then the final product is assembled by bringing together the subparts.

For the purposes of this paper, Rockwood's conceptual distinction of these approaches is applied (Rockwood, 1995a, 1995b). Rockwood defines the differences between cooperative and collaborative learning in terms of knowledge and power. Cooperative learning is concerned with the outcome of learning as being either foundational or traditional knowledge. This approach is considered more directed, structured and controlled by the teacher with the group task focused on identifying specific answers and factual knowledge. Contrastingly, collaborative learning is conceptualized in terms of the social constructionist's perspective of knowledge as primarily a social construct. Groups are given more open-ended, complex tasks where knowledge is negotiated and constructed through collaboration by group members via engagement with the expertise, skills and insights of the group participants.

Research on collaborative learning is particularly important because of the numerous learning outcomes these approaches can offer. From a socializing standpoint, collaborative learning can improve teamwork and increase altruistic behaviors. Prichard, Bizo & Stratford (2006) examined the collaborative abilities of three cohorts of students (N=295) over the course of two semesters to see how previous team-building knowledge impacted performance in collaborative groups. The study found that students with previous teamwork training were more successful and that an important outcome of collaborative learning is that it supports student abilities for doing group work. In a different study, Solomon et al. (1988) created a five-year program to assess the pro-social development of a single cohort of students moving from kindergarten through 5th grade. One of the findings from this study was that a significant outcome of collaboration and group work was an increase in students' pro-social behaviors.

Collaborative/cooperative learning research has also identified some important outcomes related to student views on respect and diversity, particularly with regards to the social justice concept of equity. For example, Cohen (1994) and Cohen & Lotan (1997) analyze several pieces of research that explore how equity and access can be afforded through cooperative learning. The analysis of the previous research showed that through adjustments to the organization of the classroom, student-teacher roles and the nature of the curriculum, cooperative learning environments can help minimize social status differences between students. Similarly, Johnson & Johnson (1981) compared the effects of cooperative experiences on the interethnic attitudes of 4th grade boys/girls over the course of a 15 day instructional period. Cooperative learning experiences were found to cause more cross-ethnic interaction than more individualistic approaches. Thus, another outcome of collaboration and group work is the fostering of respectful interactions between students of different backgrounds. It is clear, then, that research in this area can have a significant impact on different qualities of student learning.

Though there is a considerable body of empirical research on collaborative group learning in the Education, LIS and other literatures, findings have been mixed (Johnson & Johnson, 1991; Mulryan, 1992; Todd & Kuhlthau, 2004). The early research of Daiute & Dalton (1993) and Johnson & Johnson (1991) found that students learn more when cognitive work is distributed amongst a group of individuals than they do alone. Further research showed that students learn more in well-developed collaborative environments then they do individually (Barron, 2003; Slavin, 1996). However, these findings have received mixed support when explored empirically. For example, Johnson, Johnson & Stanne (1989) concluded that even though there was considerable evidence that group collaborations encourage higher individual achievement and greater group productivity than individual situations, some group conditions may work against this, such as where team members are not working towards the same goal, or where teams members are not all determined to work for higher achievements. Tudge (1992) found that the

benefits were greater to those whose partner was more competent, but also acknowledged that effective collaboration was fostered when pairs understood and worked according to the nature of the rules and the shared understandings that they developed during the process. Nystrand, Gamoran, & Heck (1993) further found that providing group time for ongoing dialog and negotiation was an important dynamic in building collaboration and a shared understanding of the group task. This was also important in terms of group dynamics when disagreements occurred. In a comparative quasi-experimental study of students working alone and in groups, Teasley (1995) and Stahl (2006) found that group dialog produced richer and more interpretive insights and supported interpretive cognitive processes than working alone.

Chin & Chia (2004), for example, identified a number of problems in group dynamics, including disagreements over the next steps, delegation of work responsibilities, tasks and strategies for working together as well as what information to include in the group presentation, and time to be made available to resolve these. This is supported by Lazonder's work (2005) in the context of students undertaking web searches. Lazonder found that peer-to-peer collaboration encourages students to articulate their thoughts, which in turn facilitates the regulation of the search process as well as search outcomes. He found that pairs of students working together located the target information more often and in less time than students working individually. Pairs also employed a richer repertoire of search strategies and were more proficient in monitoring and evaluating their search behavior (Lazonder, 2006). In contrast, Meyers' work (2010) on the effect of student group work on information seeking and problem solving found that on average, individuals achieved better search results than groups.

Building on previous work, Manlove, Lazonder & Ton (2009) found that collaboration appeared to enhance students' abilities to give more detailed accounts of products and learning processes. They identified the need to structure collaborative learning to include aspects such as positive

interdependence, individual accountability, encouraging interaction, appropriate use of social skills, and group processing "forced monitoring points within inquiry learning may be a solution to increase regulatory support use and thus regulatory activity of students during technology enhanced inquiry learning" (Manlove, Lazonder & Ton, 2009, p. 114). The need for structure to support collaborative learning was also identified by Kuiper, Volman & Terwel (2009), who found that explicit focus on the dynamics of collaborative inquiry by classroom teachers had a positive impact on the collaborative work undertaken by the group.

Some research is beginning to emerge in the context of the digital environment as the learning environment. Early work by Lakkala (2005) highlights the difficulty of moving from individualistic ways of working in a digital space, to achieving real collaborative knowledge building. Lakkala, Ilomaki & Palonen, (2007) and Johnson, Johnson & Roseth (2010) found that the web-based learning environment was used more as a coordination tool for organizing the collaborative work than as a space for negotiating, debating and creating knowledge. The digital environment was seen to support groups of students in learning to work together, developing personal relationships, social skills and positive interactions with one another, developing team work skills, managing the task and individual accountability. In addition, it enabled active exchange of ideas within small groups that increased interest among the students and promoted critical thinking. They were able to capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work). Collectively, the research to date also highlights the difficulty and complexity of promoting real collaborative knowledge building (Scardamalia & Bereiter, 2006).

Recent research from Finland sheds some light on this complexity. Sormunen et al (2013) examined the group work strategies of 17 groups of students in an upper secondary school in Finland studying Finnish literature and history who were engaged in authoring Wikipedia articles or Wikipedia-style articles

to represent their knowledge of their chosen research topic. Student interviews were conducted and analyzed to identify the key activities that the students undertook, the ways the group work was conducted in these activities and how the students justified their choice of group work strategies. The study identified four group work strategies, which the students applied in the activities of their article projects. The strategies, in the order of increasing collaboration, were: 1) delegation, 2) division, 3) pair collaboration, and 4) group collaboration. Overall, they found that division was the dominant strategy in searching, reading and writing. Division was where the activity was divided between group members into individually completed subtasks, and then brought together in the final work. The study also found that group collaboration, where students worked together to complete an activity, was commonly applied.

Research Goals

Against this backdrop, the present research seeks to understand the process and outcomes of an inquiry-based project involving teams of students collaborating together for the joint creation and production of knowledge of a curriculum topic. In particular it will:

(1) track the process of team work: to understand how student teams work together to build a shared representation of knowledge;
(2) examine the dynamics of the co-construction of knowledge by teams of students;
(3) track students' engagement with information sources and how the teams transform and co-construct text into their joint representation of knowledge;
(4) track both individual learning and group learning, and to understand the relationship between individual knowledge developed in the process and the team representation of the joint product created in the process;

As this research is currently under way, his paper reports on preliminary findings emerging in relation to the cognitive, personal and interpersonal

dynamics of student team processes as they undertake their group-based research task (Goal 1).

Sample and Methodology

The research involved 2 English Accelerated classes of Grade 9 students in a New Jersey public co-educational high school engaged in a collaborative inquiry-based task in a wiki environment in Fall 2013. 42 students were involved and these were organized into 13 groups. The school was selected because of the high level of classroom teacher – school librarian instructional collaboration; the quality information collection available in and through the school library; the expertise of the instructional team having experience with students learning and working in a collaborative digital environments (Wikis and Google documents); and the instructional team's expertise with working within an inquiry-based instructional framework. The selection process was based on data collected as part of the New Jersey school library study (Todd, Gordon & Lu, 2010, 2011).

Grade 9 English focuses on the five elements of the language arts: reading, writing, speaking, listening, and critical viewing. The accelerated course offers a wide range of challenging literature in the genres of short story, novel, drama, nonfiction, and poetry. The course includes independent reading assignments, and stresses critical thinking and speaking skills, study skills, and research strategies. Instruction and practice in writing concentrate on a variety of writing modes. In the research task, students were assigned a novel, and given the following objective and prompt: *Objective:* Students will discover and develop ideas through research, prove a thesis and report on findings. *Prompt:* You must prove that your assigned novel is of respectable literary merit. To do so, you must also identify reasons for this merit and present to your classmates.

The assignment to the groups was random, rather than being based on student selected groups, topic selected groups or other means of assigning groups. This was undertaken by the English teacher. Students undertook their

collaborative inquiry research task in a class wiki environment that was structured to meet the specific curriculum objectives, and which enabled the students to discuss their research topics, establish working relationships, plan and manage the tasks, collect information sources, and work together through the process of co-constructing their products, which included a class presentation, visual display, and annotated bibliography. The wiki environment was developed by the school librarian for the teaching enabled the researchers to capture and track their research and writing processes, their use of information sources, their interpersonal dynamics and decision-making processes, and how they went about collaboratively creating their products. In addition, the wiki space captured interactions and feedback from the instructional team. The digital space also enabled researchers to gather data to understand how the information environment and instructional interventions helped or hindered the knowledge construction process.

As part of the learning requirements, students were to make daily journal entries during the two weeks that the classes were scheduled in the library for a range of instructional interventions led by the school librarian. Students were informed that "Topics may include, but are not limited to, the research process and/or the material you find". To this end, students were required as homework to input a journal response after the conclusion of each class into a networked Google document (1 for each day of the classes in the library) for a total of approximately 336 journal entries. Students were then required to read each other's journal responses and comment on at least one other student's journal response in the same networked Google document for each week of the process (referred to as the commentary stream).

Students also completed a pre and post reflection task to provide further insights into the cognitive, affective and interpersonal aspects of the research and writing process. These were integrated into the sequence of instruction and research journey. This was based on the SLIM "Reflection Tasks" (Student Learning Through Inquiry Measure developed by CISSL) to track both individual learning and group learning, with emphasis on the knowledge

construction process, and the cognitive, affective and behavioral dimensions. The presurvey was administered on the first day of the library classes and asked students to first identify, via open ended answers what their research topic was, what interested them about that topic, what they already knew about the topic and what terms they might use to search for information on the topic. Students were then asked to indicate on a 5 point scale how much they felt they knew about the given topic (1 =nothing at all; 5 =a great deal). The remaining questions on the pre-survey asked students to write open-ended responses indicating what they like and dislike about research, what they find easy and hard about research and finally how they feel about working in groups. The post-survey asked students to provide open-ended responses about what they now know about research, what they found easy or difficult about their research, how they feel about working in a digital environment and how they feel about group work by the end of the project. Additionally, two Likert Style (5 point scale) questions were asked pertaining to students' perceptions of the helpfulness of the reflection journal entries (1 = no help; 5 = most helpful) as well as how much they felt they learned about their topics (1 = nothing; 5 = a great deal). The journal responses, commentary stream and the more formal pre and post measures make up the dataset used in this study. Overall, The combination of data from the reflection tasks and the documentary record of interactions and developments recorded on the wiki site have enabled the researchers to compare changes in knowledge, resource use, the knowledge construction process, and personal and interpersonal dynamics in the production of a collaborate product. The findings presented here focus on the process of group work: to understand how student groups work together to build a shared representation of knowledge, and to identify some of the cognitive, personal and interpersonal dynamics at play during the research process.

Key Findings

Each of the eight student groups was responsible for providing an analysis of the literary merit of a book of their choosing. When asked to describe in their own words what they were researching, students overwhelmingly indicated to

be researching the "merit and authenticity" of their given novels. Although the assignment was the same for all students, some students translated the prompt into their own conceptions, such as whether their novel offered "an effective portrayal of society and human nature," or "different types of plot and conflict." This may be an indicator of the uncertainty that students feel when entering the information search process, or it may show students having strong conceptions of the direction they wanted the research to go, creating potentially some challenging dynamics for the group negotiation process.

The second question of the pre-survey asked students what they would like to research about their topic. Students seem to be either goal-directed with their responses, indicating that they wanted to research just what the assignment indicates ("the literary merit of my novel"), or they were more exploratory in their responses, citing personal interests ("I like x") and preferences ("I would prefer x") or previous knowledge ("I want to know more about x").

The pre-survey also measured students' self-reported levels of knowledge of their topic, as shown in Table 1.

Table 1: Pre-Survey: How much do you know about your topic

Response	Percentage
Nothing	7%
Not Much	78%
Some	0%
Quite a Bit	15%
A Great Deal	0%

As shown in Table 1, 85% of students knew little to nothing about their topics while 15% claimed to know quite a bit. Few students claimed to know nothing about their topic (7%) or a great deal (0%) but the majority (78%) felt that they did know something. As one of the goals of this study is to understand if students learned about their topic through the collaborative work, the fact that students mostly knew very little at the start of the study removes some of the ambiguity that previous experience of the students might have brought

to the table. The same question in the post-survey showed that 92% of students felt that they knew quite a bit to a great deal about their topics and 8% of students felt they knew something. No students claimed to be on the lower end of the scale. Based on this measure, it would appear that students perceived themselves to be much better informed of their topics after going through the research exercise.

Table 2 shows students' self-reported levels of knowledge of their topic at the end of the research task:

Table 2: Post-Survey: How much do you know about your topic?

Response	Percentage
Nothing	0%
Not Much	0%
Some	8%
Quite a Bit	42%
A Great Deal	50%

The finding that 92% of the students claimed that they knew "quite a bit" or "a great deal" comes into play when the students perceptions of working in groups is analyzed. In this data analysis process, the researchers have used an emic, rather than etic approach. An emic approach is one where the categories emerge directly from how the students imagined and explained things: their observations, categories and interpretations. This is in contrast to an etic approach, where researchers have imposed a predetermined set of categories that they deep important to undertake the analysis.

The analysis of the students' perceptions in relation to engaging in group work at the commencement of the research task identifies four key dimensions that surround their participation and engagement. These are: (1) social justice, (2) knowledge, (3) interpersonal, and (4) project management. The majority of responses revolved around the social justice and knowledge dimensions.

Social Justice

Social justice, broadly defined, centres on the belief that all people deserve equal social, political and economic rights, treatment and opportunities (Zajda et al., 2006, p.6; Rawls, 1971, p.3). From the perspective of the students, this was seen in terms of equity of contribution, with intellectual input and workload to complete the group task shared equally and fairly across the group. Students valued the affordances of group work in terms of "the work is split up evenly" and "work spread out among the group", and when the workload was shared amongst the group members, they believed that "no one would be overloaded". However, while the group saw these positive aspects of group work, their perceptions at the outset of the research task were quite negative. They were concerned about equal effort and all team members contributing their fair share of work (as opposed to social loafing), as well as team members all receiving the same assessment credit when effort was not evenly distributed. As students said: "usually the entire group does not work together", "members tend to slack off", and this "leads to certain people in the group doing more work than others". Some students saw that it was easier to work alone: "it is easier to work by yourself so that you don't have to make sure the people that you are working with are doing their jobs", thus avoiding problems caused by "individuals in the group that are either too lazy or take complete control of the project" and thus adding "more variables that can lessen the grade" or create issues around work credit to grade several students on one project is unfair"

Knowledge Creation

The knowledge dimension of group work refers to the opportunities that group work provides in terms of the knowledge generation and production process, particularly in relation to quantity and diversity of viewpoints and perspectives, testing their own ideas in the group, extending their own understanding of the topic and learning together. Students largely viewed this positively. They welcomed the opportunity to "acquire new ideas I would not have thought of previously", acquire "so many more ideas" and "gather the input of many people, not just me", as one student expressed: two minds are

better than one, but four minds are better than two". In particular, they saw value in the group in terms of opening up the diversity of viewpoints: "there is more than one person's opinion on each part of the project" and "I can say my ideas and see what they think of them"; 'their ideas could show me a different way of thinking and inspire ideas of my own". Students were able to articulate some benefits in this shared knowledge building process. This was in relation to both the research task: "it adds to my insight to improve it" and "allows for many different influences and ideas on the topic that is being researched" and "you get help and opinions to make your project better". Students recognized that the knowledge building process involved multiple perspectives and viewpoints, and that engaging with this diversity through "bouncing my ideas off other people" added strength to the group process and overall outcome: "we can learn and improve from each other's input"; and "we become smarter together". At the same time, a small number of students saw the collaborative knowledge sharing and knowledge building process as a challenge, particularly in term of reaching a consensus: "making it hard to reach a compromise and it slows down the progress" and that it was "tedious due to the possibility of differing ideas and conflicts".

Interpersonal Interaction

The interpersonal dimension of group tasks refers to the role of and nature of the interactions between group members to accomplish the tasks. At the outset of the research task, students predominately viewed this as a positive dimension. They appeared to recognize that the process of working together fostered both learning about one another as well as learning form one another. For example: "a chance for members to understand one another as the closeness allows the sharing of strengths and weaknesses that are not very apparent before" and enabling the project to "exude different personalities that make it better". Students also saw that the group task would enable the integration of multiple skills that would strengthen the project: "everyone has different skills that can contribute to the group" and "it could be helpful if I am weak in a certain part that someone in my group is strong in". They saw the outcome of this interpersonal process as "allows us to

create a stronger project through discussion and collaboration. Some students also identified limitations: "I like working in groups when the people I am with are intelligent and hard workers". Two students particularly noted that the positive outcomes were relational "all depends on who is in the group" and that "communicating ideas is difficult".

Project Management

The Project management dimension intersects with the social justice dimension described above. Students positively viewed group participation in the research task in terms of project management functions including distribution of workload, mapping out and monitoring the project progress. In relation to project scoping and monitoring, students saw value in group auditing with "more than one person checking the work; and "helpful to have several people giving input on what should be done. This enabled them to get "different perspectives on how you should approach the project"; "make the work go faster and keep things organized", as well as providing opportunities so that "group members can check your work", "constantly looking over each other's work". Students also value in terms of shared workload: "we can split tasks", "work can be divided". The outcome of this process was expressed in terms of affective aspects of stress and coping: "other people helping out, taking off the pressure", with the result that "the stress of working alone is relieved". As with the dimensions listed above, students at the outset of the research task were largely positive in relation to project management. However, several concerns *were* identified, centring on dealing with group issues arising during the task: "people procrastinate" and "too many variables to hold accountable if something is off, or not functioning". One student expressed the outcome of this in terms of "making it hard to reach a compromise and slow down progress", and preferred to work alone: "working solo gives you the control where you understand that everything is your fault and responsibility".

Table 3 summarizes the core dimensions of pre-task perceptions of the group process, and their positive and negative attributes.

Table 3: Pre-task perception of the group process

Dimension	Description	Positive	Negative
Social Justice	Refers to core ideas around: shared responsibility, equity of contribution, equity of treatment, division of labor and workload	Work is spread out; The work is split up evenly and workload shared; No one overloaded	Waste time in ensuring others are doing their fair share; Uneven distribution of workload; Uneven commitment and effort; Lack of group togetherness; Problem of equal assessment for unequal contribution; People procrastinate
Knowledge creation	Refers to the opportunities that group work provides in terms of the knowledge generation and production process, particularly in relation to quantity and diversity of viewpoints and perspectives, testing their own ideas in the group, extending their own understanding of the topic and learning together.	Acquisition of new ideas not thought of previously; Recognition of and engagement with multiple opinions, perspectives and viewpoints; Builds a wider range of ideas and thoughts; Learning and improving from each other's input; Opportunities to think differently about the topic that is being examined.	Difficulty of consensus building; Complexity of compromise; Slowing down completion progress
Interpersonal interactions	Refers to the role of and nature of the interactions between group members to accomplish the tasks	Developing group interaction skills; Learning about and from group members; Integration of multiple skills that strengthen the project and create a stronger project.	Difficulty of communicating ideas; Group characteristics
Project management	Refers to management functions including distribution of workload, mapping out and monitoring the project progress.	Project auditing and checking; Planning perspectives; Project timing and organization; Managing workload; Project monitoring for quality.	Complexity of managing process problems: control, responsibility; Implementing effective compromise

Following the completion of the research task, the 42 students reflected on their learning, both individually and as a group. Included in the reflection task was their commentary on the group process. Specifically, students were asked to reflect on how they felt about their participation in the group-learning task. Utilizing an emic approach again to data analysis, three key themes emerged. These are: (1) knowledge creation and learning outcomes, (2) Division of workload and learning equity, and (3) Collegiality and cooperation.

Knowledge Creation and Learning Outcomes

The most predominant post-task reflection theme centred on the process of creating the group representation and perception of its outcome. Students particularly valued the group process as providing opportunities for sharing of different perspectives and viewpoints, engaging with these in thoughtful and critical ways, and working with these to build a deeper representation of their knowledge, and at the same time, expanding their own repertoire of knowledge about the topic. They saw the outcome in terms of a better quality product: "I like working in a group. When working with others, I get so many other views and ideas that I had not previously thought of. This really adds depth to the final product"; "I really like working in groups. It gives different perspectives on the same big topic", and "With multiple people, there are more ideas flowing and often a better train of thought". One student reflected: working in groups allows for different ideas to come in to play creating a sharper focus for the task". For example, "we would have all chosen different, poorer theses than the one we chose to use if we had not been together and conversed". The sharing of ideas also contributed to resolving confusions: "I like working in a group because you can bounce your ideas off of the other members, and if you are confused they can always help clarify". However, one student acknowledged that strongly held diverse views created some issues with the team meetings: "Having two group-members with such opposing views when it came to religious topics, while working on a novel so packed with allusions to the Bible, created an unstable mix of distrust and really, chaos during the real life meetings we had".

Division of Workload and Learning Equity

This theme refers to workload balances and resultant learning outcomes. The equitable division of workload, identified in the pre-survey as part of the social justice dimension was the second most recurring theme in the final reflections. One aspect of the cognitive knowledge dimension was the perception that undertaking group-based research tasks was less individual work: "I liked working in a group because I could bounce ideas off of my group members and did not have to do all of the work myself' and "The best part about working in a group, which is why I prefer it over individual projects, is that the workload can be divided among the group members. For individual projects, one must do all the work by himself, but for group projects, each member needed only to do 1/3 of the actual work, making it a lot less stressful for us" and "there is less pressure on one person because the work can be divided". One student presented a counter voice: "However, I felt actually finishing the project was harder in a group then it would have been if the project was individual, since I had to constantly remind my group members to work it."

Students made reference to the division of workload both positively and negatively: "I prefer it because it splits the work into sections that everyone wants to do and what they are best" at", and "I enjoyed having other people that I could rely on to gather information with me, and being able to designate separate jobs needed to complete the research process to different people. This allowed us to work more efficiently and effectively. More frequently stated were concerns about the uneven contribution of work by team members, and the flow-on of that to assessment: "I still dislike it. For our project, there was not totally participation by each person", and "I feel that working in a group project allows for a quicker completion of the project because if everyone works together, then the productivity can be great. However, there is always the chance of having group members that are not dependable which just increases the work for the people who are actually being productive. This took effort." Concern was also expressed in terms of fairness of assessment: "I dislike the group project because we all get the

same grade despite the amount of work that is put in by each group member and the presentation of each group member".

Collegiality and Cooperation

This theme refers to the role of group tasks in relationship formation and the benefits afforded through this. As stated earlier, students were randomly assigned to groups, and this did not emerge at all as a strong issue, apart from one pre-task reference by one student in relation to not being able to choose working partners. Having completed the group task, students identified the mutuality of working to a common goal and the stronger relationships among them that it fostered: "I love working in group projects because you have friends who help you get to your goal". Mutuality developed stronger collegial relationships amongst a number of the students, and taught important interpersonal skills: "The group project was a good experience. It helped me know some students more intimately; more importantly, it taught me how to compromise and work with others". The collegiality provided a context for supporting the learning process: "I like it because it gives you people to talk to. You can complain to them, help each other, and lean on each other throughout the process" and "I really, really, really liked working in a group project. I needed their help a lot and could not have done it on my own".

At the same time, there were some negative sentiments: "The group does not work well together, it caused some friction. This made the process long and forced as opposed to an easy and fun way to learn" and "I just think it would have been better if maybe we had gotten to choose more so that we were comfortable with whom we were working with". One student provided this insightful conclusion: "Sometimes it becomes difficult to work with others because of their personality/work ethic." Another student elaborated on this idea: "I normally like working with groups but this time I had a very difficult time. I frequently reached out to my group members but communication was an issue and I ended up doing the majority of the work, which was very stressful".

Overall, the students viewed the group task as a positive experience, both in terms of learning, and in terms of the affective dimensions of learning. As indicated in Table 2, and compared to table 1, students perceived that they had learned a considerable amount about their chosen topic, notwithstanding their views of the group experience. Embedded in 31 of the responses across the groups was the affective outcome of learning as an enjoyable experience, for example: "I felt that working in a group project was very fun. I enjoyed it a lot"; I've always liked working independently, but this project was very interesting and fun in some ways.

Table 4 summarizes the core dimensions of post-task perceptions of the group process, and their positive and negative attributes.

Table 4: Post-task perceptions of the group process

Dimension	Description	Positive	Negative
Knowledge creation and outcomes	Refers to the opportunities that group work provides in terms of the knowledge generation and production process	Sharing of different perspectives and viewpoints; depth of knowledge outcome Quality product; Resolution of confusion	Reluctance to compromise on strongly held views
Division of workload and Learning equity	Refers to workload balances and resultant learning outcomes	Equitable division of workload and tasks; Reduction of stress; Strength of individual expertise; Efficiency and effectiveness	Time involved in getting team to produce; Realization of shared responsibility; Inequity of group assessment not matched to individual input
Collegiality and cooperation	Refers to the role of group tasks in relationship formation and the benefits afforded through this	Mutuality of working to common goal; Development of collegial relationships; Development of interpersonal skills; Learning support	Group tension; Interaction of personal attributes; Stress

Discussion

Students' perceptions of group work are shaped by cognitive, social and personal dimensions, in particular social justice, knowledge, and relationship dimensions. The pre- and post-survey reflections on group processes show some consistent patterns around these concepts. The social justice dimension, strongly stated in the pre-surveys, was reasserted in the post-survey reflections, particularly with reference to the division of workload and learning equity in relation to assessment. Students appeared to bring a sense of the importance of shared responsibility, shared effort and shared knowledge as key dynamics to learning in groups. The majority of the students reflected positively on their experience with the group research task. At the outset of the task, they were concerned about the potential for uneven distribution of work, and potential for uneven assessment, concerns that seem to be based on a view of group work as a process of dividing the work task evenly to distribute and even lessen the workload. The pre-survey reflections suggest that students bring with them a sense that social justice principles will be enacted in the learning environment, whether that be a classroom or a school library.

At the same time, students, both in their pre-research and post-research reflections saw the value of groups in terms on the opportunity to build richer knowledge about their chosen topic through the sharing of different perspectives, viewpoints and opinions as a basis for negotiating the knowledge to be constructed by the group. Overall this was a strongly stated positive dimension of group work, and one that appeared to be welcomed by the students at the start of their research and realised through the process, according to their post-research reflections. The conceptual framework for Guided Inquiry, as elaborated by Kuhlthau, Caspari & Maniotes (2007, 2012) centres on students constructing their understanding of a topic by building background knowledge, and establishing the focus and direction of their inquiry. At this background building stage, students explore their topic, find new information and consider different perspectives, and develop sufficient

knowledge to move forward in the research process. Students acknowledged that this process enabled them to acquire new ideas not thought of previously, and afforded opportunities for them to think differently about their chosen topic, and to move forward with a wider range of ideas and thoughts. At the same time, they saw this as an opportunity to test their own ideas within the group, and to engage in a collaborative dialog of negotiation. Some students acknowledged that this was difficult particularly in finding a pathway through the diverse perspectives and reaching a compromise. **It** was difficulty of compromise that was reflected in both the pre- and post-reflections.

These findings also come back to core ideas in the literature surrounding cooperative and collaborative learning. As mentioned in the literature review, collaborative learning is characterized by interdependence, collaboration and co-construction in the learning process, and cooperative learning is characterized by a divide-conquer approach, where the learning task is divided into a set of subtasks which are undertaken individually, sometimes based on negotiation, and then assembled by bringing together the subparts. (Graham & Misanchuk, 2004; Rockwood,1995a,1995b). In this research task, the groups were given a more open-ended task where the focus of knowledge and its central thesis is negotiated and constructed through collaboration by group members though engaging with the expertise, skills and insights of the group participants. There was evidence to suggest that the interaction of social justice aspects and knowledge building process engaged the students in aspects of both cooperative and collaborative learning. While they engaged in the knowledge building process of sharing multiple perspectives and opinions and negotiating their thesis focus, and once this was negotiated and established, the remainder of the knowledge building process was one of splitting the task into individual tasks that were to be subsequently woven together. In the collaborative process, students, in a sense, formed their own norm of equity through collective reasoning and negotiation, even though they essentially found the process of negotiating their responsibilities, input and roles to be a challenging effort but important to reducing stress, increasing efficiency and realizing their collective goal.

This finding supports Brufee's (1995) idea that collaborative learning leads to increased reasoning and questioning in students.

It was the cooperative process that seemed to generate the concerns with the equitable distribution of labor, time and contributions within their groups, which link back to the project management concerns identified in the pre-survey. They were concerned about each person doing their share of work so that at the outcome could be achieved, and viewed their learning somewhat negatively when this was not done. This raises implications for the design of group research tasks, as well as for determining appropriate interventions and training of students if a full collaborative approach to learning is to be realised, and one where the students engage in the co-construction of knowledge for the duration of the process. Implied in the findings is the expectation that the product would be generated by a divide-and conquer approach.

According to Brufee (1995), cooperative learning has historically been discussed in terms of its application to students in K-12 rather than at the college and university level due to the ability of this approach to foster the acculturation process, and that collaborative learning is more suitable to adolescents and adults than students in lower grades. The grade 9 students in this study show the transition between cooperative and collaborative learning. The introduction of technology into classrooms has the potential to providing enhanced collaborative learning opportunities that can help facilitate class discussion, increase interactions between students and teachers, foster co-construction and production of knowledge, and provide social rather than solitary learning opportunities (Looi et al., 2009; Goldberg et al., 2013; Subramaniam et al., 2012). In this study, the students' reflections on their group dynamics did not mention information technology, even though they were immersed in this, using technology to provide to search, communicate and provide input and feedback to one another as they negotiated their projects, and interacting with teacher and school librarian.

The research presented here showed that students often rely on cooperative, "divide and conquer" types of interactions in their groups than forming truly positive dependent relationships to one another, especially at the stage of co-constructing their group knowledge. This was made evident in the groups' comments about equitable divisions of workload and stress in which the students perceived their groups as more cooperative rather than collaborative (dividing work solely based on the structure of the assignment). This supports some of the findings presented by Sormunen et al. (2013) in which students were found to dominantly use a strategy of division, dividing tasks amongst each other, rather than collaboration. Both the pre and post surveys also showed that when asked what students found easy or difficult, the vast majority of the students had concerns which were individualized based on roles rather than collective. Similarly, Lakkala (2005) and Johnson, Johnson & Roseth (2010) similarly found that students often used collaborative environments and tools in ways that reflected an individualistic rather than collectivistic thought process. It might be that the students may have understood the group work as a matter of dividing tasks up equitably and pursuing individual goals rather than truly collaborating, particularly in the knowledge construction process. Given this finding, learning environments ought to be defined as collaborative not only by virtue of their structure but also via the perceptions of those engaging in activities in that environment. Since collaborative environments are not monitored in the way cooperative environments are, educators may need to understand and adjust student perceptions of group work prior to engaging them in a collaborative environment.

Implications for Professional Practice

School educators can take several important ideas from this research. Firstly, when using a collaborative environment for learning, educators may need to understand what students' perceptions of collaboration are before engaging in such a project. This might mismatch or match educator expectations. Student perceptions of collaboration may overshadow the actions they take in working with their group, thereby furthering the "divide and conquer" mindset

instead of nurturing a truer collaborative one including the co-construction of knowledge. Secondly, though the collaborative process involves students in intersubjectively constructing norms for their groups around less concrete concepts like an equitable division of labor, such projects may need to be designed in ways that are more longitudinal and that allow students to revisit and renegotiate such norms. Allowing students to experience a collaborative project over an extended period of time can provide the necessary space and opportunity for students to re-evaluate and iteratively form group norms based on shared experience. The experience of collaboration , in other words, might be better understood through a prolonged experience, allowing students enough time to be critical of their dynamic interactions and implement group changes that reflect deeper collaboration.

As part of the task design and project management process, it is worth considering building in explicit opportunities and time for talk, and where students actively and systematically record key ideas and decisions through journaling and other strategies. Students might be encouraged to develop and map out a writing plan, and time may be needed to scaffold students through these processes, and to develop teamwork skills and expected pro-social behaviours and cognitive actions that lead to the desired learning outcomes. The nature of the knowledge and the process of knowledge construction need to be made explicit, perhaps embedded in discussion of some social justice and work load equity issues and team processes that might emerge.

The findings also challenge educators to think about the assessment criteria to be used, and the place of collaborative teamwork and the co-construction of knowledge in the assessment measure. The whole arena of assigning group vs. individual grades on group performances continues to be discussed in the literature (Chinn, 2011). While students might provide feedback that another student contributed very little to the process, especially the writing-up process, it may not be the fault of that student. For example, it could be possible that if the group is driven by a desire to get a high grade, members of the group might exclude someone from contributing out of fear that this

might pull the grade down. In addition, research acknowledges that the most proficient students tend take over the task (Chinn, 2011). The more the group dynamics are understood by educators, and made visible through reflection, journaling and feedback loops to both educators and students, and made explicit in the assessment criteria, the greater likelihood that issues surrounding social justice, knowledge creation and project management may be reduced.

Other strategies might be used, such as public display of learning outcomes, peer review of contribution, use of information technology tools to develop collaborative writing and editing strategies, the assignment of roles such as note-takers, documentalists, search strategists, summarizers, and editors; and the posting of notes of group meetings, discussions and decisions.

Conclusion

This research reported here, with particular emphasis on group processes, indicates that developing collaborative inquiry through group research tasks in a digital information environment is a complex interplay of cognitive, social and interpersonal dynamics. These centre on both the process and outcome of knowledge creation and representation, the interpersonal and personal dimensions that create the team dynamics, the functionality of the group, and the nature of the learning outcome. Embedded in these dynamics are core concepts such as social justice, division of labour and equity of contribution, and effective monitoring of learning processes, By identifying these dynamics, and through modeling, training and encouraging key processes such as positive interdependence, balanced participation, and group skills development, the potential for deep learning and understanding can be realised. This is particularly critical in the context of information technology, as information technology moves from being a tool to support learning, to being the socially constructed learning environment.

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Biographical Notes

Dr Ross J Todd is associate professor in the School of Communication & Information at Rutgers, the State University of New Jersey. He is Director of the Center for International Scholarship in School Libraries (CISSL), at Rutgers University. His primary teaching and research interests focus on adolescent information seeking and use. The research includes: understanding how children learn and build new knowledge from information; how school librarians and *classroom* teachers can more effectively empower student learning; and how the development of information and critical literacies through guided inquiry and constructivist learning approaches lead to deep knowledge and deep understanding.

Punit Dadlani is a doctoral student in the School of Communication & Information at Rutgers University, and is a Barham Scholar wnh CiSSL, funded by the Carole & Norman Barham Family Foundation. His primary research interests focus on human information behavior and the design of information environments in a variety of organizational contexts. His research includes: how school libraries integrate technology into the information environments of schools; how principles of social justice are embedded and enacted in organizational contexts and how the design of information environments impacts the information needs, seeking and use of individuals.

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Design Thinking by Accident and Design

How One School Developed a Model for 21st-Century Learning (and a Librarian and Technology Teacher Led the Way)

"From kindergarten on, in ways big and small, students move from self-discovery to meaningful pursuit and purpose."

SUSAN FAUST AND JENNY HOWLAND

Just down the road a piece from Katherine Delmar Burke School in San Francisco is one of the country's premier think-tanks on design thinking. The Hasso Plattner Institute of Design at Stanford University (aka the d.school) promotes a powerful approach to problem-solving for innovators in a wide range of fields, from engineering to elementary education. Kindergartners can use it, too.[1]

The approach may look familiar, with recommended stages not unlike some time-honored research models. In fact, design thinking offers fresh insights that emphasize observation, empathy, and openness, for example. Both by accident and design, Burke relied on design thinking to solve an urgent problem: how to prepare students to survive and ultimately thrive in the twenty-first century.

Burke began looking for solutions early in 2010. As the lower school librarian and the lower school technology teacher, we became the facilitators (more about that later). What emerged was not another list of so-called critical twenty-first-century skills, touted out there in the educational ether. Instead, within a year, Burke developed a student-centered, mission-driven model that fit our school, described what we already do, and set aspirations for the future.

So here is the Burke story—a study in design thinking and school leadership. But first, let's look at the model that is helping to solve our initial problem.

THE BURKE MODEL

Burke is an independent K–8 school with a clear mission: to educate, encourage, and empower girls.[2] To help fulfill its mission, the school designed and adopted "How We Learn: A Model for the 21st Century." The model is both a synthesis of old ideas and a new creation.

Traditional academic pursuit remains important at Burke. But in its four building blocks and four bridges, our model suggests further layers of twenty-first-century learning. These layers speak to the life skills deemed essential to meet diverse challenge, now and in the future. Our highly visual, one-page model is easily accessible. That said, a narrative description explains both its inner workings and its rationale.

Center

A student is at the core of the Burke model, with two primary questions: Who am I as a learner? How do I apply what I know about myself as a learner? From kindergarten on, in ways big and small, students move from

> Design thinking is a structured process in which students, working in teams, learn to flexibly shift among critical and creative thinking strategies to solve authentic problems in any discipline. Read more about David Kelley and the d.school at Stanford here: http://alumni.stanford.edu/get/page/magazine/article/?article_id=28380

EIGHTH-GRADE CIVIL RIGHTS UNIT

This year eighth-grade history students explored three stages of the civil rights movement: its roots, pivotal events, and long struggle. Clusters of six to eight students were given readings and focus questions and then asked to share what they learned with peers. One cluster chose to use a multimedia approach, combining a simulated historical debate, poetry readings, archival photos, and an original dance in one seamless video. Burke's model for twenty-first-century learning contributed to both a thoughtful and thought-provoking process and product. Relying on collaboration, students assumed needed roles and responsibilities, communicated their ideas, came to agreements, and engaged in peer review. The clusters wrestled with ethics: What is our intent? What impact do we want to have on the audience? In addition, the groups demonstrated and engendered empathy, imagining how Jim Crow shaped lives and self-perception. The layers of learning were deep and hopefully enduring.

—Howard McCoy, seventh and eighth grade history teacher

Using a flip camera, an eighth grader films a simulated debate between Booker T. Washington and W.E.B. DuBois.

Students find poems by Langston Hughes to recite for their video.

self-discovery to meaningful pursuit and purpose.

The next ring enumerates two preconditions for optimal learning. A major school initiative, *wellness* refers to Burke's commitment to the physical, mental, social, and emotional well-being of students. The *growth mindset* refers to ideas set out in *Mindset: The New Psychology of Success—How We Can Learn to Fulfill Our Potential* by Carol S. Dweck. Her premise is that we can learn from mistakes and that "everyone can grow and change through application and experience."[3]

The outer ring summarizes Burke's program—the institutional commitment to develop multiple intelligences, based on the work of Howard Gardner; multiple perspectives to honor diverse experiences and ideas within and beyond the school community; and multiple disciplines, covering content, skills, and understandings in various subject areas.

This outer ring represents the *educate* part of the school's mission.

Building Blocks and Bridges

Four building blocks and four bridges place key life skills in context.

The left side of the model spotlights the learning community, with personal exploration and collaboration (in other words, how independently and in concert students undertake to learn). The former encompasses the qualities, self-awareness, and metacognition needed to fully develop as an individual learner. The latter encompasses the many skills needed to fully participate in group work. Connecting individual and collective effort are two bridges: ethics and empathy. Together these bridges remind us that moral behavior and compassion are essential in a learning community.

The right side of the model spotlights the learning process, with play and design thinking (in other words, how students learn in seemingly incongruent ways). The former underscores the value of free activity as requisite for learning. The latter refers to a methodical approach, useful for many different needs. Connecting play and design thinking are two bridges: risk-taking and problem-solving. Together these bridges remind us that a robust, can-do attitude is essential to the learning process.

Our four building blocks and four bridges represent the *encourage* part of the school's mission.

Purpose

The model's building blocks and bridges each have unique merit, but their impact is amplified when taken together and applied toward a specific purpose, whether for personal satisfaction or the common good. An arrow connects the student at the center of our model, with a circle of possible applications at the bottom: expression, innovation, citizenship, or appreciation, for example.

The purpose circle speaks to the *empower* part of the school's mission.

DESIGN THINKING

Design thinking is a building block in Burke's model on twenty-first-century learning. Truth be told, as facilitators, we did not consciously rely on such a methodical approach, as we tried to identify those life skills that students can carry forth into a world of change. At times, we simply felt our way around. That said, as we reflect on how our model was developed, it is clear: design thinking shaped the work.

Some define design thinking as a methodology for innovators, fueled by a deep understanding of what people want or need in their lives.[4] As already mentioned, empathy, observation, and openness are hallmarks. In addition, many other words are ascribed to design thinking: optimistic, constructive, experiential, and human centered.[5] Some talk about outside-of-the-box

thinking; others proffer the idea that design thinking does not prescribe either an intuitive or analytical approach alone but rather a third way that integrates both.[6]

The d.school sets forth terms to describe its approach.[7] For our model, we elected to use terms that best fit our own K–8 landscape. We also use those same terms to trace the development of the model itself, knowing full well that our work was not always neat and linear but rather messy and circular. For clarity of discussion, we have further divided the terms into three "overlapping spaces" associated with the design-thinking process: inspiration, ideation, and implementation.[8]

Inspiration

Understand need. In January 2010, our then head of school brought Burke into that national conversation about critical skills needed for the future. She led a faculty meeting around "Demonstrations of Learning for 21st Century Schools," a journal article by Pat Bassett.[9] Her instructions were simply "Read and discuss." And for an hour, that is what we all did. But would that discussion turn out to be a one-off? It did not, and here's why.

Envision a solution. Months went by with no formal follow-up. But as the lower school librarian and lower school technology teacher, we asked ourselves: How could we help move from discussion to deep conversation to action? We were interested in the six critical skills set forth in Bassett's article, but might there be something more to offer students? In May 2010, we asked our head to form a think-tank of two—us! Could we use Bassett's article as a catalyst for further thinking? The answer was a resounding "Yes!"

Research what's known. Throughout that summer, the two of us read books and articles by such thinkers as Daniel Pink, John Seely Brown, Stuart Brown, and Tony Wagner. We then looked at the work of different commissions and attended conferences on twenty-first-century learning. As a librarian and a technology teacher, we also looked at the thoughtful work of our professional organizations, the International Society for Technology in Education (ISTE) and American Association of School Librarians (AASL). Instead of direct observation, we drew on our extensive knowledge of kids and curriculum (a combined total of over sixty years in elementary education). We took into account child development, the all-girls environment, and the demands of a world in flux.

Ideation

Brainstorm. From our research, we generated a list of over fifty critical skills—symphony, self-discipline, networking, and joy, to name a few. We kept open minds, continually adding to the list. We also kept students front and center in our thinking. Which skills were most important for them? Could some sort of context help? With so many concepts and questions, we were in search of meaning.

Synthesize. In search of meaning, we played with the growing list of critical skills. Could we find some shape? How about pairing some of the skills, for example, communication and expression or openness and critical thinking? Or how about a mission-driven approach with skills grouped around the words *educate*, *encourage*, and *empower*? Neither scheme panned out. And that is when collaboration came to the rescue.

Prototype. In fall 2010, the head of school created a twenty-first-century skills committee to further our preliminary work. We were named facilitators. Right off, committee members used Post-its to prioritize, group, arrange, and rearrange over fifty skills. From that collaborative effort emerged the key skills deemed most important for our students. As facilitators, we took those skills back to the drawing board and came up with the basic design used today. In short order, we had created a one-page prototype to represent our priorities—we were ready for the trial run.

Implementation

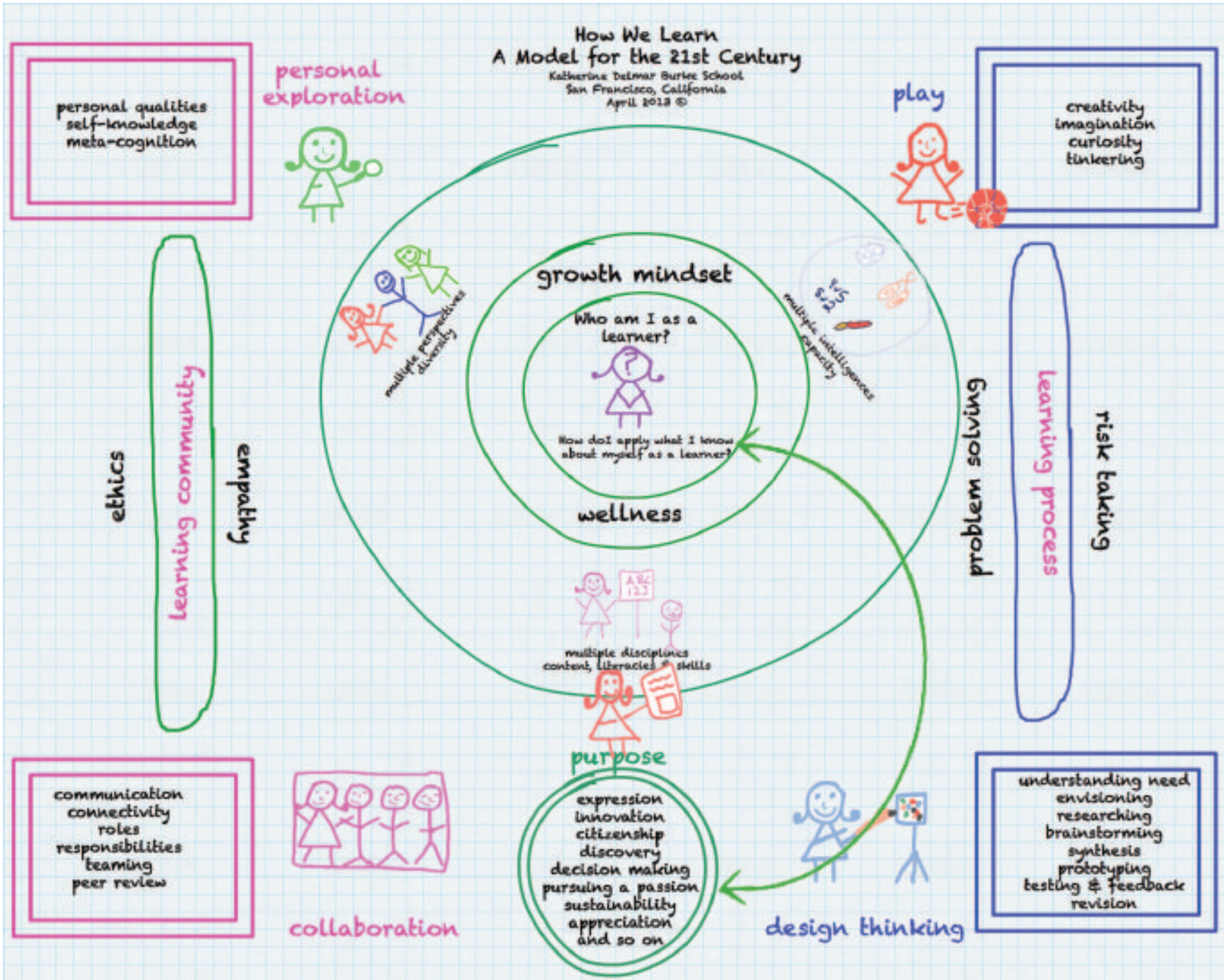
Test. The committee unveiled the prototype at a faculty meeting in January 2011. We paired our prototype with a video of the lower school art teacher, explaining how a landscape painting unit allowed fourth graders experience with the building blocks and bridges of our model. The project clearly incorporated layers of twenty-first-century learning, and the unit proved a successful test of the prototype. The video

THIRD-GRADE INVENTION CONVENTION

For the annual Invention Convention, third graders were charged with inventing a solution to an everyday problem. In science they used the design process, developed at the d.school, to transform their ideas into prototypes that were shared with the community. This project advances Burke's model on twenty-first-century learning. Of course, students practiced problem-solving and risk-taking, but there was more going on. Students drew on empathy to identify what people really needed—for example, how to feed pets or stay organized. Tinkering was a major focus since students must play with different materials to see what works. They also developed resilience. Early prototypes often failed and needed revision. Finally, the project involved different kinds of communication, from giving peer feedback to presenting at the Invention Convention. Students felt strong ownership because they were empowered to make decisions all along the way.

—Elizabeth McDonald,
lower school science teacher

Having read a biography of a famous inventor as a Library assignment, two third graders reflect on their own experiences with the Invention Convention.


How We Learn
A Model for the 21st Century
Katherine Delmar Burke School
San Francisco, California
April 2013 ©
personal qualities
self-knowledge
meta-cognition
personal exploration
play
creativity
imagination
curiosity
tinkering
growth mindset
Who am I as a learner?
How do I apply what I know about myself as a learner?
wellness
multiple perspectives diversity
multiple intelligences capacity
learning community
ethics
empathy
problem solving
learning process
risk taking
multiple disciplines content, literacies & skills
purpose
expression
innovation
citizenship
discovery
decision making
pursuing a passion
sustainability
appreciation
and so on
communication
connectivity
roles
responsibilities
teaming
peer review
collaboration
design thinking
understanding need
envisioning
researching
brainstorming
synthesis
prototyping
testing & feedback
revision

showed teachers how theory could so easily manifest itself in practice, and later many other teachers put their own units to the test. But could the prototype be improved?

Get feedback. We looked to different constituencies for evaluation. Faculty responded negatively to the look of the original prototype. Goodbye arrows, and hello stick figures that speak to our student-centered approach. (Two fourth graders created the art.) Using Powerpoint, we also shared the evolving prototype with parents and the board of trustees. Teachers spoke to upper school students as well. Feedback led to many improvements. For example, one board member asked about a student version. Done! Much later another asked for more emphasis on purpose, thus the arrow. But what to call our evolving prototype?

Revise. By August 2012, the committee could say, "Mission accomplished!" We had a substantially improved the prototype. Its work done, the committee took up one last agenda item: a name for our handiwork. The committee came to easy agreement. Our prototype would henceforth be called "How We Learn: A Model for the 21st Century." Perfect! The prototype was not simply a list of skills but rather a powerful approach to learning, broadly applicable and transferrable—truly a whole greater than the sum of its parts!

Other Considerations

At first, talk of twenty-first-century "skills" generated different reactions. After that very first faculty discussion on the subject, some teachers were heard to mutter the following: same-old, same-old; been there, done that; flavor of the month. Others enthused about innovation and change. It took some strategic work to help faculty discover the model's potential. Today most teachers embrace the model as a tool to deepen both learning and teaching.

Since 2008, we have had three heads of school. The model for twenty-first-century learning not only survived these major transitions but actually gained support and momentum, truly a testament to the school's strength as an institution and the model's power as an educational tool.

REVIEW: PAST, PRESENT, AND FUTURE

That's the model—its workings, rationale, and genesis through the design thinking. Reflection has always informed our work, so let's take a look at progress and success.

Where We Have Been

While the committee worked on the faculty level, the board embarked on a mission review. As the facilitators, we were invited to participate in that process. Thus the model served as foundation for the revised mission statement, adopted in June 2011.

Such philosophical resonance strengthens program and practice.

Where We Are

Our model describes so much of what happens at Burke every day in every discipline—science, art, music, PE, library, and technology, plus other core subjects. By intent or old-fashioned intuition, teachers already incorporate layers of twenty-first-century learning into curriculum—kindergartners studying bones or third graders creating their own inventions or eighth graders reporting on the civil rights movement.

That said, the school is in the process of promoting innovation as a mindset, thus plans for well-fitted fabrication spaces are moving forward. The idea is that girls need to tinker too. The "fab lab" environment will provide abundant opportunities for more twenty-first-century learning.

Where We Are Going

Beyond a description of what we already do, our model is meant to illustrate what we aspire to. In terms of student learning, we aspire to make the pivotal paradigm shift from teaching to learning. How can we further empower students? In terms of teaching, we aspire to use the model as a tool. As an astute board member observed, the model can be used for both planning and assessment. How can we be more effective teachers?

At the board level, a strategic initiatives subcommittee is working on an "outcome" statement on twenty-first-century learning. That statement will underscore the board's commitment and set institutional expectations for performance.

Also at the board level, there is a push for accountability. Does Burke do what it says it does? How can we substantiate our claims? Board and faculty alike are trying to figure out how to gather and analyze meaningful data, both quantitative and qualitative. How does the school help students assess their own development as learners? How do teachers assess individual student learning vis à vis the model? Finally, how does the board assess the institution's delivery of twenty-first-century learning? In answering these questions, Burke will itself continue to innovate and improve.

AGENTS OF CHANGE

As already described, the development of Burke's model is a study in design thinking. It is also a study in leadership. Way back in 2010, our head of school asked the faculty to envision what students would need to negotiate and shape their world. As the lower school librarian and lower school technology teacher, we wanted to explore possibilities, and happily a robust grassroots movement grew up.

In developing Burke's model for twenty-first-century learning, we explored the changing educational landscape and our own changing roles as faculty members. As the librarian and the technology teacher, we still curate collections of books and media; we still participate in curriculum design and development; and we still teach every lower school student, every week. But in our work around twenty-first-century learning, we have acted as catalysts for institutional change, privileged to be part of a solution, privileged to help Burke move forward boldly and wisely. As educator Debbie Abilock suggests in her book *Growing Schools: Librarians as Professional Developers*, librarians (and technology teachers too) can help schools grow.[10] We are agents of change.

NOTES

1. Hasso Plattner Instiute of Design at Stanford, "Our Point of View," http://dschool.stanford.edu/our-point-of-view/ (accessed May 7, 2013).

2. To read Burke's mission statement in full, please visit http://www.kdbs.org/about-burkes/mission-philosophy.

3. Dweck, Carol S., *Mindset: The New Psychology of Success—How We Can Learn to Fulfill Our Potential* (Ballantine Books), 2006.

4. Hasso Plattner Instiute of Design at Stanford, "Our Point of View."

5. Brown, Tim, and Jocelyn Wyatt. "Design Thinking for Social Innovation." *Stanford Social Innovation Review* (Winter 2010), http://tamarackcci.ca/files/design_thinking_for_social_innovation_-_ssir.pdf (accessed May 5, 2013).

6. Brown, Tim, and Jocelyn Wyatt. "Design Thinking for Social Innovation."

7. The K–12 Lab Wiki, "Steps in the Design Thinking Process," https://dschool.stanford.edu/groups/k12/wiki/17cff/(accessed May 5, 2013).

8. Brown, Tim, and Jocelyn Wyatt, "Design Thinking for Social Innovation."

9. Bassett, Pat, "Demonstrations of Learning for 21st Century Schools," *Independent School* (Fall 2009). (FYI: Bassett is past president of the National Association of Independent Schools.)

10. Abilock Debbie, ed., *Growing Schools: Librarians as Professional Developers* (Libraries Unlimited), 2012.

Susan Faust has been the lower school librarian at Katherine Delmar Burke School since 1984. In addition to collection development and teaching, she has worked extensively on curriculum development and school-wide initiatives. As an active member of the Association of Library Service to Children (ALA/ALSC), she has served on numerous book award committees and chaired Newbery, Sibert, Batchelder, and Notable Books for Children. In addition, she writes a regular column of children's book reviews in *The San Francisco Chronicle*.

Jenny Howland has taught for more than 30 years. In the last 20 years she has been a technology teacher for grades K-8. She is currently the Lower School Technology teacher at Katherine Delmar Burke School in San Francisco, designing collaborative projects that emphasize the STEM disciplines. She worked at Children's Computer Workshop and Bank Street Center for Children and Technology before going back into the classroom.

Friction
A Timely Cognitive Shift

Debbie Abilock
NoodleTools, Inc.

Author's Note

Debbie Abilock, a former school administrator and school librarian, co-founded and directs the education vision of NoodleTools, Inc., a full-service online teaching platform for academic research (http://www.NoodleTools.com). She co-authored *Growing Schools: Librarians as Professional Developers* with Vi Harada and Kristin Fontichiaro which was awarded LMC/ARBA 2013 "Best Professional Guide for School and Youth Librarians." She writes a column for Library Media Connection (http://www.librarymediaconnection.com/lmc/?page=featured_articles) about "friction," the design of slow thinking into the research process, and will co-teach with Jole Seroff and Tasha Bergson-Michelson a full-day AASL preconference, "Friction: Teaching Slow Thinking and Intentionality in Research." Correspondence concerning this article can be addressed to debbie@noodletools.com

Time-Honored

I remember the collective sigh of relief among school librarians when a glorious flowering of information literacy ideas based on inquiry offered us constructivist (Perkins, 1999) alternatives to piecemeal library skills lesson plans. How logical it felt to interpret information problem solving as a practical algorithm by suggesting that teachers and students use the easy-to-remember Big6 model (Eisenberg & Berkowitz, 1990). How fruitful were our conversations about low-level research reports when we could point teachers to the REACTS research questions (Stripling & Pitts, 1988) grounded in a

taxonomy (Bloom, 1956) they were already using. How much more intentional we could become when approaching teachers of math and science, after Stripling teased out distinctions between information literacy and inquiry (Stripling, 2003) and Harada showed us how to apply inquiry thinking across the disciplines (Harada, 2003).

Once Upon A Time

When challenged to step-up my own instruction involvement (Loertscher, 2000) I co-designed and co-taught independent research projects school-wide with various teaching teams. What saved me from giving up during late-night bouts of exhaustion was the conviction that we were collaboratively learning to anticipate stages of confusion and to decide how to intervene (Kuhlthau, 1994; Kuhlthau, 2003). I remember being struck by the thought that unless we could design projects so that inquiry felt transformational, that is, unless it resulted in a significant shift in student understanding (Abilock, 1993) beyond school (Callison, 1986), we would merely be assisting students in accumulating inert knowledge, easily forgotten.

Timely Space

Today, thanks to 30+ years of inspired thinking and teaching among our colleagues, a rich representation of whom are here as Treasure Mountain participants, bedrock models have bloomed into a variegated garden of professional research, inquiry designs and constructivist implementations, reinterpreted for a networked information landscape and seeded by close observations of students who are being transformed by exploration and wonder, finding and evaluating, applying and creating, together and individually.

In the River of Time

Recently I've been noodling about how to craft focused interventions in which students must engage in purposeful, slow thinking (Kahneman, 2011) the goal of which is to transforming their understanding of conceptually difficult or

counter-intuitive knowledge (Meyer & Land, 2003; Wiggins & McTighe, 2005). My thinking pulls from **Time-honored** and **Once upon a time** to interpret teaching in a **Timely space** in which we are also committed to *Growing Schools* (Abilock, Fontichiaro, & Harada, 2012). How might this play out in practice?

Time and Time Again

We know that evaluating sources is conceptually difficult but that it is essential knowledge worth teaching (Wiggins & McTighe, 2005), because of its centrality to inquiry and problem-solving in every discipline and everyday life. Currently it's taught within an information literacy process, either before students begin to search, on the fly as they search, or after they've gathered sources but before they take notes. Our teaching is largely ineffective. Schools overuse CRAAP-type tests that decontextualize evaluation by using a generic checklist rather than situating evaluation as an audience-, genre- and needs-specific thinking process. If students are assigned to work through a hoax site, typically they conclude that their biggest problem will be site creators who are deliberately out to deceive them. A second take-away is usually that objective sources are the "gold standard." Objectivity is seen as synonymous with credibility, even when the ideal source for a particular need might be a truthful but not objective eyewitness of an historical event, an expert but not credentialed report on hydraulic fracking problems, or a believable but not entirely truthful speech that models the use of compelling arguments, logic and evidence for a student's debate. Indeed, I've often chuckled at how objectivity is privileged in evaluation even as Wikipedia is vilified, given that Wikipedia's goal is to write from a neutral point of view and cite only "reliable, third-party published sources… credible published materials with a reputation for fact-checking and accuracy [and]… the opinions only of reliable authors, and not the opinions of Wikipedians who have read and interpreted primary source material for themselves" ("Identifying Reliable Sources," 2013).

When they search for information students automatically deploy a rule of thumb based on the faulty assumption that certain top-level domains (.edu vs. .com) are credible or they are lulled into accepting that software, using this same domain formula, can evaluate sources as "credible" for them. They apply everyday rules of thumb like "good looks" and personal preferences like "easy-to-use" as surrogates for credibility and critical thinking. They are guided to trust results from "authoritative databases" or custom "sweet" searches and, when a search engine delivers good enough results, mistake general relevance for need-specific credibility.

The result is a process filled with inert knowledge, ritualized behavior (Perkins, 1999) and misconceptions about evaluation; a perfect storm in which intuitive decision-making and faulty rules of thumb are reinforced by "solutionism software" (Morozov, 2013), that is, software designed by well-meaning programmers to automate and make "easy" what should be tasks worthy of human analysis and judgment.

Timeless Understanding

Embedded in evaluating sources is a "threshold concept" which, when understood, will shift teachers and students to a "qualitatively different view of subject matter" and transform their behavior, feelings and attitudes (Meyer & Land, 2003, p. 4). When the definition of "credibility" is grasped as a contextualized and nuanced set of judgment calls based on varying criteria, students will modulate how they select, evaluate, take notes and use their sources in papers. The cognitive and behavioral shift is irreversible because one has acquired an enduring understanding of a "previously hidden interrelatedness" (Meyer & Land, 2003, p. 4). During pre-searching, a source might be judged by relevance or reading level. Later, in order to determine relative authority among sources, one would weigh the expertise or credentials of writers against each other. Data and evidence can be subjected to tests of both accuracy and strength. Trustworthiness surfaces when one corroborates sources or compares publishers to determine how members of a community or discipline regard them. An argument is no longer framed as a

report of conflicting information but rather as the "moves" that one uses to enter a conversation among ones sources (Graff & Birkenstein, 2006).

Out of time or time out

In a fast-moving, networked information landscape in which most librarians no longer get the time to shepherd students along an entire research process, we cannot continue to teach a sequence of lessons matched to the information literacy timeline. Our cognitive shift is to confront timeline thinking and design interventions to systematically address pervasive concepts that are poorly understood but essential knowledge. I've been calling these interventions "friction" because they target misconceptions, inert or ritualized knowledge by activating System 2 which "allocates attention to the effortful mental activities that demand it" (Kahneman, 2011, p. 21). In the specific example we've explored, our goal is to transform the learner's (teacher and student) enduring understanding of evaluation as a sustained attitude not an event. Evaluation is a mindset in which discipline-, context- and needs-based judgment calls permeate how one finds and uses sources for a need. Once internalized through practice, evaluation of information becomes less effortful and more effective.

Carpe Deum

During Treasure Mt. 2013 we'll identify and work through an example of applying friction to see how it plays out in terms of teaching and learning.

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Online Learning: Possibilities for a Participatory Culture

David V. Loertscher and Carol Koechlin

Online courses are proliferating rapidly for children and teens. What is driving this virus in education? Does online learning really have anything to do with learning? Students are dropping out and tuning out of courses. What is to be done?

We have discovered that some U.S. states are now requiring young people to take at least one online course during their schooling. This is perceived as a solution to educational financial crunches and touted as a way to make good use of technology. These misconceptions are fueled by confusion with past-century distance learning and entrepreneurial businesses that clearly smell the potential monetary gains.

It seems that the construction of these courses is based on an effort to guarantee content delivery and make a profit. To provide sustainability and maximize profit to the investors, a course needs to be developed, tested, revised, and then sold over a period of time with many students. These "design once, teach many" courses are expected to produce very predictable results. For example, when students sign up, they may face the assignment to complete a certain number of modules in the class. Each module is very directive: read this, listen to a lecture, do that, take a test, repeat if necessary. Predictably, students find this instructional design deadly boring. And the research saying that such courses provide temporary improvement but not long-lasting results is beginning to appear. Just like postsecondary school, the dropout rate is very high because online coursework is not about learning and thus is not pedagogically sound. It is another cookie-cutter approach to education based on financial profit rather than student improvement.

But from the perspective of those working in the wide world of information and technology, we see another major problem. Any specialist in the school who has a mission to make a difference across the school—such as a teacher librarian, a teacher technologist, a reading teacher, or an instructional coach—immediately notices that they are locked out of such approaches. In such packages, all the information and technologies to be used are supplied as part of the package. There is no need to go outside of the package for anything. To the instructional designer of such courses, this makes the outcome more predictable: everyone has read or heard or done the same thing and thus can be tested on the same thing. Predictability is the major selling point. Some companies provide some choice, but even that is locked in. We repeat: the teacher librarian and other specialists are locked out. And we notice that we are not the only ones worrying about such issues and possible solutions.

Do students really need to be out in the world of information? Do they really need exposure to a variety of technologies? The argument is that with much more freedom allowed, that predictability factor is lost. It is all about performance on a test that allows this cookie kid to be compared with that cookie kid across the world.

To those interested in predictability, the idea of "real" learning—engagement, creativity, and self-directed learning—is nice, but impractical and not cost effective. Engage any of the companies in such a conversation and you will get a sales pitch that describes wonderful this or wonderful that, but direct teaching of content and predictability reign.

Over the past ten years, a variety of content management systems have emerged that provide the structure of an online learning experience and the instructor supplies the content. Some of the popular systems are Desire to Learn (D2L), Canvas, Blackboard, and Adobe Connect. These systems come with a considerable cost to the institution, but their major drawback is that the structure itself encourages traditional top-down learning experiences. There are ways to add lectures, specific assignments, discussion forums, and grade books. We have not seen these packages used for coteaching by the classroom teacher or professor and the teacher librarian. The very structure of the software encourages and reinforces that the "proper" way to learning is through direct instruction, lecture, assignments, rubrics, and traditional assessment practices.

THE RISE OF THE LEARNING COMMONS CONCEPT

In 2007 we started working on a concept that would transform the isolated school library and computer labs to the Learning Commons and published our call to lead the way in 2008. We re-envisioned the school library as both a physical and virtual participatory learning space where the various specialists of the school officed and worked together to make major differences in teaching and learning across the school. Both places were to be participatory, with a sense of ownership being developed by both learners and teachers. Both spaces were envisioned as collaborative, focusing on designing best learning experiences and environments and the idea of commons, as well as growing together as learners.

As more and more closed online education began to raise its head as teaching machines had done decades earlier, the authors wanted to elaborate on the concept of the Virtual Learning Commons that would be a replacement for the static and one-

way stream of information from librarian to patron. We, along with many others, were noticing that patrons were googling around the library. We also noticed that early adopter classroom teachers who were using technology began to design their own classroom websites that were directed at their own classes and rarely, if ever, included either teacher librarians or teacher technologists. Unwittingly, many specialists were assisting teachers in developing their own course websites that perpetuated the idea of the isolated teacher in the isolated classroom. The teacher learned to provide not only assignments but also the information and resources to be used in accomplishing the varying tasks. Thus the authors wrote a second book and expanded the idea of a collaborative Virtual Learning Commons in 2012.

In this virtual space as it has been developed over the last several years by the authors and graduate students at San Jose State University, five major participatory virtual "rooms" were developed:

- The Information Center
- The Literacy Center
- The Knowledge Building Center
- The Experimental Learning Center
- School Culture

It was in the Knowledge Building Center that we envisioned that the teacher librarian could move squarely into the center of teaching and learning in the school to become the "heart of the school" that had been the focus of the school library program back as far as the 1960s but not realized in many school library programs.

What could be done in virtual space that seemed so difficult in many schools? The answer to that question came in the appearance of collaborative technologies, often referred to as Web 2.0, and the emergence of a suite of tools known as Google Apps for Education. These tools were not just ways of creating multimedia or enhancing efficiency, but they could be used to deepen understanding of topical content in ways not possible before. The emerging popularity of the SAMR**[Q: spell out]** model led the way for educators to search out and implement new ways to boost teaching and learning to new heights. Best of all, these tools were free or very inexpensive and could be used on a number of devices either furnished by the school or owned by the student. A major advance toward equity was now possible.

Using such tools brought new possibilities for the assessment of teaching and learning. Instead of relying on one set of scores that measures a singular aspect of learning, assessment could now focus on multiple measures at three important levels:

- Personal expertise: what the individual knows and is able to do
- Cooperative group work: demonstration that when a product or project must be built to specifications, that each individual could contribute a piece, a puzzle piece as it were, into the mix and that the pieces would fit together to make a whole that "worked" or made sense, or filled a requirement in the overall learning experience
- Collaborative intelligence: the idea that truly collaborative work by learners could create something new when added together; new ideas, new solutions, inventions, creative solutions. The whole would be greater than the sum of its parts.

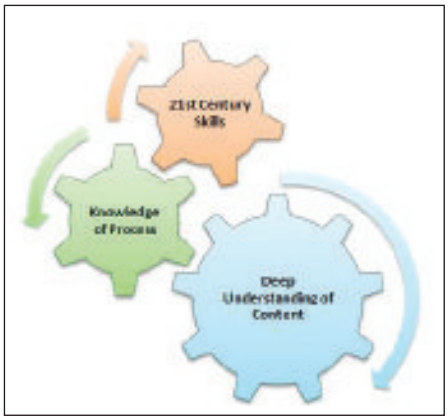
In reality, assessment could be as varied as individual learners and could not just celebrate the meeting of an expected level but could exceed that expectation. Looking at a variety of measures, the coteaching partners could celebrate the percentage of learners who rose above what was originally expected rather than concentrating on just achieving minimums.

PUTTING IT ALL TOGETHER

We asked ourselves a variety of questions:

- How could two adults make working collaboratively a natural experience rather than a contrived one?
- How could learners participate and grow as learners in a networked flat environment rather than in a pyramidal top down directed teaching experience?
- How could a vast array of information and technology resources be saddled to promote wide learning rather than narrow fulfill narrow expectations?
- How could engagement be stimulated to help learners achieve more than minimal expectations?
- How could assessment efforts recognize diversity, creativity, and even innovation on top of the normal minimums?
- How could the best ideas from constructivist experts and disruptive technologies be used under an experimental model and under a best practices model?

There is a growing number of voices shouting out a much more constructivist approach to teaching and learning, but demonstrations of this are lacking. In this article, we recommend three approaches that put teacher librarians and teacher technologists at the center of online learning experiences. These approaches also ensure that learners develop and apply the skills needed to build understanding and accomplish the work, a clear comprehension of the process of learning in a networked world, and the expectation that these two factors will drive a much deeper understanding of the topical content of the unit as pictured in this diagram.



The three approaches are:

- Knowledge Building Centers
- Book2Cloud
- QuickMOOC

The foundational idea of all three approaches is that when a teacher librarian or teacher technologist joins forces with a classroom teacher, a creative synergy produces proven results. If these partners then adopt a participatory partnership with the students in a learning experience, then much richer, more engaging, and beyond minimal outcomes actually occur. Consider the possibilities of encouraging ev-

ery student to meet or exceed expectations rather than just achieving the minimum. Consider the possibilities of high engagement, the building of resilient learners, and the possibilities of real projects and experiences that push young people into a much more self-directed world of learning. It is not just about being minimally ready to get into some kind of college or career; it is all about exceeding the expectations that businesses and educational institutions expect; or it is all about young people launching their own future world as entrepreneurs, inventors, ready to make changes for the better in in society and in the world. To accomplish this task, the very structure of online learning would make a collaborative and participatory learning culture seem like a natural way of designing a learning experience.

Below is the description of three approaches mentioned above for teacher librarians and teacher technologists to consider promoting to the people they work with .

Each of the learning designs could be used by students to

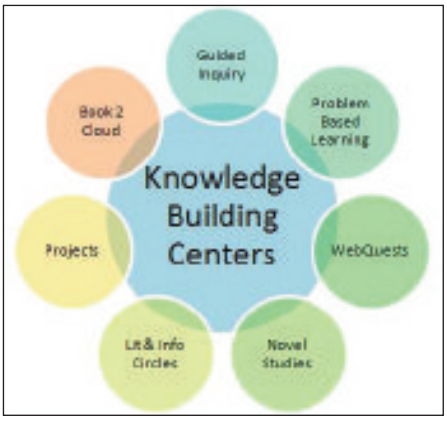
- proceed through the experience alone or with a group, with mentors totally online
- experience a "blended learning" approach where some online learning is used alongside the mentors in a physical school environment
- use the model course as a jumping-off place where learners design their own learning experience under the guidance of the mentors

In any case, the learning is structured in such a way that at least two adults are mentoring the learning experience as coteachers. And the students are expected to become self-directed responsible learners rather than just being asked to fill a series of closely structured assignments.

KNOWLEDGE BUILDING CENTERS

This approach to designing excellent learning experiences in new collaborative environments was first introduced to readers in an article in this journal, "Knowledge Building: The Heart of the Learning Commons," volume 38, number 3. Since then this approach has been refined and adapted successfully by many teacher librarians willing to experiment with the template (https://sites.google.com/site/knowledgebuildingcenter/) as pictured below:

Many types of project-based and inquiry learning experiences work very well in the Knowledge Building Center (KBC) environment because the actual learning organization is available anywhere, at any time, and on various devices, as shown in the illustration below. This visual expands on some possibilities: What makes it unique is its design to encourage collaborative coteaching by the classroom teacher, the teacher librarian, and any other specialist. The appropriate adult mentors are "in the room" together as they plan, teach, and assess the learning alongside a participatory culture of learners. The KBCs can be constructed around a number of instructional designs, and because the template is a Google Site, it is available to both adults and learners 24/7. These learning experiences can be used and then moved to a museum as evidence of experimentation with learners and documentation of impact by each of the mentors. KBCs are particularly useful when linking various classes in the school together or classes across schools or groups around the world, no matter the time zone. And if you don't care to use a Google site, the template will provide ideas for working in other technologies, such as Moodle.



Virtual Knowledge Building Centers are

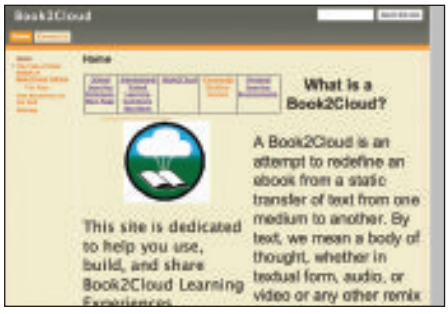
collaborative construction zones between adults and students

- places to learn, solve, work, create, think, achieve, shine, demonstrate
- participatory learning
- higher level thinking and metacognition
- ventures into the real world of information
- free or almost free
- simple to create on a variety of technologies
- super learning experiences

In our book *The Virtual Learning Commons: Building a Participatory School Learning Community,* you will find an entire chapter with much more about the potential of KBCs to actually transform learning into new and exciting experiences, as well as other KBC template designs and examples to explore created by teacher librarians.

BOOK2CLOUD

A Book2Cloud experience presents learners with an engaging text, document, video, or other material that challenges the mind and requires deep investigation to create meaning. Using this "text," a virtual room is created where individuals or small groups create meaning around pieces and parts of the text and then put them together to build deep understanding of the whole. You can see many examples and explanations at https://sites.google.com/site/book2cloud/.

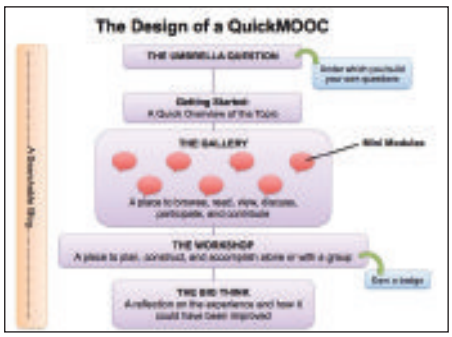


We have created a Book2Cloud free template for easy construction of such learning experiences in your own school. You can find this template at https://sites.google.com/site/book2cloudtemplate/home.

Book2Cloud is most appropriate when you want to help learners understand the power of curation and collaborative learning. It is also an important tool for those working on complex texts as a part of the Common Core standards in the United States.

QUICKMOOCS

A third approach to collaborative online learning is a variation on the currently popular MOOC (massive open online course) movement popular in the university community. A QuickMOOC takes a topic similar to a unit of instruction rather than an entire full-length course; a way of spending two to three hours in an on-topic participatory community where the learner is in command of his or her own learning. As illustrated in the instructional design model below, a learner can come into this learning experience either as an individual or with a group under the guidance of such mentors as the teacher and the teacher librarian. Here they encounter an umbrella question and then develop their own questions that fit under the larger topic. They proceed to a room where they get started by building background knowledge and then into a gallery where there are many possibilities to build their knowledge depending on what they already know and what they want to pursue. Using this knowledge, they progress to the workshop with lots of possible projects or pathways to follow, and this will lead to some kind of badge or conclusion they work out with their mentors. Finally, this is topped off with a Big Think where they reflect on what they have learned and how they learned it. Instead of exiting, they can stay in this participatory community as long as they wish, mentoring others, contributing content, ideas, or other resources. Here is the model:



The first QuickMOOCs to be developed center on professional development topics for teacher librarians and classroom teachers, but others are on the radar for individual learning units directed at K–12 students. For example, one topic centers on the creation of the physical learning commons in the school. Unlike the other two approaches, there is a small fee to take one of these short courses as a way to encourage a higher completion rate. The major difference in this online learning design is the idea of self-directed learning under the guidance of mentors, the idea of joining a participatory community, and a variety of outcomes based on the individual learner's need and interest. Descriptions of the various offerings are at http://quickmooc.com.

CONCLUSION

So what do we need to consider when designing online learning? If "learning" is what we are after, whether blended or totally online, then a move must be initiated from locked-in, content-driven packages to participatory knowledge-building experiences. Learners need to be free to work individually, cooperatively, and collaboratively, with the best information available in technology-rich learning environments. Teacher librarians and teacher technologists are uniquely positioned to lead in inventive ways to make online learning really work. Bring your expertise and the rich resources of the library learning commons into the center of online teaching and learning. Seek new ways to work with teachers to infuse learning to learn skills and processes with curriculum content in online environments. Experiment with our ideas and models and templates and create your own. Share back with us and with your professional networks. Help the online learning thrust move into the new networked world of participatory knowledge building.

Lead—don't be locked out!

Digital Curation Research in Progress

Joyce Valenza

School of Communication and Information, Rutgers, The State University of New Jersey

Brenda Boyer

Kutztown Area School District, Kutztown, Pennsylvania

Della Curtis

Coordinator (retired), Office of Library Services, Baltimore County Public Schools, Baltimore, MD

Abstract

Curation of resources has long been within the purview of professional librarians and archivists. Now, digital curation is becoming a commonplace activity for people of all ages and for multitudes of purposes. In this changing milieu, the evolving digital curation practices of librarians warrant exploration.

Keywords- curation; digital curation; librarians, social curation, digital curation tools

Digital curation is a burgeoning area of interest to the library field. As the task of carefully collecting digital resources for constituents and learners is increasingly part of the librarian's professional duties, an investigation into the state-of-the-art of digital curation is needed. Curation has long been a traditional domain of the librarian and archivist; now, curation belongs to everyone and is happening everywhere. Valenza (2012) defined curators as those who "make sense of the vast amounts of content that are continually produced. They are talented at scouting, identifying relevance, evaluating, classifying, organizing, and presenting aggregated content for a targeted audience" (para.5). LibGuides, Pinterest, YouTube, Scoopit, PearlTrees, and Mentormob are just a few of the numerous proprietary and free tools readily

available to expedite this task for anyone with a desire to collect and share. So, how are librarians curating? Why are they curating and what tools are they using? Why are they using these tools? How is curation managed at the enterprise level? This study is driven by questions such as these in a quest to uncover the state-of-the-art of digital curation in libraries.

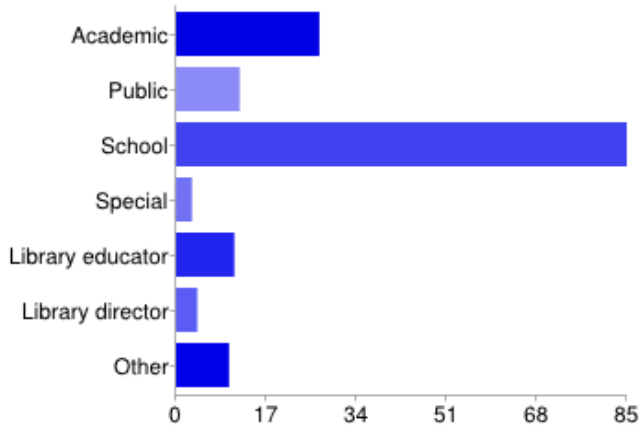
The researchers are currently collecting data from a 32-question survey that addresses these and other curation-related issues. Launched on September 19, 2013, the survey has been distributed via various listservs and Twitter hashtags and to date has 147 responses. Here is what we are learning (so far) from our small sample, largely comprised of school and academic librarians:

147 responses

Publish analytics

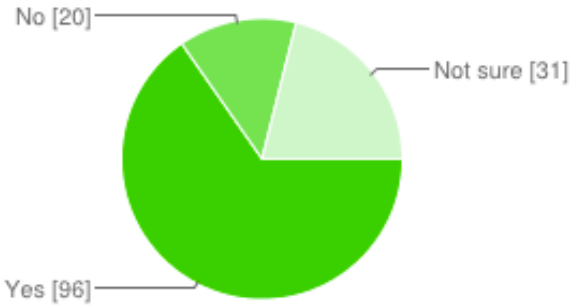
Summary

1. Who are you? (What type of librarian are you?)



Academic	**27**	18%
Public	**12**	8%
School	**85**	56%
Special	**3**	2%
Library educator	**11**	7%
Library director	**4**	3%
Other	**10**	7%

5. Do you consider yourself a digital curator?

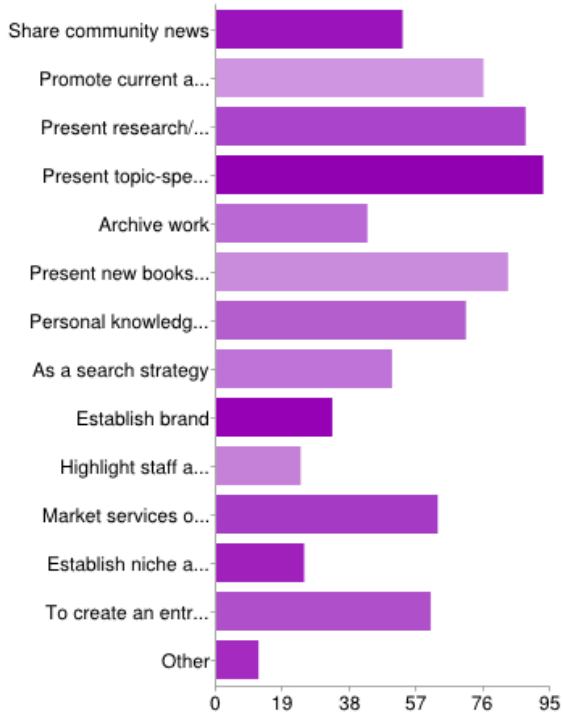


Yes	**96**	65%
No	**20**	14%
Not sure	**31**	21%

As expected, most of the professionals who took the time to respond to the digital curation survey consider themselves curators.

Reasons for curation are varied and spread across most of the options predicted. Presenting topic-specific guides, new books and media, and research and communication tools are currently the top reasons cited for curating.

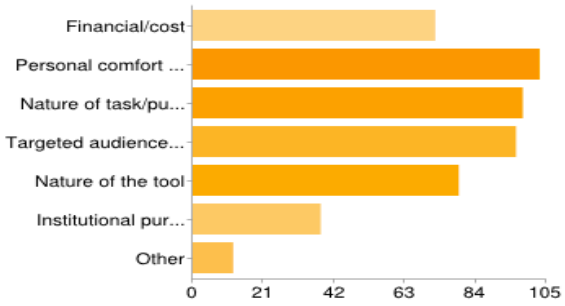
7. Why do you curate?



Share community news	**53**	7%
Promote current awareness	**76**	10%
Present research/communication tools	**88**	11%
Present topic-specific guides	**93**	12%
Archive work	**43**	6%
Present new books and media	**83**	11%
Personal knowledge management	**71**	9%
As a search strategy	**50**	6%
Establish brand	**33**	4%
Highlight staff achievements/talents	**24**	3%
Market services or resources	**63**	8%
Establish niche authority	**25**	3%
To create an entry point to collection	**61**	8%
Other	**12**	2%

Curation tool selection is driven by the curator's personal comfort level and the tool's ease of use, the purpose of the task, and targeted audience.

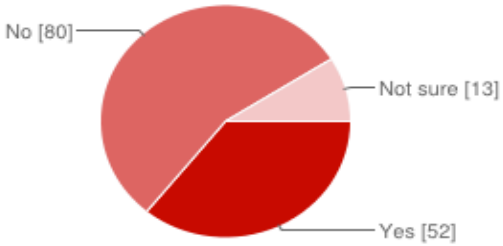
10. How do you decide which tools to use for your various curation tasks? (Check all that apply.)



Financial/cost	72	14%
Personal comfort level/ease	103	21%
Nature of task/purpose	98	20%
Targeted audience needs	96	19%
Nature of the tool	79	16%
Institutional purchase or standard	38	8%
Other	12	2%

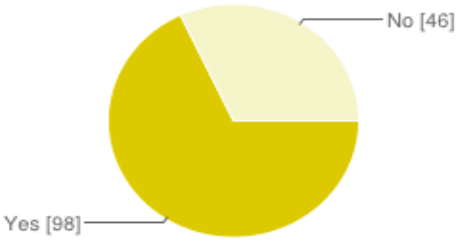
Curation does not seem to be a specified job task for more than half of the respondents. Curation does appear to be a collaborative activity shared with colleagues.

13. Is digital curation a specified job task for you or others in your library?



Yes	52	36%
No	80	55%
Not sure	13	9%

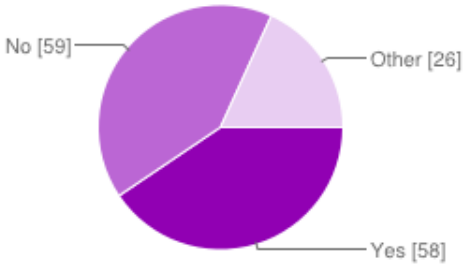
14. Do you collaborate with other faculty or staff to curate content?



Yes	98	68%
No	46	32%

Currently 59% of survey participants engage their patrons/students and other stakeholders in curation efforts.

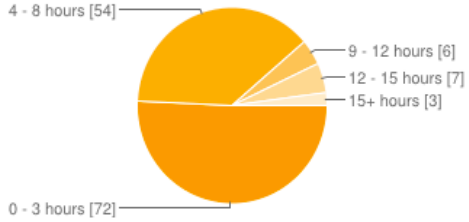
16. Do you invite your patrons/users/members/students to participate in curation activities?



Yes	58	41%
No	59	41%
Other	26	18%

Curation is an activity that a significant number of respondents engage in outside of their workday.

19. How much time would you estimate that you engage in voluntary digital content curation per week outside of work hours?



0 - 3 hours	72	51%
4 - 8 hours	54	38%
9 - 12 hours	6	4%
12 - 15 hours	7	5%
15+ hours	3	2%

Among the open-ended questions was one that asked participants to identify their favorite curation tools. Twitter and Pinterest are current front-runners:

BagtheWeb	1	0%
Bundlr	1	0%
Delicious	44	6%
Diigo	51	6%
EdCanvas	9	1%
Evernote	51	6%
Facebook	62	8%
Flickr	32	4%
Learnist	8	1%
LibGuides	51	6%
LiveBinders	27	3%
MentorMob	6	1%
News.me	1	0%
Paper.li	18	2%

Pearltrees	6	1%
Pinterest	70	9%
RebelMouse	4	1%
Scoop.it	45	6%
Slideshare	30	4%
Storify	18	2%
Stumbleupon	9	1%
Symbaloo	24	3%
Theemify	2	0%
Tumblr	19	2%
Twitter	72	9%
Vimeo	19	2%
YouTube	50	6%
Other	63	8%

Treasure Mountain will provide an opportunity to share preliminary data and discuss the next phases of this ongoing research including interviews of various digital curators and other aspects of digital curation the study will investigate.

References

Valenza, J. (2012). Curation. School library Monthly 29 (1).

"Educators at all levels can use this tool both in the classroom and in school-wide and district-wide curriculum planning."

INFOhio IMatrix:

A Tool to Enhance Deep, Rigorous Learning!

GAYLE GEITGEY, TOM SHESSLER, ANN TEPE, LAURA SPONHOUR, MIKE RIDINGER, THERESA FREDERICKA

What keeps you up at night? Educating students to be college and career ready? Incorporating inquiry into your teaching for the very first time? Shifting your instruction to explore topics in greater depth and at more rigorous levels of learning? Or, are you struggling to incorporate formative instructional assessment?

In Ohio, teachers face the arrival of the Common Core State Standards and Ohio Learning Standards and the new emphasis on teaching inquiry skills. In order to help teachers implement the standards in the area of inquiry and use appropriate resources, INFOhio developed the IMatrix, an online tool that supports integrating inquiry with instructional practice.

HOW WAS IMATRIX CREATED?

INFOhio, Ohio's K–12 digital library, has long supported inquiry and research. So logically, the next step was to create an online tool that merges information and resources needed to effectively implement inquiry in instruction. Using the shared services partnership with Hamilton County Educational Service Center in Cincinnati, Ohio, a development team was formed to design a tool that would combine Ohio's New Learning Standards with inquiry learning skills. This tool had to be easy to access, extremely user friendly, and combine the three major elements of grade level, subject area, and inquiry standard. The design team also wanted teachers to be able to easily see cross- curricular connections and have instant access to both assessment and instructional resources. The new tool must also allow teachers to drill down to a specific skill set in a specific grade level for a specific subject area. And, to add to the complexity of designing this tool, the development team felt it was crucial for teachers to see the progression of skills through the grade levels. After many weeks of discussions and diagrams, the IMatrix structure—basically a three-dimensional grid—was created as the design for the new tool, and INFOhio's technical services team went to work to build the online tool.

WHAT IS THE IMATRIX?

INFOhio's IMatrix helps educators practice inquiry-based instruction that aligns to skills embedded within the content standards of the four core curriculum areas: English/language arts, mathematics, science, and social studies. By searching the IMatrix, educators can easily see how skills are scaffolded across grades for students and find resources that will help them teach those skills, find interdisciplinary connections, and help plan quality instruction.

The IMatrix uses the six Dimensions of Inquiry as its unifying instructional model. The Dimensions of Inquiry, first identified through an environmental scan of various inquiry models, include the following skills:

1. Questioning
2. Locating Information
3. Evaluating Information
4. Applying Information
5. Sharing Knowledge
6. Reflecting on Learning

Step 1: Explore the IMatrix Cube

The IMatrix uses the Dimensions of Inquiry for two main reasons. First, the new nationwide Common Core standards for ELA and math and Ohio's updated standards for science and social studies demand that teachers help students develop the critical research skills they need in college and on the job. Second, inquiry is common to all four content areas and to all grade levels. Therefore, coordinating lessons across subject areas and building on skills from grade to grade is easier.

WHO SHOULD USE THE IMATRIX?

Educators at all levels can use this tool both in the classroom and in school-wide and district-wide curriculum planning. IMatrix provides a comprehensive way to view key skills as they scaffold in a student's learning from kindergarten through the end of high school.

WHY USE THE IMATRIX?

One of the main objectives of the standards movement is to ensure students learn the essential skills and knowledge that are keys to college and career success. The IMatrix helps teachers identify the key skills in the standards that support the development of thinking skills. Inquiry-based instructional practices, in particular, help students develop thinking skills, provide them with authentic content with which to practice the skills, and ask them to demonstrate their ability to use these skills as they discover connections, develop insights, and learn to articulate their understandings about what they learn.

Students develop those thinking skills—how to form questions, how to work with information, how to share their knowledge, and evaluate their own learning—best through experiences embedded in all of the content areas across all grade levels. Therefore, IMatrix correlates standards from the four core content areas to demonstrate not only interdisciplinary connections among those skills but also to show more clearly the scaffolding of these skills from simple tasks in the early years to more complex assignments in later grades. By helping teachers develop a clear understanding of how these skills align to all of the content areas, IMatrix provides them with a deeper insight into how student learning in their classroom meshes with learning in other classes and builds upon learning from earlier years.

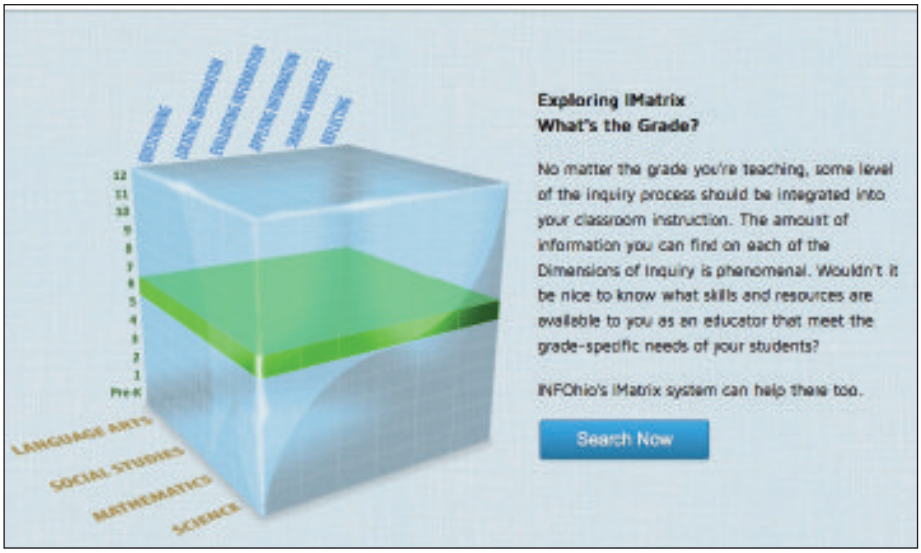
In addition, many experts of the Common Core for Reading and Writing recommend that students have a minimum of three or four rigorous research experiences embedded in multiple content areas throughout each school year. Doing that requires coordinating assessment plans and identifying appropriate content across subject areas. IMatrix helps schools identify key vertical alignment and interdisciplinary alignment for essential student skills.

HOW TO USE IMATRIX (HTTP://IMATRIX.INFOHIO.ORG)

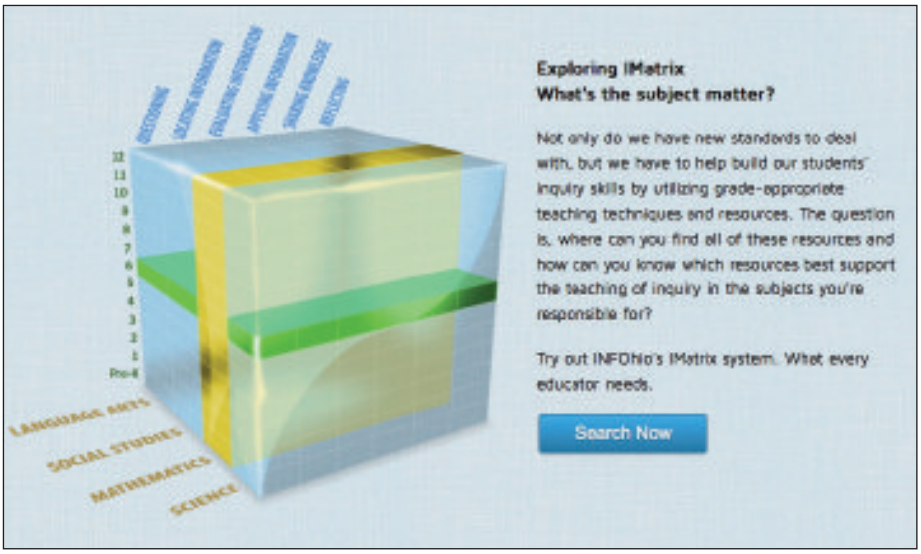
STEP 1 —EXPLORE THE IMATRIX CUBE

Click on each of the six navigation buttons on the IMatrix home page to walk through the structure of the matrix cube and the various relationships it represents. Click *Introducing IMatrix* in the left menu to learn more about how and when to use it.

Step 2: Brush Up on Inquiry if Necessary



Step 3: Explore the Components



Step 4: Examine Curriculum Areas

Step 5: Search IMatrix

STEP 2—BRUSH UP ON INQUIRY, IF NECESSARY

Understanding inquiry is crucial to making the best use of IMatrix. The brief material listed under What Is Inquiry on the main menu includes links to help expand your knowledge. There are many inquiry models and structures for teaching the inquiry process. INFOhio has identified six Dimensions of Inquiry that encompass most of these, so any model you use can be correlated to these dimensions.

STEP 3—EXPLORE THE COMPONENTS

INFOhio has completed the correlation of resources, standards, and inquiry dimensions for grades K–8. Remaining grades will be added in the near future.

STEP 4—EXAMINE CURRICULUM AREAS

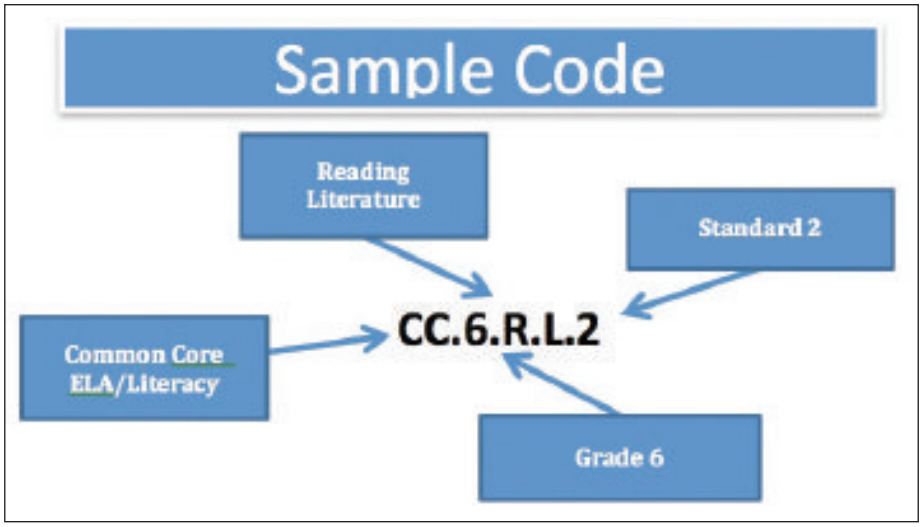
Each of the subject areas links to resources for that field, such as the state or national subject area standards, organizations, and other high-level resources.

STEP 5—SEARCH IMATRIX

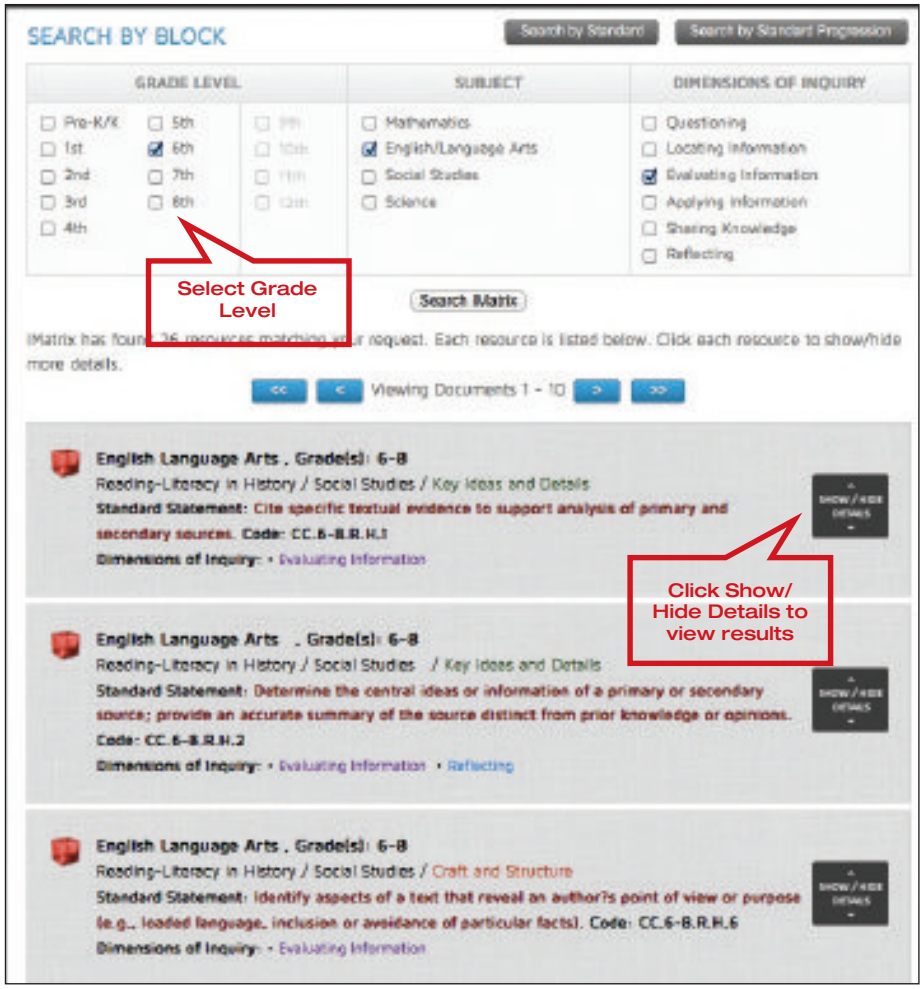
In its search, you see the real power of IMatrix. Select the subject area, grade level, and inquiry dimension to drill down to specific skills and resources. You can also search by specific standard, if you know it.

SEARCHING THE IMATRIX BY BLOCK, STANDARD CODE, OR STANDARD PROGRESSION

Searching is easy. To search by block, select a grade level, subject, and dimension of inquiry. For example, a seventh grade social studies teacher who is concerned that his students need more practice evaluating information, can click *7th grade*, *Social Studies*, and *Evaluating Information* on the search screen. IMatrix returns every applicable standard along with dozens of websites, articles, lesson plans, and activities he can use to help his students.



To search by the standard, simply type the standard code and select Search IMatrix. An example would be CC.6.W.1, which shows it is a Common Core Standard for sixth grade writing, standard statement 1. A word of explanation: When IMatrix was first designed there was no uniform coding for the Common Core Standards or Ohio Learning Standards in social studies or science. When standardized coding is available, IMatrix will revise the coding to the national standard. It is also important to note that IMatrix is the integration of the standards with the Dimensions of Inquiry.



Search by block result

Only the standards with inquiry integration have been included in IMatrix.

The newest search strategy for IMatrix is a search by standard progression. This search uses an asterisk as a wild card and will allow you to select any grade levels above and below your current grade or you may select all the grade levels, and then enter a standard code using the asterisk to replace the grade level (CC.*.R.L.1). The result will be a progression of the standard for all the grade levels selected. Or, when entering a standard code, use the asterisk to get a more global search of how many standard statements aligned with the Dimensions of Inquiry there are for a grade level. For example, CC.6. R.L.* will show results for all the reading literature standards for sixth grade that are aligned to inquiry.

It is important to note that IMatrix includes both Internet based resources as well as INFOhio resources for the assessment and instructional strategies and resources section. The INFOhio resources are available through a statewide strategic partnership, Libraries Connect Ohio (LCO), made up of school, public, and university libraries under the leadership of the State Library of Ohio. All of the content, including the premium research databases, is available at no charge to all Ohio citizens, including all K–12 students, educators, and parents. Licensing agreements between LCO and the database publishers mean that some resources might be blocked for people outside of Ohio, but many states have similar statewide digital libraries where educators can find classroom resources at no cost.

LIBRARY AND CLASSROOM APPLICATION

Creating an environment of inquiry in a classroom requires skill, practice, and encouragement. For many teachers, this is a new way of thinking about their teaching. First and foremost, teachers must understand and believe in the value of inquiry across all subject areas and be comfortable with the inquiry process. The school library media specialist and teacher working to-

Search by standard progression

gether can best teach inquiry skills in concert with the content.

The IMatrix gives teachers and librarians easy access to resources that not only help explain inquiry, but also help teach inquiry skills to students. The Dimensions of Inquiry provide a ready-made scaffold to understand the skills students need to acquire in order to master each aspect of the process. Teachers can pace their own learning, using resources provided, or library media specialists can team with district curriculum leaders to create professional development that meets the needs of a small group of teachers, a grade level, a building, or the whole district.

The media specialist is well situated in schools to play a key role in helping teachers discover ways others are teaching the same skills, allowing everyone to maximize efforts, develop deeper learning, or even expand the scope of a project to bring rich interdisciplinary connections to the table. For example, working in a learning team with their school library media specialist, teachers might bring content topics they want students to master, along with their own ideas for inquiry topics for students to research. The learning team can then use the IMatrix to search for content standards that align to specific content areas, grade levels, and the Dimensions of Inquiry. By searching similar skills in earlier grade levels, teachers and media specialists can easily see how a specific skill has been scaffolded in earlier grades, or explore how the skills will develop in later grades. The ability to see skill standards across grade levels also makes it easier for educators to differentiate projects to meet the needs of all their students. Planning templates within the IMatrix provide a framework that helps a learning team plan around a wide range of design criteria, including content standards, Common Core alignments, essential questions, assessments, instructional strategies, and appropriate uses of instructional technology. The research template can be used as a planning guide by teachers and media specialists to gather their thoughts prior to working on final project design, and by the team during planning work. Completed forms provide a framework for easy dissemination of project ideas with colleagues, administrators, parents, and students.

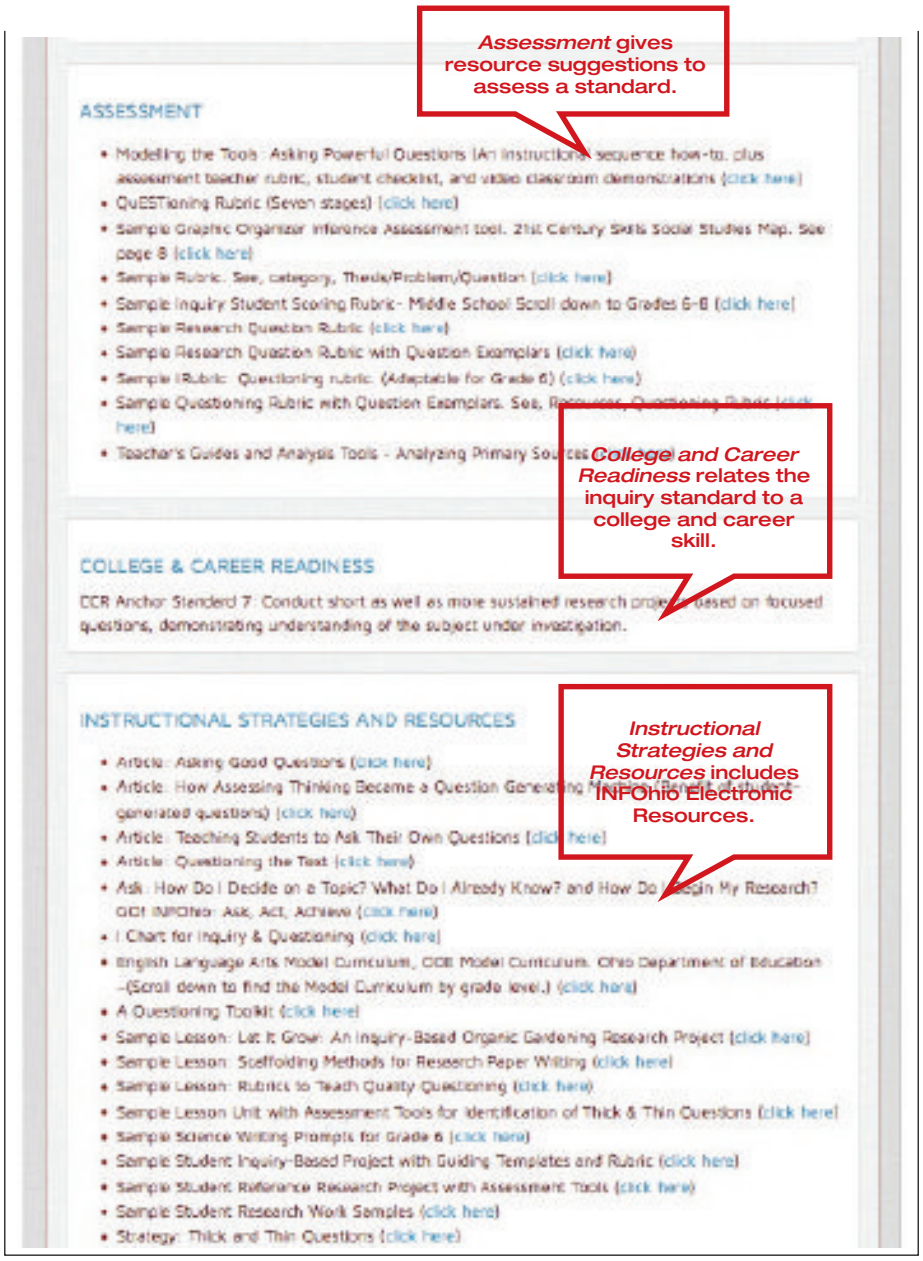
Once a project has been completed, the team can review opportunities for reflection to strengthen future learning—both for students and their own professional development—as they consider what they have learned about designing inquiry-based projects and how future projects can benefit from this learning.

LOOKING AHEAD

Since launching IMatrix in August, INFOhio has already begun work on improvements and expansion of the project. Alignments for grades K–5 have been finalized and background work is underway to complete alignments for grades 9–12. The development team is working to expand resources that support professional development about the Dimensions of Learning, effectively searching the IMatrix, and planning inquiry-based projects.

Developing model lessons to support teachers as they learn to create effective inquiry-based instruction is also being considered. Part of this process would include expanded planning templates for teachers, media specialists, and district administrators charged with guiding professional development plans for the district. Altogether, these enhancements would provide districts with resources that will help everyone better understand how to best design a scope and sequence of the Dimension of Inquiry skills across the curriculum, ensuring that all students receive this important instruction.

As the IMatrix is being seen and used by more educators, additional ideas for expanded resources and innovative tools are already coming from the field and being studied by the development team. Possibilities range from expanded web-



Result example

based capabilities, increased connections to other INFOhio programs, and even the possibility of additional technology-based tools to support the work. For any inquiries about use of these materials outside of the state of Ohio, contact INFOhio at central@infohio.org.

DEVELOPMENT TEAM

IMatrix was developed in a partnership between INFOhio and Hamilton County Educational Service Center. The INFOhio IMatrix design team was:
Tom Shessler—Hamilton County ESC education consultant
Ann Tepe—education consultant
Linda Johnson-Towles—education consultant
Mike Ridinger—INFOhio web designer
Gayle Geitgey—INFOhio instructional specialist

INFOhio, one of the country's largest and most comprehensive information networks, serves Ohio K–12 schools with library management software, digital content for the classroom, and professional development to support academic content standards and effective instruction. INFOhio offers a full range of programs to help educators better understand the expanding definition of literacy and how to use tools and technologies to support digital learning. To deliver those resources and services, INFOhio has forged strategic partnerships with Information Technology Centers (ITCs), the State Library of Ohio, and other statewide library networks which combine federal, regional, and local dollars to make cost-effective group purchases to save the state millions of dollars. Using these strategic partnerships enables all Ohio K–12 students and educators robust access to the research resources they need for rigorous academic study.

IMatrix is copyrighted by INFOhio. IMatrix was created with the Joomla CMS, version 2.5.x. IMatrix consists of hundreds of individual documents containing detailed information about each content standard, dimension of inquiry, grade level and subject area. Content is stored using Joomla's core content organization tools, making the content portable and easy to access. Each document's content is indexed and made searchable via the IMatrix web interface. The searching mechanism behind the web interface was custom designed and written in PHP by INFOhio's technical services team.

INFOhio
Filling the Gap by Connecting Common Core State Standards and the School Library

Jennifer Schwelik
Gayle Geitgey
Melissa Higgs-Horwell

INFOhio, working with partner agencies, focused on placing the school library at the center of the statewide initiative to eliminate an identified information literacy skill gap. The gap is illustrated by a 2010 Project Information Literacy survey showing that 50 percent of freshmen arrive on campus unprepared with the research skills needed to manage college-level work, and for more than three-fourths (84%) of the students surveyed, "the most difficult step of the course-related research process was getting started." (Head, p.3)

Kent State's Tool for Real-Time Assessment of Information Literacy Skills (TRAILS) program assesses students in 3rd, 6th, 9th, and 12th grade to determine weak spots. Benchmarks for the 2011-12 school year showed that overall the students at grade level who took the 3rd, 6th, 9th, or 12 grade assessments (nearly 58,000 in total), had a mean score of about 50 percent (3rd-50.1%, 6th-54.4%, 9th-52.8%, 12th-49%). The assessments measured student understanding of developing a research strategy, evaluating sources, and using online technology wisely.

Awareness of this lack of preparation for college-level work prompted Ohio to join the Common Core initiative and to develop additional Ohio Learning Standards for other content areas. To determine if the new standards are closing the gap, Ohio created a new educator evaluation system, new assessments, and new value-added reports for schools and districts. The school and district report changes emphasize reducing the gap between middle income students and those facing life challenges such as poverty

and learning English as a second language. The standards and assessment changes include an emphasis on inquiry-based instruction, including developing critical thinking skills. Schools are struggling to meet these standards during an economic down-turn that has forced large scale reductions in school librarians, the people who have traditionally taught inquiry and research in schools. The demands on the remaining school librarians who are handling increased numbers of patrons and faculty can be overwhelming. For those districts with no school librarian support, teaching research and critical thinking skills is falling to classroom teachers, who also face larger class sizes and heavier workloads.

INFOhio listened to these needs and began working on tools to help all Ohio students and educators, keeping in mind those districts and classrooms that were faced with implementing the Common Core State Standards without the instructional leadership of a school librarian. Classroom teachers required to implement the standards including the college and career readiness standards needed guidance. School librarians, facing increased demands, needed resources to assist the classroom teacher.

Several years ago INFOhio partnered with OhioLINK, Ohio's academic library network, to form a College Career Readiness Task Force (CCRTF) that helped create direction for general work needed. Working closely with the Hamilton and Montgomery County Educational Service Centers, the Ohio Department of Education, and the State Library of Ohio, the CCRTF identified tools to help the classroom teacher, school librarian, and student develop inquiry based lessons and conduct research. Aligned with the Ohio Learning Standards and Common Core State Standards, the tools include:

- IMatrix - An online tool that supports integrating inquiry with instructional practice.
- Go! Ask, Act Achieve - A research and inquiry-learning site for middle school and high school students.

- R4S: Research for Success - A blended-learning course preparing juniors and seniors with the rigorous research skills needed in college and careers.

These tools are freely available to students and teachers both in Ohio and across the country. This paper introduces each tool and ways school librarians and classroom teachers are working together to ensure that every student in Ohio has the skills necessary for life-long success.

IMatrix http://imatrix.infohio.org

One of the main objectives of the standards movement is to ensure students learn the essential skills and knowledge that are keys to college and career success. To teach these skills, inquiry-based instruction is encouraged. However, educators often confuse inquiry with discovery learning. (Wolk). The IMatrix helps teachers identify the key skills in the standards that support the development of thinking skills. Inquiry-based instructional practices, in particular, help students develop thinking skills, provide them with authentic content with which to practice the skills, and ask them to demonstrate their ability to use these skills as they discover connections, develop insights, and learn to articulate their understandings about what they learn.

The IMatrix gives teachers and librarians easy access to resources that not only help explain inquiry, but also help teach inquiry skills to students. The Dimensions of Inquiry provide a ready-made scaffold that helps teachers better understand the skills students require in order to master each aspect of the process. The IMatrix uses six Dimensions of Inquiry as its unifying instructional model. The Dimensions of Inquiry, first identified through an environmental scan of various inquiry models, include the following skills:

1. Questioning
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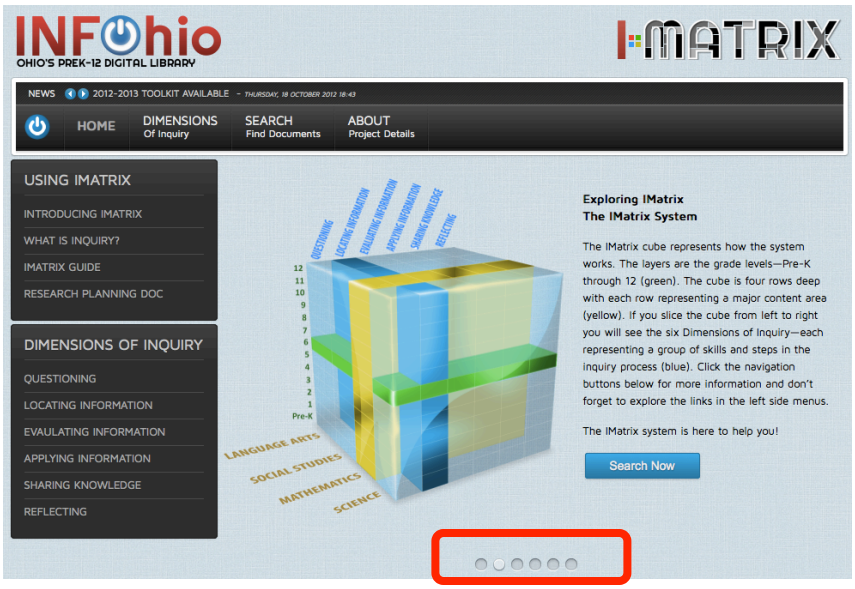
3. Evaluating Information
4. Applying Information

5. Sharing Knowledge
6. Reflecting on Learning

The IMatrix uses the Dimensions of Inquiry for two main reasons. First, the new nationwide Common Core standards for ELA and math and Ohio's updated standards for science and social studies demand that teachers help students develop the critical research skills they need in college and on the job. Second, inquiry is common to all four content areas and to all grade levels. Therefore, coordinating lessons across subject areas and building on skills from grade to grade is easier. (See Appendix)

Students develop those thinking skills—how to form questions, how to work with information, how to share their knowledge, and how to evaluate their own learning—best through experiences embedded in all of the content areas across all grade levels. Therefore, IMatrix correlates standards from the four core content areas to demonstrate not only interdisciplinary connections among those skills but also to show more clearly scaffolding of those skills from simple tasks in the early years to more complex assignments in later grades. By helping teachers develop a clear understanding of how these skills align to all of the content areas, IMatrix provides them with a deeper insight into how student learning in their classroom meshes with learning in other classes and builds upon learning from earlier years.

Common Core for Reading and Writing recommend that students have rigorous research experiences embedded in multiple content areas throughout each school year. Doing that requires coordinating assessment plans and identifying appropriate content across subject areas. IMatrix helps educators identify key vertical alignment and interdisciplinary alignments for essential student skills.



GO! Ask, Act, Achieve http://go.infohio.org

To help teachers and librarians transform to inquiry-based teaching, INFOhio launched *GO! INFOhio* (go.infohio.org), a free online service that brings together INFOhio resources with selected websites to support research and inquiry. Go is designed to help middle and high school students work through a research project step-by-step.

Confronted with a large research project, students often become overwhelmed and procrastinate. To counteract that tendency, *GO! INFOhio* is organized into three smaller sections based on the Dimensions of Inquiry: *Ask!*, *Act!*, and *Achieve!*

- *Ask!* takes student through the initial phases of research—choosing a topic and asking good questions.
- *Act!* takes the student through the second phase of research—finding reliable resources, deciding which ones meet the need the best, taking notes, and even working with a group.

- *Achieve!* takes student through the final phase of research—presenting the project-- either as a paper, presentation, or online publication—and evaluating their work.

Each section includes links to a variety of INFOhio databases and products along with other websites featuring tools to support research and inquiry, including mind mapping tools, note taking strategies, and presentation ideas. In addition, students find tips on citing sources and other information to help them develop good digital citizenship, a key component of information literacy.

The site includes interactive pieces to engage today's learners. Students used to video games and YouTube and Facebook, find Go! INFOhio to be an inviting site that guides them through inquiry and research projects. Students find videos, interactive PDFs, and online questionnaires. Go! INFOhio also includes teenage Vokis, who feature the voices of real Ohio students, to sympathize with their hard work and encourage them to keep going.

While the site is organized so that students can use it independently, it also gives educators the tools they need to introduce information literacy skills. *GO! INFOhio* includes a comprehensive Teacher's Guide with background information on each of the featured links along with additional sites and resources to provide background information and to extend the learning.

R4S: Research for Success http://r4s.infohio.org

To bridge the high school to college gap, INFOhio created **R4S: Research for Success**, an online information literacy course designed to address inquiry and research instruction for high school juniors and seniors. The modules are built around the new Common Core State Standards, the Association of School Librarians Standards for 21st Century Learners, and the International Society of Technology in Education NETS Standards. The topics covered apply to all subject areas.

In addition, the online modules give schools a way to incorporate blended learning into the classroom. Blended learning combines traditional face-to-face lessons with online coursework that provides teachers with a means to adjust instruction to meet the unique needs of each student. Research demonstrates that blended learning has the potential to increase student learning outcomes while lowering attrition rates. (Dzuban) R4S, designed to be used as a blended course, is free and easily available to teachers and librarians.

R4S underwent a year of development and a year of piloting, evaluating, and revising. The resulting web-based course contains six modules, based on the INFOhio's Dimensions of Inquiry. The R4S course has widgets that allow the content to easily integrate into any learning management system. As well as rigorous and engaging content for students, R4S provides a teacher's guide with supporting materials and a facilitator's guide to assist those new to either inquiry-based instruction or blended learning instruction.

R4S is truly a transition to college and career tool. First-year experience college librarians have recognized the value of R4S and are incorporating it into their first year experience in the 2013-14 school year at Ohio Wesleyan, Cleveland State University, and Kent State University. The first year experience librarians at these institutions are also promoting the R4S content to their colleagues throughout Ohio. As well, the public library community

has taken an interest in R4S and has requested information about the tool at regional meetings.

TRAILS Assessing the Learning http://trails-9.org

Working with Kent State University Libraries, INFOhio arranged to use the TRAILS assessment as one indicator of student growth when using the R4S modules. To ensure the highest quality tool possible, a validity/reliability study was done on the TRAILS assessment. The results of the TRAILS validity/reliability study found that enough items in all four assessments (grades 3,6,9,12) achieved scale reliability, fit-to-scale, and showed no bias based on race/ethnicity and gender.

The reliability study included having students in the associated grade interact with the entire item bank for each grade (3,6,9,12) during the fall 2012 semester. The study included students from a wide range of socioeconomic backgrounds. The students included both genders and a percentage from various race/culture backgrounds. The items were then analyzed for distractor function, differential item function, and difficulty. The items represent each TRAILS subscale, and a spread of item difficulty. The items

were analyzed for overall reliability, item fit, and difficulty. The results of the reliability study were that:

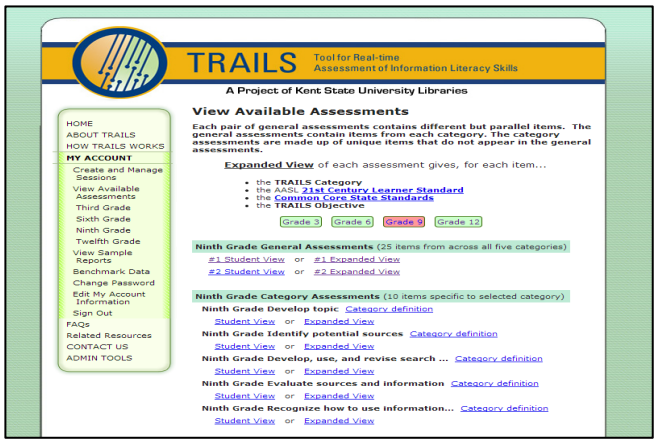
- No item fit issues identified
- No differential item function issues identified among the items
- No distractor issues identified

For the content validity study. school library-media specialists who work with students at the appropriate grade level (3,6,9 or 12) were surveyed during in spring 2013 and asked to rate each item on a three point scale:

- Does not measure associated objective
- Does measure associated objective with revisions
- Does measure associated objective

The respondents were also asked to provide suggestions on items they reviewed. The content validity study determined that the content of the items passing the validity/reliability study measured their stated objectives.

The next step is to conduct virtual focus groups in 2014 to gather content expert input on cut score(s) for each test.



Coaching and Implementing

All three of tools are freely available for student and educator use. The challenge is communicating with classroom teachers and curriculum directors that the tools are available.

INFOhio has a large network of providers and support through the Information Technology Centers in Ohio. These 46 providers assist in communicating with their local users about changes and uses of technology tools from INFOhio. Since many of the providers have a focus on technology, INFOhio determined a need to secure instructional support across the state.

To provide the instructional support, INFOhio created the regional ICoach program. Collaborating with Ohio Educational Service Centers, Instructional Technology Centers and Educational Technology Agencies, INFOhio has 17 regional ICoach members working in 16 State Support Regions. The INFOhio regional Certified ICoach trains classroom teachers and other educators to use INFOhio resources effectively while helping them to integrate INFOhio into their classrooms. The INFOhio ICoach encourages educators to develop 21st century instructional strategies using INFOhio resources. For the next phase of the ICoach program, INFOhio created a District/Building ICoach program, which adds another 66 teachers, administrators, and librarians to support professional development training of INFOhio resources in their school district.

As well, INFOhio strategically placed instructional staff members throughout the state in regions. The regional staff members work with public libraries, academic libraries, and school libraries as well as education leadership groups in their region to keep school libraries at the center of instruction.

Next Steps

Working with state agencies, INFOhio is putting in place virtual and face-to-face INFOhio Librarians who will assist in designing and delivering virtual

instruction and face-to-face modules that can be used by school librarians and classroom teachers.

Creating model lessons to support teachers as they learn to design effective inquiry-based instruction is being considered for future development. Part of this process would include expanded planning templates for teachers, media specialists, and district administrators responsible for guiding professional development plans for their districts.

As well, future plans include developing a freely available research tool for K-4 elementary students and teachers that will use the INFOhio Dimensions of Inquiry and complement the existing Go! and R4S sites.

Altogether, these enhancements will provide districts with resources to help teachers create inquiry-based curriculum and students develop the skills needed in research and writing for college and career success.

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Development Teams

IMATRIX Development Team

Tom Shessler—Hamilton County ESC Education Consultant
Ann Tepe—Education Consultant

Linda Johnson-Towles—Education Consultant
Mike Ridinger—INFOhio Web Designer
Gayle Geitgey-INFOhio Instructional Specialist

Go! Ask, Act, Achieve Development Team
Jennifer Schwelik – INFOhio eLearning Specialist
Melissa Higgs-Horwell – INFOhio eLearning Specialist
Linda Johnson-Towles—Education Consultant
Mike Ridinger - INFOhio Web Designer
Connie Champlin – Library Consultant

R4S: Research for Success Development Team
Jennifer Schwelik – INFOhio eLearning Specialist
Melissa Higgs-Horwell – INFOhio eLearning Specialist
Jim Vincent – SPARCC – Manager Technology Integration
Roger Minier – NWOET – Course Evaluator
Mike Ridinger - INFOhio Web Designer
Connie Champlin – Library Consultant

TRAILS Project Team
Kenneth J. Burhanna, M.L.S., TRAILS Project Director; Head of Library Instruction, Kent State University Libraries
Vanessa Earp, M.L.S., M.S., Librarian for Education, Kent State University Libraries
Meghan Harper, Ph.D., Associate Professor; Coordinator, School Library Program; School of Library & Information Science, Kent State University
Tammy Eschedor Voelker, M.L.S., Reference & Instruction Librarian, Kent State University Libraries
Barbara F. Schloman, Ph.D., TRAILS Founding Member, Kent State University Libraries (Emeritus)
Jennifer Schwelik, M. Ed., TRAILS Project Manager
David L. Bird, Software Engineer

Joseph A. Salem, Jr., M.L.S., TRAILS Statistical Consultant; Head, Research & Learning Services, University Libraries, The University of Akron

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Authors

Jennifer Schwelik is an eLearning Specialist for INFOhio, the digital library for Ohio schools. She was a school librarian and the Project Manager for TRAILS. She is an American Memory Fellow and an OELMA Award of Merit recipient.

Gayle Geitgey is an Instructional Integration Specialist for INFOhio, the digital library for Ohio schools. She has been a high school librarian, district technology director, and an online adjunct instructor in the areas of curriculum design and information literacy.

Melissa Higgs-Horwell is an eLearning Specialist for INFOhio, the digital library for Ohio schools. She was a school librarian and technology coordinator and distance learning coordinator. She is an OELMA Award of Merit recipient.

INFOhio Contact

Theresa M. Fredericka
Executive Director | INFOhio
35 E Chestnut 8th Floor, Columbus OH 43215
614-485-6731 | fredericka@infohio.org | http://www.infohio.org
Facebook: http://www.facebook.com/INFOhio | Twitter:
http://twitter.com/infohio

Appendix

INFOhio IMatrix Dimensions of Inquiry

This chart presents the six Dimensions of Inquiry in an easy to use, abbreviated format. For an expanded explanation of the Dimensions, go to http://educators.infohio.org/dimensions.

Questioning	Locating Information	Evaluating Information
INFOhio DIALOGUE - D -- Discover/ Develop an Overview: previewing, examining prior knowledge, brainstorming, developing initial questions DIALOGUE I -- Investigate: building basic understandings, narrowing topic. Go! INFOhio: Ask -- How do I decide on a topic? What do I already know? Research 4 Success-R4S-Module 1-Ask Good Questions DoK (WI) - Who, what, when, where, why? Define. B6 - Task Definition. Pathways - Appreciation, curiosity, imagination; Establish focus, form initial questions, brainstorm, relate to prior knowledge, identify key words, build background, clustering, outlining, webbing, listing, narrowing/broadening. Stripling - Wonder: Develop questions, make predictions, hypothesis.	INFOhio DIALOGUE - L -- Locate/ Explore: identifying/locating sources, exploring relationships. Go! INFOhio: Ask -- How do I begin my research? Go! INFOhio: Act -- How do I find valid information? Research for Success-R4S-Module 2-Finding Information B6 - Information Seeking Strategies, Location and Access. Pathways - Organize; Planning and implementing my search strategy; Identify sources, select resources and tools, skimming, scanning, questioning techniques, interviewing, note taking, summarizing, verify information, record bibliographic information, know when to get help, determine relevancy, use good search strategies. Stripling - Investigate: Find and evaluate information to answer questions, test hypotheses; Think about information to illuminate new questions and hypotheses (combined with Evaluating Information).	INFOhio DIALOGUE - A -- Analyze: refining key words, problem solving. DIALOGUE - O -- Organize/Apply: assessing, classifying, categorizing, examining, comparing/contrasting. Go! INFOhio: Act -- How do I analyze which information is valuable to my research? Research 4 Success-Module 3-Selecting the Best DoK (WI) - Infer, analyze, cause and effect, classify, compare, relate, graph, separate, estimate, predict, interpret, make observations, use context clues, distinguish, organize, identify patterns, collect, categorize, infer, assess, investigate, differentiate. B6 - Use of Information. Pathways - Assess usefulness of information; compare/contrast, integrate concepts, seek patterns/trends, organize, infer, analyze, paraphrase, evaluate, classify, filter for bias, point of view. Stripling - Investigate: Find and evaluate information to answer questions, test hypotheses; Think about information to illuminate new questions and hypotheses (combined with Locating Information).

KEY: ➢ INFOhio's DIALOGUE Inquiry Framework and Go! INFOhio: Ask/Act/Achieve ➢ B6 / The Big Six Skills™ ➢ Pathways / Pathways to Knowledge®
➢ DoK(WI) / Depth of Knowledge Levels (Wisconsin Center of Educational Research, U. of Wisconsin-Madison) ➢ Stripling / The Stripling Inquiry Model

Applying Information	Sharing Knowledge	Reflecting
INFOhio DIALOGUE - A -- Analyze: apply critical thinking, questioning deeply, examining concepts. DIALOGUE - O -- Organize/Apply: synthesizing, interpreting, reasoning. DIALOGUE - G -- Globalize: relate to bigger picture, seek global perspective, consider impact. DIALOGUE - U -- Understand/Reflect: developing understanding and deep comprehension, constructing new knowledge. Go! INFOhio: Act -- How do I organize my work? How do I keep from plagiarizing? Research 4 Success-R4S-Module 4-Putting It Together DoK (WI) - Summarize, modify, construct, display, revise, develop a logical argument, apprise, construct, use concepts to solve non-routine problems, compare, formulate, draw conclusions, hypothesize, cite evidence, connect, synthesize, apply concepts, create. B6 - Synthesis. Pathways - Interpreting; Does the evidence support my thesis? Do I need more information? Is my essential question still valid or do I need to redefine my question? Conclude, synthesize, reflect to develop personal meaning, practice ethical use of information. Stripling - Connect: Connect to self, previous knowledge; Gain background and context. Construct: Construct new understandings connected to previous knowledge; Draw conclusions about questions and hypotheses.	INFOhio DIALOGUE - U -- Understand/Reflect: Creating, communicating new understandings. Go! INFOhio: Act -- How do I work with others in a group? Go! INFOhio: Achieve -- How do you present your project? How do I publish my work? Research 4 Success-R4S-Module 5-Your Presentation DoK (WI) - Show, construct, critique, explain phenomena in terms of concepts, design, create. Pathways - Expression; Communication; Creativity; Constructing and presenting new knowledge, choose appropriate format, organize content, solve problem, answer need, respect intellectual property, compose, write, design, create, draft/edit/revise, express ideas through best format. Stripling - Express: Apply understandings to new context, new situation; Express new ideas to share learning with others.	INFOhio DIALOGUE - U -- Understand/Reflect: Reflecting. DIALOGUE - E -- Evaluate: Evaluating results, assessing learning process. Go! INFOhio: Achieve -- How do I evaluate my project? Research 4 Success-R4S-Module 6-Making the Grade B6 - Evaluation. Pathways - Think about process and product; evaluate and redefine question if necessary, evaluate end product (both student and teacher) check for effective communication of new knowledge, assess personal information seeking process. Stripling - Reflect: Reflect on own learning, ask new questions. Formative and Summative Assessments. Ongoing assessment. Assessment and reflection throughout by both student and teacher.

KEY: ➢ INFOhio's DIALOGUE Inquiry Framework and Go! INFOhio: Ask/Act/Achieve ➢ B6 / The Big Six Skills™ ➢ Pathways / Pathways to Knowledge®
➢ DoK(WI) / Depth of Knowledge Levels (Wisconsin Center of Educational Research, U. of Wisconsin-Madison) ➢ Stripling / The Stripling Inquiry Model

Part II

Adults as Learners

Designing Professional Development as Inquiry
The PEARL Experience

Violet H. Harada and Michael Brian Ogawa
University of Hawaii

In an era of high stakes testing and standards-based educational reform, the need for high quality professional development (PD) emerges as a critical factor that influences systemic change (Kubitskey and Fishman 2006). The reality, however, is that most traditional forms of PD are still one-shot workshops with outside experts that "threaten the teacher's identities as professionals who bring a life time of experience to the professional development process" (Reilly and Literat 2012, 102). Tragically, PD is often "demeaning and mind numbing as folks passively sit and get the wisdom of so-called experts" (Sparks 2002, 2-3).

Dennis Sparks (2002), who is noted for his work with the National Staff Development Council, states that high-quality, meaningful PD must focus on deepening teachers' content knowledge and pedagogical skills. It embeds opportunities for practice and reflection in the ongoing work of the classroom. Such PD creates a learning ecosystem that cultivates collegiality and collaboration in solving important problems related to teaching and learning (Reilly and Literat 2012). At the core of relevant PD is the need to frame it as a joint adventure in inquiry for both the developers and the participants.

Creating Project PEARL

Pathways to Excellence and Achievement in Research and Learning (PEARL) was a three-year project that targeted teams of teachers and librarians working with high school students on project-based learning. Funded by the Institute of Museum and Library Services, PEARL's objectives were to collaboratively

- identify critical learning gaps in the research process for students
- create and implement interventions to address these learning gaps
- cultivate coteaching opportunities within school teams.

We worked with two cohorts in year-long PD programs during the school years 2010-2011 and 2011-2012. A total of 50 teachers and librarians representing 20 schools in Hawaii participated in PEARL. Both cohorts began with a one-week summer institute that was held at a high school library on Oahu. During the ensuing school year, the participants worked directly with their students on different aspects of research planning and implementation at their respective schools. Teams posted progress reports and reflections online from September through April of the school year and exchanged ideas and suggestions with one other. Each participant also submitted a culminating portfolio that included lessons and summaries of related activities (e.g., conferencing sessions), exemplars of student work, and reflection logs.

On one level, our goal was to design, deliver, and facilitate the training. On a second level, our purpose was to analyze and document the iterative design process we used to create, implement, and continually evolve the PD and to study its impact on teaching practices. Our six-member team included secondary and university librarians and library educators. We began our work with the understanding that an inquiry approach in teaching was fundamental to effective learning for students and that we had to model this process in developing the PD. In this paper, we present highlights of the design process and our lessons learned.

Approaching PD as Inquiry

The design process for our team began with identifying the questions that would help us shape the PEARL experience, namely

- How do adults learn best?
- What learning truly matters?
- How do we structure PD for that learning to happen?

- How do we capture impact on teaching practices?

As we combed the research on adult learning in both formal and informal settings, we realized the importance of capitalizing on the learner's rich background of experiences, knowledge, skills, interests, and competences. This meant inviting the learners to take an active role in their own learning. This also meant that we would have to relinquish some control in order to respect the expertise teachers brought to the PD (Abilock, Fontichiaro, and Harada 2012; Smylie, 1995). Peter Early and Sara Bubb (2004) highlight the following critical characteristics of adult learners:

- They are largely self-directed and require a climate of trust, openness, and respect to learn effectively.
- Their previous experiences are too significant to ignore and must be implicit in the process.
- They prefer learning that incorporates problem-solving strategies.
- Their commitment to learning depends on its practical relevance. (18)

We also conducted informal focus group sessions with local librarians to help us determine the questions that instructional teams might wrestle with in project-based learning. The following questions emerged through the conversations:

- How should projects be designed to encourage the use of cognitive and metacognitive skills to develop learning and reflective abilities?
- How can projects be designed to help students maintain mastery goals, take risks, and view errors as inherent in learning?
- What must be directly taught and what type of support or scaffolding might be necessary?
- What are the outcomes for students in terms of the process and the product and how can these be effectively assessed?

Structuring PD as Inquiry

We wanted to frame the PD with the above questions in mind. This motivated us to cull from the extensive body of research on designing effective professional development (e.g., Darling Hammond and Richardson 2009, Guskey 2000, Resnick and Hall 1998, Loucks-Horsley and Matsumoto 1999). Figure 1 identifies features that became building blocks for PEARL.

Features of Effective PD	Implementation in PEARL
Active inquiry-oriented learning—providing time for instructional planning, discussion, and consideration of underlying principles of project-based design.	We framed the PD around essential questions and allowed time for facilitated conversations and focused planning. We also intentionally built in think and talk time. Over 70 percent of the institute was devoted to discussions between school teams and planning sessions within school teams.
Coherence—aligning the PD with instructors' personal goals for learning and their goals for students, coherence with other reform activities and standards in the local school contexts.	We opened the PD with opportunities for participants to articulate their personal goals via informal profiles shared with the group. We focused on purposeful problem solving rather than recipe exchanges. Each school team also collaborated on school action plans that connected project based learning with classroom-library standards and the school's priorities.
Sustained learning and support—moving beyond the conventional one-shot workshops and formal course formats to a year-long, interactive learning and teaching experience.	We blended face-to-face and online interaction for teachers to learn from each other based on their own level of development and preparedness rather than structuring everyone's progress into a fixed sequence. We built in iterative cycles of planning, trial, reflection, and modification/change and provided ongoing mentoring and peer critiquing opportunities in both face-to-face and online formats.
Problem solving regarding local barriers and supports--addressing conflicting demands and school-specific initiatives as a real part of the challenge.	We integrated real-world issues into the implementation phase and encouraged teams to share challenges they encountered in carrying out their action plans.

Figure 1. Essential Features of Effective PD

Engaging in Collaborative Learning

The PEARL initiative focused on a practice-based foundation using authentic records and tools for teaching and learning with the aim of creating a common ground for individuals and teams to jointly plan, teach, and reflect. The tone for the PD was established with the following questions that developers and participants found essential in understanding and dealing with learning in schools:

- What makes students effective researchers?
- How can inquiry shape student research?
- How might students build sufficient background knowledge to identify researchable topics and issues?
- How might students be challenged to create more rigorous and creative questions?
- How might students chronicle and reflect on their research journey?

To address these questions in a collaborative environment, our team experimented with strategies that invited open exchanges, more questions, and collegial feedback during the institute. Examples of strategies included:

Facewall: in this "no tech" social networking approach participants used sticky notes to generate questions or ask for assistance with something being covered in the institute. They posted their notes on a bulletin board, which served as the Facewall. Throughout the day, participants browsed through the postings and responded to them with more sticky notes. The continuous stream of postings reflected how participants were feeling about the activities and flagged possible areas for adjustments in the training.

Student profiles: we created six profiles that described fictional students who were working through their projects. Teams read the profiles and "adopted" one of the students to assist in successfully completing his or her project. Participants appreciated this technique that brought out recognizable student

traits and concretized their discussions. As one of them noted in a conversation with the authors:

> *The student profiles made our conversations and recommendations real. Our team selected Logan (one of the fictional students) because he mirrored many of the traits we saw in our students such as lack of interest in academic work, limited extracurricular activities, and a desire for quick fixes to things. At the same time, he was curious about nanotechnology and we thought this might be a hook for a possible project for Logan.*

Swap meets: while we spent the mornings introducing a range of intervention strategies to use with the participants, we devoted the afternoons to team planning sessions where members brainstormed how they might adapt techniques and tools to their own situations. The swap meet in the last hour of each day was time set aside for teams to share their progress and seek feedback from their PEARL colleagues. This form of public reflection allowed novices and experienced instructors alike to learn from others. As one teacher described it:

> *The swap meets were critical. If we reported a roadblock in our thinking, someone from another team would suggest something that opened new options we had not considered. We also loved the opportunity to help other teams with their issues. These exchanges definitely energized all of us.*

Other strategies that we incorporated into the PD included the following:

- Critical friends – allowing buddies to critique one another's works in progress
- Gallery walk – displaying created artifacts (e.g., charted lists, visualizations of ideas) and having participants browse and comment on the artifacts
- Gamification – using gaming techniques to engage participants (e.g., team competitions and joint problem solving)

- Role-playing – enacting different roles and inviting participants to experience situations from different perspectives and points of view
- Peer teaching –having school teams teach others about the tools, strategies, and lessons they had successfully used.

At the end of the summer institute, participants and developers agreed on a timeline for the online postings during the school year that would include regular reflection reports. The reports were public to all PEARL team members thereby allowing teams to provide feedback to one another. While we assigned each team to a buddy team for this purpose, we also encouraged exchanges among all teams. A critical component of the online work was providing timely and relevant feedback as PEARL developers. Wiggins' (2012) observations about the characteristics of effective feedback held true for our adult learners.

- Ensure that the learner has a goal, acts on it, and receives goal-targeted feedback.
- Provide actionable feedback that is specific, concrete, and useful.
- Fashion exchanges that are learner-friendly--avoid overloading or being too technical.
- Provide timely responses so the learner has opportunities to revise and improve on performance.

Figure 2 provides a sampling of characteristics and feedback offered in our online conversations.

Characteristics of Effective Feedback	Examples from PEARL
Offer specific suggestions for improvement	"Your students had trouble developing questions from a list of different perspectives. I wonder if the list needs to be shortened and whether students want more examples of questions from the selected perspectives?"
Pose questions to clarify and expand on points made	"You had a great approach to having students explore problems in the real world. How did you

	introduce current events to motivate their interest? What activities did you implement?"
Encourage cross-team dialogue	"It must be ESP because several of your colleagues brought up the same issue of involving community mentors in the research projects! Check out the suggestions that Amy and June made in their reflections this month."
Link to your personal experiences	"As a former English teacher, I can relate to your concerns that students don't do enough critical reading so they have limited models of good writing."

Figure 2. Characteristics and Examples of Effective Feedback

Impacting Teaching and Learning

As developers, our critical question was how did the PEARL experience influence teaching practices in project-based learning? To study the overall impact of the year-long PEARL training, we collected data from surveys and post-interviews as well as participants' logs, reports, and final portfolios. We employed an open and axial coding process to identify themes that emerged from the qualitative data. Quantitative data from surveys were analyzed using t-tests to determine if the gains reported were statistically significant and substantial.

The PEARL training had covered a range of skills deemed essential in inquiry-framed projects. They included: identifying researchable topics, conducting preliminary searches for background information, generating higher-order questions, writing thesis statements, refining search strategies, evaluating resources, synthesizing information, and reflecting throughout the process. While all participants indicated that they incorporated many of these skills in direct instruction, the following areas emerged as especially critical in a majority of the logs written and in statements made during the interviews. We capture representative comments below.

Allowing time for pre-searching to explore topics and gain background knowledge. A librarian made the following observation of her team:

> *I think in the past, my teachers did not realize the importance of giving students time to explore and build some background knowledge before selecting their final topic. As a result of PEARL, the teachers I collaborated with scheduled several days for pre-search and I felt it was very useful. This also gave us time to meet with each student to talk about their topic and possible avenues of research and how it could tie into their actual project.*

Guiding students in topic selection. In previous years, teachers admitted that they expected students to "find topics" on their own. One teacher acknowledged that guiding the students to select topics of relevance and interest was the first major hurdle in the process. She noted:

> *The Assessing the Topic of Choice [introduced in the training] was a good tool to use when conferencing with the students. It made them evaluate their topics based on the criteria provided. During our conferences with the students, these criteria helped us provide the students with specific feedback on their topics.*

Participants also experimented with interactive instructional techniques that allowed students to assume greater responsibility for collaborative learning. The following excerpts from teachers' logs describe the uses of peer critiquing and mentoring.

One team described using peer critiquing as students their generated questions:

> *Having students work in small groups made managing the large class much easier. [Note: this was an academy with over a hundred students.] We also had five adults on the floor to help as necessary. Having students share out in a round-robin style worked well. It provided more immediate feedback than if questions were just turned in to the teachers. As students shared and got the "thumbs up"*

there was a sense of validation and pride. There were a few "oohs" as students tried to outdo each other in asking questions at a higher order of thinking. When they were off their targets, it gave the teachers an opportunity to correct misunderstandings and to refine the questioning. Occasionally as students read a question aloud, they would catch themselves asking an inappropriate (for the perspective) question. We encouraged them to challenge the thinking without attacking the thinker.

In another situation, senior students mentored their junior colleagues:

Having the 2010-2011 Health Services Capstone students mentor the 2011-2012 Capstone students in the fourth quarter of their junior year was very successful. The seniors helped the juniors brainstorm possible topics and also gave them advice about how to plan and implement their projects. The juniors became the seniors' assistants during their presentations at the oral boards and also practiced with them during the fourth quarter. This activity took place during recess, lunch, and after school. The seniors also shared the different components of their portfolios and their research papers. This type of advice offered by peers was much more powerful than any advice we could have provided.

Recognizing that Inquiry Teaching and Learning Is Bumpy and Messy

As teams planned and implemented their ideas, they constantly had to rethink what they were doing. A librarian described the following exchange with one of her teachers. As they closely observed what students were doing, they made necessary adjustments in their team taught instruction.

The students kind of took a step back at one point because they realized their questions weren't that good. We had continued on but then we realized that we should get them to think a little more. We also took a step back to the question generation phase…we wanted to

get them thinking about what they had done and how improvements could be made.

Another librarian said the "big a-ha" for her team was giving themselves "the permission to make changes without feeling like we had failed…that we were engaged in a spiral of trying things, observing the results with students, getting student feedback, and returning to the design table again."

Reflecting as Part of the Learning Process

Prior to PEARL, teachers acknowledged that they had given "little time" to students reflecting on their ongoing work. As a result of the summer exchanges, the teams modified the assessment and conferencing handouts provided during the institute to incorporate reflection as an integral part of the projects. A librarian reported:

It was a good idea to incorporate assessment checklists into the worksheets. This helped students to be aware of the criteria for their work. Also, the PEARL Conferencing Check-Log for Research was a great forum for students to reflect on the research process and for mentors to provide specific feedback on the students' reflections.

By having her students assess their own progress, a teacher discovered the power of self-reflection:

I was surprised that students were able to articulate their feelings, understand their learning targets, and provide wonderful feedback on their learning process. The rubric I used as a reflection piece was invaluable and I will continue to use this template in the future. The main reason it worked was students were able to identify their needs and what they felt they could improve upon. As a teacher, I couldn't ask for better feedback than having students be able to tell me themselves.

Growing Instructional Partnerships

A crucial target of the PEARL training was to strengthen the instructional partnerships of librarians and teachers. Individuals completed open-ended survey questions regarding their instructional relationships as teams prior to and after the PD. Almost 80 percent of the participants indicated that their relationships were markedly strengthened as a result of the collaborative planning and problem solving during the training. In some cases, partnerships had not existed before PEARL and the intensive opportunities to plan and exchange ideas seeded the new working relationships. The remaining 20 percent indicated that their instructional relationships had been positive even before the training and that PEARL helped them sustain their existing levels of cooperative and collaborative work. Teachers discovered that their librarians contributed deep understanding of how information might be interpreted, evaluated, and applied to new contexts. At the same time, they appreciated the emotional support librarians brought to the team. A teacher, who worked with her librarian for the first time, wrote:

> *Hands down, the BEST part of this project has been the collaboration with T [librarian]. She was a tremendous support and resource. She was always willing to check out another source or pursue another angle or clarify a difficult idea. Working with her bumped up the quality of the thesis statement tremendously. There is no doubt that taking the PEARL institute as a team made the research process much more palatable. We had a clearer sequence of the process and definitely had a better handle on how to get to the thesis statement. The academic and personal support that I received from my librarian created a vehicle for my own growth as a writer and as a teacher.*

Reflecting on Student Outcomes

Teaching teams used a range of rubrics and checklists to assess student performance on the major phases of research. We had introduced assessment tools at the institute and teams were invited to adapt them or design their own instruments. We asked the teams to report percentages of students succeeding and percentages failing to meet the criteria for

research skills that were taught. The following notes capture the teams' reflections about strategies that worked; areas where students continued to have difficulties; and plans for future modifications and changes.

Selecting a topic/pre-searching for background knowledge. Teams reported that almost 85 percent of the students were able to select topics that met criteria for intellectual rigor, personal interest, feasibility in terms of time and resources needed, and possible relevance to the community. The teachers indicated that the number of students completing this task was "much higher" than in previous years although no statistical data had been collected in earlier semesters. They attributed this increase to the use of PEARL tools such as the personal inventory and a checklist to determine the quality of the topics. Using these tools provided students with "ideas they had not considered" and "connections with things the students actually cared about." The teams indicated that a majority of the students, who dropped out of the project assignment, were those with chronic absentee rates and those who transferred to other schools. In their reflections, teams discussed future adaptations that included peer sharing and critiquing of topics as well as more individual and group conferencing sessions to brainstorm possible topics and provide timely feedback.

Generating questions. Students admitted that generating their own questions was "a first time experience" for most of them. Teachers also commented that many students expected instructors to "give us the questions." To initiate this activity, the teams experimented with the Question Master game approach, which was a friendly competition to generate questions from different perspectives. According to the teams, about 75 percent of the students were able to produce questions for their own projects that were clearly stated, central to the issue or topic under study, and generative in nature. The remaining students could only generate questions at "basic (who, what, where, when) levels." Since most of the feedback had been solely between the instructor and the individual student, several teams reflected that they would incorporate more peer sharing of questions using

different strategies such as pair-share and gallery walks in the future. They also discussed ways to introduce, model, and guide students to use graphic organizers that focused on broadening as well as deepening questions such as mind mapping, hierarchical trees, and question matrices.

Creating thesis statements. Teams acknowledged this skill remained the most difficult for them to teach and for students to master. Only 52 percent of the students met expectations for statements that clearly articulated a stand and that were potentially arguable. Although the instructors used checklists to identify key elements of effective thesis statements, in retrospect, many of the teams realized they had not provided sufficient time for students to explore and gain adequate background knowledge about their selected topics to formulate researchable thesis statements. They also noted that students needed "a range of sample statements to analyze" instead of a quick lesson on creating "good statements." In their reflections, teams considered future sessions where students could examine sample sets of statements and "calibrate" their quality using the criteria provided. As one teacher noted: "Just modeling good thesis statements is not very effective. Students have to examine both weak and strong statements—we need to guide them through discussions about why certain statements are stronger than others and what can be done to improve weak ones."

Locating and evaluating information sources. Librarians led these sessions for all teams and reported that over 80 percent of the students were successful in accomplishing the tasks involved. Most of this work focused on using online databases, i.e., EBSCO. Students who did not satisfactorily complete this phase of research had particular difficulty with identifying bias. Librarians stated, "Simply identifying who produced the article or the site was not enough to determine bias." They discussed the importance of closer reading, e.g., having students compare two articles describing the same event and analyzing their choices of words as well as the organization and possible omission of facts.

Organizing and synthesizing information. About 75 percent of the students produced drafts of formal writing that included a clearly stated thesis supported by cited evidence in a coherent presentation. In reporting the results, teams that incorporated the use of graphic organizers as a step between note taking and drafting final papers noted that students had greater success in the final phases of their projects. The organizers ranged from idea webs to hierarchical tree structures and fishbone organizers. One librarian noted, "It's a misconception we have as instructors that our students can move seamlessly from taking notes, which is data collection, to shaping personal knowledge from the data. An organizer helps many of them visually represent how they are making sense of what they have collected. I think it's a necessary bridge to understanding."

Coreflecting on progress. In past years, the majority of the teachers acknowledged that assessing students' progress had been a "hit or miss" practice. A teacher admitted, "I did it very informally and only if I had the time." In addition, students frequently did not have a voice in the process, e.g., they turned in their notes and received grades on them but had no real opportunity to discuss their work with the instructors. In short, assessment was sporadic and teacher-focused. As a result of exchanges during the PEARL institute, teams experimented with variant forms of conference logs. The forms included columns for key tasks, dates started and completed, and spaces for student and mentor comments as well as next steps to take. Students were responsible for maintaining the logs and having them available during conferences. Several schools used Google Drive for this activity and reported success in editing and exchanging comments in this online environment.

Tackling Problems and Adjusting Practice

All the teams experienced hurdles that were challenging to surmount. Some of the obstacles were linked to students' lack of motivation to complete research projects. This resulted in school-initiated future plans to focus on more individual conferencing and peer interaction and to integrate additional

technology tools for learning. Both teachers and librarians admitted that lack of time exacerbated by restrictive testing schedules made it difficult to teach all aspects of the research process. Therefore, many teams currently have plans in motion to initiate work on research skills earlier than the senior year. All the high schools participating in the PEARL training reported that they were able to gain administrative and faculty support to begin research activities with juniors, and in some cases, even earlier with freshmen and sophomores.

Other teachers planned to start with smaller writing projects within a school year and build skills in a scaffolded fashion. As one participant reported:

> *I plan to have smaller writing projects during the school year to supplement the activities done in class. This way a student can build upon acquired skills and knowledge and apply this information in new ways. For example, I would like to include a mini-position paper into the curriculum so students can have practice writing thesis statements and conducting research.*

Sustaining and Expanding Partnerships

A critical focus for PEARL has been the participation of librarians as key teaching partners. In all instances, teachers discovered that librarians could "do substantially more than help with finding resources." Librarians played major roles in the pre-searching phase of the projects and they assisted with conference sessions. Many of them also critiqued students' final work as members of judging panels. In a recent email message, one of the librarians summed up the partnership experience as follows:

> *My team came to realize that involving me in many facets of the work not only made their tasks easier, but that I contributed things they admittedly weren't adequately addressing. They knew their subject areas; I contributed the process knowledge. The combination made everything so much better for our students.*

The question, of course, is whether school teams have been able to sustain their collaborative work. In phone and email contacts with the PEARL librarians, all but three indicated that they have continued to work with partners albeit the team compositions have changed because of retirements, transfers, and changes in teaching assignments. One of the three librarians reported that her original partners both retired and she is searching for new team members. The other two librarians transferred to new high schools where they are "still getting to know the faculty."

A critical development has been the expanded leadership roles reported by seven of the librarians. They stated that working with their PEARL teams contributed to their "willingness and confidence" in assuming the following tasks:

- Leading a newly established schoolwide task force for project-based learning
- Codesigning and coteaching a special summer program for middle school students in core areas including research skills to prepare them for high school
- Participating in a work group with community college librarians to bridge the research gaps in the transition from high school to college
- Coordinating the campus senior project initiative
- Collaborating with the school curriculum coordinator to design and deliver professional development for teachers
- Coordinating the mentoring program for new teachers
- Initiating a series of "tech tools for learning" sessions that are open to students, faculty, and staff.

Conclusion

Quality PD acknowledges that the processes of teaching and learning are ambiguous, complicated, and nonlinear. The PD centers on the tasks, questions, and problems situated in practice. Instead of definitive answers and preordained solutions, participants focus on possibilities, methods of

reasoning, and alternative conjectures. Importantly, this inquiry-oriented stance is a collective endeavor where professionals learn from one another.

As a development team, we realized that to create K-12 learners who are complex problem solvers and reflective researchers, the teams guiding them must also live the same process. By focusing on critical questions about teaching and learning, participants challenged themselves to design instruction as teams and foster learning as teams. They discovered the power of colearning and self-discovery where members accepted a collective responsibility for student learning. The gestalt effect of the interaction has truly been a phenomenon that results in a "whole that is other than the sum of its parts" (Tuck 2010).

Note

The PEARL Web site includes a training guide as well as handouts and news vignettes. We invite you to visit the site at http://www.hawaii.edu/lis/pearl/

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Authors

Violet H. Harada is a professor emerita in the Library and Information Science Program at the University of Hawaii. She served as the principal investigator and director for Project PEARL.

Michael-Brian Ogawa is an instructional technology specialist in the Department of Information and Computer Sciences at the University of Hawaii. He served as a co-investigator and evaluator for Project PEARL.

Adult Learners in the Learning Commons
The Elephant in the Room

Judi Moreillon
Texas Woman's University

Author's Note

Judi Moreillon is an assistant professor in the School of Library and Information Studies at Texas Woman's University in Denton. Correspondence concerning this article should be addressed to Judi Moreillon, SLIS, Texas Woman's University, P. O. Box 425438, Denton, Texas 76204-5438. Office Phone: 940.898.2258. Office Fax: 940.898.2611. Email contact: jmoreillon@twu.edu

Abstract

The Learning Commons (LC) philosophy suggests criteria for the physical and virtual spaces of the library. It includes programmatic features that situate the library program at the core of the school's academic program. It suggests a constructivist approach to learning that centers on the inquiry model for student-led investigations. The LC model also recommends that the physical and virtual space serve as a laboratory for professional development for school faculty and administration. While the literature is burgeoning with information about the opportunities afforded pre-K-12 learners in the LC, it lacks focused attention on the critical importance of the learning experiences offered adult learners. Are educators maximizing the benefit of instructional partnerships through classroom-library coplanning and coteaching in the LC? Are educators jointly developing their instructional expertise through other types of professional development opportunities in the LC? Are librarians taking the opportunity to lead educational reform or revolution through our collaborative work in the LC? This thought-piece paper suggests a honed

strategy is neccessary to meet the needs of adult learners may be the elephant in the Learning Commons room.

Note: While the premise of this paper applies to both preK-12 school and academic libraries, the focus here is on the preK-12 school library environment.

Keywords: Learning Commons; instructional partnerships; school librarian leadership; job-embedded professional development

If You Build It, They Will Come

Many would apply this oft-used phrase (slightly misquoted from the film *Field of Dreams*) to the LC concept. Library practitioners who share their experiences of building the Learning Commons environment and school librarian educators and leaders who write and speak on this topic thoroughly describe the changes to the physical (and virtual) spaces and the increased opportunities for rich student learning in the LC (Collins, 2013; Harland, 2011; Johnson, 2013; Loertscher, 2013; Loertscher, Koechlin, & Zwaan, 2008; Mitchell & Potvin-Schafer, 2012; Robinson, 2013).

As Loertscher notes, changing the vision for learning in the LC is not achieved by simply changing the name on the door (from Library to Learning Commons). Many school librarians may have an erroneous belief that simply by building the LC with its flexible furniture for various instructional groupings, attention to the use of space for print resources, technology, and social interaction spaces, and other physical or virtual upgrades, they will achieve the goals of the LC. After instituting these changes to the physical and virtual space, many librarians report increased library traffic and resource circulation and a greater sense of ownership in the library by all stakeholders. They notice obvious markers of increased satisfaction on the part of students, faculty, and administrators as well as their own renewed enthusiasm for their work in the library. The LC model can revitalize a “tired” library—and a “tired” librarian, too.

But renovations to the physical and virtual space of the library are only the tip of the LC iceberg. In a recent *Teacher Librarian* article, Loertscher provided links to videos shared by international leaders in education that spotlight the kinds of engaged student-led learning experiences that could be associated with the LC vision. Sadly, he also notes, "it is very rare to have any of these major presenters mention the possibility that a librarian or a library might be a partner in any of these kinds of learning activities" (Loertscher, 2013, p. 60). While Loertscher goes on to proclaim that "active learning, experimentation, effective use of technology, personalized learning, maker spaces, and collaboration across the curriculum is not only a vision or dream but is beginning to play out in many locations (p. 60)," it is the collaboration across the curriculum component that often seems left out of the conversation when the school librarian field writes about the LC.

Several authors on the LC discuss the importance of the "library squad," a team of knowledgeable, approachable, skilled people, including technologists and other specialists, paraprofessionals, and the librarian(s), who work as in collaboration to meet learners' various needs (Harland, 2011) or student technology aides (Robinson, 2013). These efforts to involve more stakeholders in the smooth operation of the LC in terms of technology tools use align with research in school librarianship that suggests that forging partnerships with instructional technologists is necessary for effectively integrating technology tools into the curriculum (Johnston, 2013). While the ease and efficiency of using 21st-century tools is an important aspect of the LC model, the question remains: How can the retooled physical and virtual space of the library help school librarians achieve the vision for the LC for the adult learners in the school?

Beyond the Physical (and Virtual) Space and Staff

When librarian and LC staff have built the appropriate physical and virtual spaces and have mastered collaboration with the IT department, the real work of planning for the deep learning goals of the LC can begin. Are students

using the LC for traditional research projects, also known as "bird units" (Loertscher, 2005)? Is this because librarians are reacting to the perceived needs of classroom teachers and specialists rather than advocating for meaningful inquiry-based learning? Are school librarians influencing assignments through coplanning and coteaching with colleagues?

Just because more students are using the library, can one assume students are developing their reading proficiency through strategic engagement with more complex texts? Can one assume they are engaged in higher-order thinking, problem-solving, inquiry-based learning experiences? Can one assume that faculty are flocking to the library to initiate coplanning with the librarian in order to utilize the expertise of the librarian and integrate the resources of the library, including technology tools, into standards-based teaching? Are the adults in the LC engaged as learners, too? Increasing the physical attractiveness and school culture cachet of the library are essential first steps, but without backing up the physical environment with substantive learning on the part of the adults, the potential of the LC vision will not be achieved.

School Librarian as Instructional Partners

The American Association of School Librarians (AASL) and researchers in the field have identified the instructional partner role as critical to securing a vibrant future for the school librarian profession. *Empowering Learners: Guidelines for School Library Programs* (AASL, 2009) outlines five roles for the school librarian; leader and instructional partner top the list. In fact, developing instructional partnerships is one way school librarians enact a leadership role in their schools (Haycock, 2010; McGregor, 2003; Moreillon & Ballard, 2012; Todd, 2011; Zmuda & Harada, 2008). These are essential roles for school librarians serving as facilitators in the LC.

While most school librarians state that their primary clientele is students rather than teachers, Haycock notes that serving teachers first would give school librarians' work "more power, impact, and effect" (2010, p. 3). If the LC is to

have a substantial impact on learning and teaching in our schools, then shifting our focus to teachers and specialists as our target stakeholders is necessary. According to AASL, school librarian instructional partners develop polices, practices, and curricula. We also collaborate with colleagues to codesign instruction, coteach, and coassess student learning outcomes related to academic standards, with foci on critical thinking, technology and information literacy, social skills, and cultural competences (AASL, 2009, p. 17). All of these activities come into play when building the library program with the LC model.

Interpersonal relationships form the basis of collaborative cultures. It may be easier for school librarians to form relationships with students rather than with colleagues. After all, most of us come from the classroom where we focused our attention on the learners in our care. But when we move from the classroom to the LC, we must expand our vision and our reach. Collegial relationships can flourish into effective instructional partnerships when school librarians apply their knowledge and skills to influence teachers' teaching. "Through a self-paced, hands-on, and active process, we can help classroom teachers and specialist colleagues reach their goals through the reciprocal mentorship that comes from collaborative planning and coteaching" (Moreillon, 2013, p. 155).

The School Librarian as Professional Developer

In addition to coplanning with teachers, coteaching, and teaching ICT (information and communication technologies), providing in-service trainings to teachers is one of the library predictors of improved student achievement on standardized tests, particularly in the areas of reading and language arts (Achterman, 2008). There are many models for delivering professional development including brief presentations at faculty meetings, planned one-shot or after-school workshops taught in a series, spontaneous, informal interventions, and job-embedded professional develop through coteaching that occurs with real students in real time with the real supports and constraints of educators' working environment. The professional

development laboratory of the LC is fertile ground for addressing adult learning through all of these methods.

In *Growing Schools: Librarians as Professional Developers*, editors Abilock, Fontichiaro, and Harada (2012) assembled a collection of chapters authored by practicing public and school librarians and school library/technology directors, educational technologists, classroom teachers, librarian educators, entrepreneurs, and library advocates who share their first-hand experiences with guiding professional development. (It should be noted that this book caught the attention of the U.S. Department of Education; it was spotlighted on their Web site.) Coeditor Harada notes, "If we want our young learners to survive and succeed as self-initiating and creative problem solvers… the professionals charged with guiding our young students must experience this same transformative learning" (2012, p. xviii). The authors in this book demonstrate that when school librarians meet teachers' professional development needs, we develop our own expertise and create learning opportunities for ourselves as well.

The professional development goal of the LC is for all members of the learning community to have opportunities for growth while providing children and youth with dynamic learning experiences. In Phase 2 of the New Jersey Study, Todd, Gordon, and Lu (2011) studied teachers' perceptions of the school library in collaborative culture schools. They found that the library conducts "substantial, cost-effective, hands-on professional development through the cooperative design of learning experiences" (p. 26). In addition, these teachers noted that the school library learning environment is based on a "complex model of teaching and learning of teaching and learning that is exploratory and highly motivational" (p. 27). These are precisely the types of learning experiences that align with the LC philosophy.

The School Librarian as Leader

The high-quality, high-impact professional work described in the New Jersey Study, Phase 2 positions school librarians as leaders in their schools. Whether

the school administration perceives these activities as educational reform or revolution, the librarian's vital collaborative work leads to continuous development of instructional best practices in the school. In these schools, librarians take a leadership role alongside their principals and other teacher leaders. In some schools, leadership initiatives may focus on improving reading proficiency at all grade levels in all content areas. In other schools, initiatives may focus on effective technology integration, or project-based learning, or other efforts designed to improve student learning outcomes. In all cases, the LC philosophy is an ideal model in which the school librarian's leadership role can flourish.

Success as a leader in U.S. schools today is most often defined in terms of student achievement. The Library Impact Studies continue to show positive correlations between the work of state-credentialed school librarians who collaborate with classroom teachers and students' standardized test results, particularly in the area of reading (Library Research Service, 2013). Kachel et al. (2011) summarized school library research findings and identified a positive correlation between classroom-library collaboration for instruction and increased student achievement in fifteen out of the twenty-one studies they reviewed. Other studies show the value classroom teachers and principals place on the collaborative work of school librarians (Kimmel, 2012: Lance & Hofshire, 2012; Todd, Gordon, & Lu, 2011).

A leadership role necessarily takes commitment and knowledge. The redesign of the school library program to align with the LC philosophy takes persistence and outreach to garner support and buy-in from the larger school community. Together, librarians and principals can enlist advocates from among the opinion-leaders in the school. LC school librarians must also continually develop their knowledge and skills in order to effectively lead. School librarian leaders are concerned about "connecting agendas, about collaborating, about being 'at the table' when instructional issues are identified and analyzed and solutions proposed" (Haycock, 2010, p. 11). Building on research and practice, LC school librarians have a still-growing body of

evidence for leading collaboration efforts in order for collaborative practices to become an expected norm in preK-12 school culture.

Adult Learners: The Mortar in the Learning Commons

A recent national study by the National Center for Literacy Education notes, "The most effective school systems in the world design their schools so that teachers spend substantial portions of their day working alongside other educators to think through challenges together" (NCLE,. 2013, p. 29). In the environment we call "school," adults, who are responsible for ensuring that students meet learning outcomes, are still guiding, if not determining, the shape of the learning that takes place. While giving students varying levels of ownership and choice, educators continue to outline the criteria for success and are responsible for assessing students' progress toward mastering state-mandated and tested content and processes. Therefore, school librarians must enact our roles as instructional partners, professional developers, and leaders in order for the LC to reach its intended goal of serving as a driving force in the improvement of academic programs.

In the future, it is my hope that the literature published related to the LC model will address adult learning more directly and more specifically. Listening to ourselves and librarian colleagues talk and write about the LC can give us a clue as to the evolution of the LC program. Do we use first-person or third-person pronouns? Is the space in which we work "my" LC or "our" LC? Are all the adults in the school as much a part of "our" LC as students are?

It is time to decide if we will remain isolated at the periphery of the school's academic program or if we will take our rightful and most effective place at the center of learning and teaching (Loetscher2012). It is not enough to simply build the physical and virtual space of the Learning Commons. School librarians must develop and share our expertise through forging instructional partnerships, offering and participating in professional development, including job-embedded professional development through coteaching, and taking a

major role on our principals' leadership teams. In order to enact best practices in the LC, it must be an "our" space for adults as well as youth.

In the physical and virtual spaces of the LC, school librarians will wear many hats but we must always maintain a global view of the entire learning community and understand that the best way to positively impact student learning in through influencing teachers' teaching. Through coplanning and coteaching, we can collaborate with colleagues to reframe and deepen the assignments in which students engage. In order for the LC model to reach its intended goals and achieve the vision, school librarians must continually and proactively pursue instructional partnerships, professional development, and leadership with the elephant in the room—adult learners—and meet the imperative to address their learning needs in order to affect student learning outcomes.

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Part III

Evolution to the Learning Commons

One Common Goal
How Schools Support Effective School Libraries

Carol A. Gordon

School Libraries Then and Now

The school library, conceived as a place dedicated to curriculum-related materials is now a connected, interactive place and virtual space dedicated to information access and use. The buzz of collaborative learning and social networking replaces hushed silence. The role of school librarian has evolved from collection-centric functions, such as acquirer, organizer, and gatekeeper, to user-centric functions of teacher, co-teacher, and teacher of teachers. A unique pedagogy flows from the design, implementation, evaluation, and revision of instruction that delivers 21st century information and communication competencies in collaboration with classroom teachers. The foci of school library pedagogy are information, technology and inquiry processes, including traditional literacy and transliteracies. As information became ubiquitous, information handling became more complex and the school library concept of help and intervention matured to include co-teaching. As teacher of teachers the school librarian provides just enough-just in time, as well as formal teacher training, in the context of information and inquiry-based content learning. While the information-technology revolution has complicated what we mean by "information literacy," school library pedagogy meets the needs of students and educators to continuously update their competencies related to information processing, emerging literacy, and content creation across multimedia formats. These competencies are critical for 21st century learning yet little attention is given to schooling as the context in which they are taught. How do school climate, management styles, administrative decisions, and teaching modes contribute to the success of school library pedagogy? This study examines educators' views about how their schools enable their effective school libraries.

What the Research Says

School library research for the last two decades has struggled to generate measures through empirical research that support the claim that school libraries contribute to students learning. In 1959 conducting research for this purpose was an innovative idea. Mary Gaver, a professor in the Graduate School of Library Services at Rutgers University, led a major research study, *Effectiveness of Centralized School Library Services* (1963), involving 271 schools in 13 states. She compared test scores of students in three learning environments: schools with classroom libraries; schools with centralized libraries run by non-librarians; and schools with centralized libraries run by librarians. Students in schools with centralized libraries managed by qualified librarians tended to score higher than students without centralized libraries or qualified librarians. She held the belief that:

> With the school library literally the heart of the educational program, the students of the school have their best chance to become capable and enthusiastic readers, informed about the world around them, and alive to the limitless possibilities of tomorrow (1958).

Gaver's pioneering study blazed a trail for school library impact studies that aimed to present evidence that school libraries make a difference in teaching and learning. These studies establish that student academic achievement through the school library is a complex interaction of a range of variables that are dimensions of the school library program and student achievement as measured by standardized state tests in English Language Arts and Mathematics. Statistical analyses consistently show a positive correlation between the variables and student achievement (Scholastic, 2008). Students' higher test scores correlate with: 1) The size of the school library staff (Lance, et, al., 1999; Baumbach, 2002; Lance, et al., 2001; Lance, et al., 2000; Smith, 2001); 2) Full-time/certified school librarians (Lance, et al., 1999; Callison, 2004; Rodney, et al., 2003; Baxter & Smalley, 2003; Todd, et al., 2004; Lance, et, al., 2000); 3) The frequency of library-centered instruction (Lance, et al., 1999) and collaborative instruction between school librarians

and teachers (Lance, et al., 2000; Lance, et al., 2005; Lance, et al, 2001); 4) Size or currency of library collections (Burgin & Bracy, 2003; Lance, et al., 2000; Smith, 2001); 5) Licensed databases through a school library network (Lance, 2002); 6) Flexible scheduling (Lance, et al., 2005; Lance, et al., 2003); and 7) School library spending (Lance, et al., 2001; Baxter & Smalley, 2003). These correlation studies use regression analysis to isolate the effect of the socio-economic status of students.

In a key study school librarians identified inhibitors and enables in successful and struggling school library programs (Kuhlthau, 1993). School librarians with successful programs identified learning problems such as focus formulation while those with struggling programs targeted logistical issues such as lack of sufficient time and support. Inhibitors include lack of time, confusion of roles, and poorly designed assignments.
Enablers are a team teaching approach, a mutually held constructivist view of learning, a shared commitment of teaching skills for lifelong learning, and competence in designing activities and strategies to improve learning.

The study described in this paper builds on these studies as well as Phase 1 of *One Common Goal Student Learning* which. The New Jersey Association of School Librarians (NJASL) commissioned the Center for International Scholarship in School Libraries (CiSSL) to conduct Phase 1 and Phase 2. Phase 1 (2009) explored several dimensions of 765 school libraries from all New Jersey counties. A survey administered to school librarians yielded data on their work in terms of facility, staffing and certification, collection and access, information technology, administration and management, instruction, professional activities, reading and literacy-related functions, and budget. The study concluded that the work of the librarians contributes to the intellectual development of students in several ways: engagement with information; development of reading, viewing, and listening; and support for the use of technology to deepen and enrich learning. Findings also showed high levels of co-teaching between school librarians and classroom teachers: 19,320 cooperations, 11,179 coordinations, and 3,916 collaborations. The median

numbers of co-teaching events for the school year were 27 cooperations, 15 coordinations, and five instructional collaborations. CiSSL researchers and the NJASL Advisory Board decided to focus on these findings to more fully understand the how the school library contributes to learning from the perspective of educators. Exploring in-depth the status quo of effective school libraries this research clarifies what is working in the school library and what can work across the school to prepare youth to live, learn, and create in a digitalized world.

Data Collection and Analysis in Phase 2

A qualitative approach offered the opportunity to document the perspectives, perceptions, attitudes, and values of school administrators and classroom teachers in those schools that reported the highest number of co-teaching events in the Phase 1 survey. The goal of Phase 2 was to produce a rich body of data expressed in the respondents' own words through semi-structured interviews conducted in focus groups. The questions, or themes that guided these interviews include:

Theme 1: In what ways, if any, does the school library contribute to learning?

Theme 2: In what ways does the school support the school library?

Theme 3: How do educators envision the future school library?

The findings related to the second and third theme are discussed in this paper. These questions are critical to the transition school and society are making from traditional print-based schooling to teaching and learning in digital environments. From the perspective of educational inputs that comprise the administrative and teaching functions of schools, the data are analyzed to reveal the characteristics of school environments that are favorable for school libraries. The educational context is only part of the story, however, because it is inextricably woven into the fabric of learning, or output of schooling. The focus groups did not make a distinction between inputs and outputs in their discourse. Instead, they viewed teaching and learning as two

sides of the same coin. Therefore the outputs, or what students have actually learned, as stated in the first theme of the study, emerge in this article as evidence of the effectiveness of the organization and management that forms school culture. Lastly, this article looks at the evidence generated when the focus groups stepped into the future to envision their school libraries.

The data consist of the participants' "stories" as they build a narrative of the interaction of school library and classroom. Mateaas and Sengers (1999) support the methodology of narrative, stating that fields such as history, psychology, law, medicine, education, and social work use stories and narrative forms as an effective method to find patterns and insights that quantitative empirical research does not yield. Sandelowski (1991) writes that human beings often lose their narrative nature in hard data-driven research environments, while narratives drawn from soft data deliver richness, depth, and variation through cohesive, meaningful, and directive stories. Atlee (2003) claims story as an instrument of data collection and presentation facilitates understanding of phenomena, helping the researcher to sense the importance of context, character, or history, for example. Story promotes dissatisfaction with isolated events and abstract ideas and develops ability to sort out and describe phenomena in rich detail. People, places and things can be seen in terms of their function in a story, and helps the researcher to see other viewpoints. Stories present opportunities to recognize themes and find meaning in phenomena.

Focus groups, which served as the primary method of data collection, are

> … a method of group interviewing in which the interaction between the moderator and the group, as well as the interaction between group members, serves to elicit information and insights in response to carefully designed questions. (NYS Program Evaluation, 2008)

Data that contain a high level of insight emerge from the interaction among participants in their response to dynamic questions posed by the moderator

to the focus group. The qualitative literature states that these data avoid pre-judgment superficial or patronizing responses. Fundamental differences among participants emerge as they tend to explore the complexities of the phenomena discussed. Participants feel as though others are listening to them, encouraging depth and breadth of commentary.

The sample of focus group participants was drawn from the database constructed from the Phase 1 survey. Analysis of these data provided a ranked listing of schools reporting high numbers of co-teaching, including collaboration, coordinations, and cooperations with descriptive data including: school type (public or private); grade levels; enrollment; location; curriculum areas where co-teaching occurred; the focus of information literacy instruction; information technology instruction; and statements made by the school librarians about the effects of the co-teaching events on student learning. The researchers selected 30 schools across New Jersey counties and grade levels. CiSSL and the NJASL Advisory Board set the composition of the focus groups to include the school principal, several classroom teachers from a variety of curriculum content areas who co-taught with the school librarian, curriculum supervisors, and specialist teachers in the areas of reading/literacy, Special Education, and English Language Learners. From this list 18 schools were selected and invited and 12 agreed. There was one focus group per school and each group contained six to eight participants. Participants in the focus groups explore the themes inherent in these questions from the perspective of their educational roles. This article looks at the data that defines school culture, or context, in which these educators work with highly effective school librarians. They tell us how school libraries work in their schools today and how they would like them to look tomorrow.

Doctoral students who were trained in focus group research posted the transcripts from recorded interviews, including those made by the students and the faculty researchers, on the CiSSL Sakai site. There were two transcripts for each focus group interview that were checked for accuracy and consistency. One of the transcripts for each focus group was transcribed

and checked by the CiSSL team. The transcripts were coded the transcripts to identify the respondents' comments. Lastly, the two transcripts for each interview were combined into one document to facilitate analysis. The researchers used three types of coding. Open coding identified concepts and their properties, or characteristics, and dimensions, or variations of properties of a category. Axial coding relate categories to their subcategories and coding occurred around the axis of a category, linking categories at the level of properties and dimensions. Selective coding involved identifying a category as a core category and school library as pedagogical center emerged as the predominant construct.

Findings and their Implications

How do Schools Enable School Libraries?

If you're talking about developing a collaborative culture then you have to have a framework within the building that will develop and support that. I think we've moved in that direction. (Elementary Teacher)

Teachers recognize that the organizational frameworks in their schools are school library friendly. They are highly cognizant of a sense of community in their schools and see the school library as part of that community, rather than an isolated, independent unit. Figure 1 illustrates the framework for teaching and learning that emerged from the data as common to the participating schools in the Part 2 study. The educational beliefs of educators and school culture are the primary elements that enable the unique learning environment of the school library. The focus groups identified core capabilities that constitute learning in the context of educational beliefs, school culture, and an effective school library environment. The groups identified the following core capabilities they observe when their students engage in inquiry- and information-based learning supported by a collaborative teaching team and digital technology.

Resource-based capabilities include seeking, accessing, and evaluating information sources in a variety of formats, including print-based and digital literacies, social and cultural artifacts, and technological tools.

Knowledge-based capabilities are evident in the creation, construction, and sharing of the products of knowledge that demonstrate deep knowledge and understanding.

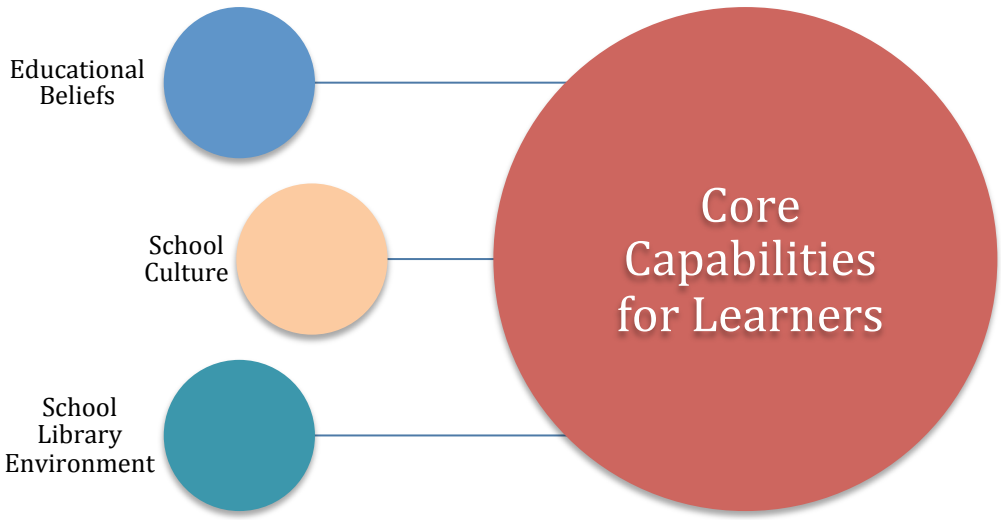
Reading-to-Learn capabilities enable learners to comprehend, interpret, communicate, and disseminate text in multimedia formats for the development of meaning and understanding.

Thinking-based capabilities manifests in the substantive engagement with information through critical thinking, including application, analysis, evaluation, and synthesis to create new ideas and products.

Learning management capabilities appear when learners prepare, plan, and successfully undertake a curriculum-based inquiry unit of study in rich information and technology environments.

Personal and interpersonal capabilities develop when students learn how to learn as independent and collaborative learners.

Figure 1: Framework for Teaching and Learning



Administrators and teachers acknowledge that these capabilities are directly connected to the learning environment of the school library, which in turn, is supported by their educational beliefs and the school culture that is the consequence of those beliefs.

Educational Beliefs and School Culture

We really promote lifelong learning around here and learning is not only the focus for students, but learning is a focus for everyone in the school, including me. (Principal)

School principals emerged as the chief architects and articulators of a school culture that is collaborative. They create the vision that drives school culture. While not directly involved in co-teaching in the school library, the focus group responses of the principals provide insights into learning philosophy, instructional approaches, and support structures in their schools. These organizational elements are directly linked with how principals conceptualize their schools and how they manage the critical dimensions of that structure, such as schedule, personnel, curriculum and assessment, community relations, and funding. These dimensions are critical to the kind of school culture that can inhibit or support school libraries.

The principals in the study practice a participatory management style rather than an authoritative one. There is a high level of trust between the principal and staff that encourages teachers to deviate from traditional, classroom methods to experiential, hands-on learning. These principals are delegators who allow their teachers, the "educational experts," to do their jobs. They think outside the box for solutions that focus on learning. Most importantly, they create a caring culture that gives priority to student learning. While these principals care about test results, they understand that deep learning requires teachers to create rich learning experiences for their students that are information and technology based. They hold a strong belief that the work of the school librarian contributes to good test scores. They hold the school librarian in high regard for providing training for teachers and support

professional development opportunities for them because they know that it is a good investment that will be shared with teachers. Principals hold the high expectation that their school librarians are teachers of teachers. They value the excitement they see in students who are motivated and engaged in their learning through effective teaching and teacher training.

Participating schools in the study held common educational beliefs about educating children for the 21st century. The school librarian is perceived as a teacher who contributes a specific pedagogy for learning from information through inquiry. These educators did not take information processing for granted. Rather, they understood the complexity of an information-based inquiry process whereby students find meaning in the information as they construct new knowledge. Knowing and understanding are viewed as the primary steps to higher order thinking that involves application, analysis, evaluation, and synthesis, leading to a learning outcome that is creative. Critical thinking, problem-solving, and creativity are highly valued as part of learning. They recognize the connection between the rich information environment of a well-resourced and equipped library and critical thinking that enables problem solving, communication, collaboration, creativity, and innovation. These teachers are aware of the limitations of focusing solely on standardized testing and superficial teaching that emphasizes right and wrong answers. They are looking for complexity and challenge for their students. They want to teach their content in a way that helps students to think. High quality learning outcomes that students create are viewed as the evidence that their students have also learned the information and technology processes that the library's resources and pedagogy support.

These educators were aware that a globalized, information and technology rich world creates the need for a whole school approach to teaching digital youth. Digital citizenship is an important educational goal as the participating educators work toward creating challenging learning environments for their students that take a 21st century perspective on knowledge and the use of that knowledge to solve real world problems. The school library enables them to provide a 21st century education and they value the expertise of the school

librarian as essential for high quality learning outcomes. They recognize the expectation of youth that their lives in school are connected to their lives outside of school. In their view the school library enables these educators to deliver an information- and technology-rich education. They value a strong information technology infrastructure that provides access to technology tools they do not have in their classrooms. The dynamic, multimedia library environment provides the instruction students need to perform complex information and technology tasks These educators want a dynamic technological and media-rich learning environment to teach their content through relevant and challenging learning experiences for their students. They are aware of the need for infusing digital citizenship with teaching so that their students can ethically and safely navigate the social and cultural norms of virtual environments.

These principals give high priority to funding their school libraries despite budgetary issues. Their strong financial commitment is based on student learning and the continuous improvement of teaching in their schools. While not directly involved in co-teaching in the school library, their focus group responses provide insights into school culture, learning philosophy, instructional approaches, and support structures that are directly linked to how they conceptualize the organizational structure of their schools and how they manage the critical dimensions of that structure, such as schedule, personnel, curriculum and assessment, and community relations. These dimensions are critical to the kind of school culture that can inhibit or support school libraries. Principals are willing to support the acquisition of resources for the school library with an adequate budget because they perceive the school librarian as a good teacher who actively engages in curriculum planning. In some of the focus groups teachers expressed deep emotion about how school librarians helped them to be better teachers. Principals recognize the need to provide professional development for school librarians that enables them to be good teachers and good teachers of teachers.

Teachers expressed a strong commitment to inquiry learning that results in academic rigor and deep understanding. The educators in this study strive for

effective teaching and quality learning outcomes. They believe that in constructivist learning principles, active and engaged learning, the activation of prior knowledge that enables new learning, the importance of constructing meaning from information, and the importance collaborative learning. These teachers are role models of lifelong learning who welcome professional development opportunities that are embedded in their collaboration with their school librarians. They expressed a passion for what they taught and wanted their students to experience deep understanding. They saw the library as "the place where all the disciplines come together" to support multidisciplinary teaching.

These beliefs enabled the school library to develop as a pedagogical center where collaborative learning brings richness and depth to their teaching. Educators observed the culture of high expectations for all students and the accommodation through differentiation for diverse learners. The quality of student work is the evidence they cite for the deep understanding that their students derive from information and inquiry based learning in the school library. Teachers in these schools value innovation and new approaches. They see themselves as learners and are willing to take risks to improve their teaching and engage their students. Collaborative teaching is one way they expand their pedagogical repertoire to share resources and ideas, and they view the school librarian as a co-teacher.

Commonly held educational beliefs formed a foundation for a collaborative school culture that had a high tolerance for pedagogical innovation. The school library was perceived as "part of the way we do things." Teachers observed that information and resource-based learning that is experiential and collaborative, supported by the expertise of a school librarian, results in motivated learners. School culture that encourages innovative and collaborative teaching supports self-directed learners who explore, focus, and create.

Teachers, school librarians, and principals are about a culture that nurtures collaboration and community. This is the kind of environment where everyone

is a learner, including the principal, and learning comes first.

School Library Environment

There is a sign over the door that says Learning Center. It really is a learning center! (Science Teacher)

The environment of the effective school libraries in these studies shared similar environments even though they differed in age and size of facilities, levels of funding, socio-economic levels and ages of students, size of collections, technological capabilities, and support staff. From the perspective of the participants in this study, the school library functions primarily as a pedagogical center for students and faculty. It is a common instructional zone for the whole school where students learn to learn through information led by professional school librarians. Focus groups portrayed the school librarian primarily as teacher who has the unique role of seeing the 'big picture" and pulling the academic disciplines together. As co-teachers school librarians bring depth to learning by helping students and teachers develop information skills that lead to the retrieval and utilization of good information. They facilitate the integration of skill and content instruction.

The learning environments of these effective libraries is welcoming, with the goal of equitable and stable access for all students. The concept of help encouraged students to seek guidance in use information and technology. A spirit of experimentation empowered teachers to take risks associated with innovation. Support for teachers through hands-on, cost effective professional development supported an innovative spirit among faculty, particularly with regard to the integration of technology with information-based learning. A collaborative atmosphere was evident as teachers worked with each other as well as with the librarian. Seen as an extension of the classroom, the library offers a central, safe place that removes barriers and constraints to resource- and technology-based learning.

Participants pointed out how the library was different from the classroom. The school

library is seen as a source of energy that supports the school's mission to produce literate and informed learners who can thrive in a digital, knowledge based world. It is the hub of a learning network that supports a community of learners and the exchange of ideas across the school and its global environment. It is a "connector" that supports hybrid activities that connect real and virtual worlds of the school community. It is a digital library that has no walls. The school library, through information, breathes life into the curriculum and connects curriculum to the real world of students. Students can connect curriculum learning with their personal interests. Teachers connect the disciplines to provide a richer interdisciplinary approach to learning. The school library connects people to each other as they learn together. Teachers connect with each other to provide exciting learning experiences for students. Students and teachers connect to the wider world of information. The connections are perceived to be "easy" because of the systems, processes and organization in place in the school library, and because of a philosophy and practice of "help" provided by school librarians. The school library is an extension of the classroom, supporting enrichment activities and special needs learning.

The school library also connects the values of the school district with its school community, as well as connecting the school with the greater community in which it resides. The school librarian connects the school library with the public library. The school library connects the school and home through technology and through the relationships the school librarian establishes the school librarian as information broker who connects people with resources. School librarians bring information and people together at the point of need. The school librarian's role as connector firmly establishes the school as connected to the community, the curriculum connected to the real world, and the school community connected to its stakeholders. In the role of teacher the school librarian makes the ultimate connection among the academic disciplines represented in the school curriculum and the instructional program. It is where the disciplines meet in a real world setting.

The school library promotes information exchange, reading enrichment and is

seen as the center for digital literacy. Educators observe that their students see the school library as a place to engage with information where they are encouraged to critically evaluate sources, use diverse sources, and create content. Learning is seen as a process that is discovered as students pursue their information needs as they learn how to learn.

The environment of the school library is that of a learning center that contains resources that present diverse subjects and viewpoints through a mosaic of knowledge and global access. Knowledge is respected, pursued, and guided. The school's centrality in teaching and learning is seen as a result of the work of school librarians. S/he is viewed as a teacher whose work centers on being an instructional partner who contributes information-learning expertise. The unique contribution of the school librarian as teacher is learning through information and resources. Teachers seek this expertise and feel that it helps them to be "better teachers." Principals believe their school librarians help to shape, as well as support deep learning and the preparation of students to live and work in a digital world.

The school library promotes deep learning that is based on a complex model of teaching and learning that is motivational and exploratory, rather than on the "right answer" prompted by rote memorization and drill. Students want to be in the library; they view it as their information home and value the guidance they receive from the librarians. It is an inviting place of learning for teachers as well. They like the informality and freedom of the library environment. The school library sets the stage for student-initiated inquiry and allows learning to happen serendipitously.

Technology distinguished the library from the classroom. It is comprised of a virtual, as well as a physical space for learning. The content of learning, teaching methods, learning behaviors, and learning outcomes are different. Students have a wide range of choices in the library, including traditional and online collections and reading materials. The expensive technology in the library is often not available in classrooms. Teachers see the skills taught in the library as life skills that enable students to function interdependently and

independently in digital environments. They are aware of the information management skills that open new doors for learning from information through technology. Teachers also see the school library as their home base for constructivist, hands-on learning that includes team planning and a relaxed atmosphere as students pursue diverse ways of learning.

As powerful as the role of the school librarian is in shaping and supporting school culture that endorses the concept of a teaching library, school librarians cannot do this alone. Collegiality grows from mutual intents and shared experiences of the school librarian and the teachers who open their classrooms to collaborate because they recognize the value they derive from the school librarian. Teachers see themselves as modeling collaboration for their students. Teachers respect the school librarian as an educator with whom they can identify and on whom they can rely.

How Educators View an Effective School Librarian

The school librarian can't just be a warm body. You're really hiring a personality and an educator – a person who cares. (Science Teacher)

The educators participating in this study often refer to the qualities of the school librarian as the major factor in the success of the school library program and the school library reflects the dispositions and personality traits of the librarian. Principals in particular recognize the importance of library staff in the effectiveness of the library program.

According to the consensus of educators the effective school librarian is resilient and non-judgmental. S/he is a good communicator who is willing to go the extra mile to support teaching and learning. As a person who loves to learn and is a lifelong learner s/he freely shares knowledge and expertise and has a strong "help" orientation. Teachers observe that their school librarians actively work to build a profile of the school library as an active learning center that has the ethos of a place that invites learning: a place to be, do and become. The effective school librarian has high visibility as a teacher and

works to sustain this image as a priority. S/he is sociable, accessible, inclusive and welcoming; the living antithesis of the librarian stereotype. Focused on enabling multiple learning needs, these librarians are solution-oriented and have high expectations for their colleagues and students. They like and care about young people and are flexible in creating a learning environment that appeals to them. They are leaders and instructional innovators who are not afraid to take risks, be creative, and do what best serves learners of all ages.

A universally held perception among participants is that the school librarian is a teacher of teachers. Participants identified the information-learning expertise of the school librarians and the teaching role of the school librarian as not limited to students. Rather it extended to considerable in-school training of teachers. The school librarians were positioned and seen to deliver effective professional development with ongoing support. Because the professional development offered by the school librarian is hands-on, teachers feel that they are learning something useful and are more likely to use what they learned in the context in which they learned it. The school librarian plays a dynamic role in building collaborative and collegial relationships among staff members through sharing of information-learning expertise, ideas, problems and solutions as everyone works together to build a better school. The wider school culture of investing in school libraries and giving the school librarians freedom to implement professional expertise gives rise to a pervasive notion of school libraries as part of a "culture of help" in schools. School librarians take an active role in nurturing this help, which creates further ripples of help.

How Educators Envision the Future School Library

(The school library) is the nerve center – the heart of school academically (and) the reading center… Now it's just the challenge of maintaining it. (Social Studies Teacher)

Educators in this study held high expectations for school libraries in their schools as a rationale for more funding for school libraries. Despite the

current budget crisis, these educators want larger libraries and increased staffing.

Larger Libraries

If I could change anything to make it better …, I would expand the school library. I think it's such an integral part of this school that if I had my way about it, the funding would go here first. (Teacher)

Teachers wanted more space to develop instructional opportunities. Collaborative learning was viewed as a teaching method that requires more school library space enabling teachers to differentiate to meet diverse student needs. Recognizing the social nature of social and collaborative learning in the school library, some educators wanted a coffee shop in the library. Another consideration that drove teachers' wish lists was the perceived need for more technology to support specific content needs such as: writing labs to facilitate the writing process; language labs with immediate connections to resources; more computer space to enhance transliteracy experiences; additional need for small, quiet spaces for reading; teleconferencing facilities; and an information technology place for teachers. The value of the library was clearly seen in its intersection with print and digital resources, and there was no indication that the print-based resources should be reduced. At the same time, it was acknowledged that digital information services were expanding, placing increased demand on technology and the need to continuously improve the technology infrastructure, accompanied by specialist technical expertise.

Increased Staffing

Clone the librarian! (Teacher)

Educators saw the need for more staffing a teaching school library focused on creative engagement with information and technology to meet content standards and to provide significant life learning experiences for students.

Focus groups were interested in having more time for instructional collaborations, which requires more school librarians. They believed this would continue to build more curriculum integration and strengthen interdisciplinary learning and teaching with the involvement of more teachers with the school library. Some teachers wanted extended hours for the school library during the school year and summer hours as well.

Implications for Researchers and Practitioners

Phase 2 has implications for researchers who are looking for methodologies that elicit powerful findings that support the positive effects of school libraries on student learning. The challenge of the Phase 2 study was to capture the stories of educators, in their own words, in an unobtrusive and efficient manner as they responded to three broad questions about their school libraries. Focus groups protocols for the semi-structured interviews and strong guidelines for moderating the discussions elicited extended responses and interaction among participants. The details of this methodology are available in the research report, *One Common Goal: Student Learning, Part 2* (Todd, Gordon and Lu, 2011).

While statistical measures meet the gold standard for the randomized, controlled trial approach characteristic of experimental research, qualitative research is well-suited to unpacking the question of how school libraries impact student learning by providing rich, descriptive data. An ethnocentric approach has the potential to inform 21st century teaching across school curricula, in both the classroom and the library by providing models of school library pedagogy. The use of homogeneous focus groups of educators, for example, could provide data that support how school libraries can add rigor to the study of specific academic disciplines. How do historians add new knowledge to their discipline? What are the seminal questions historians ask, for example, in their research? How do they evaluate their sources and the information they find? What methods do they use to collect data and analyze it? These findings could help tailor the generic definition of information literacy to the disciplines to create multiple models of the concept.

In this study participant practitioners saw the future of school libraries threatened by budget cuts in education. Concerns about the potential negative impact of reduced budgets on the work of the school library were addressed on a national, rather than local level. The educators involved in this study are committed to making a difference in their students' learning through school library pedagogy and expressed concern that this is not valued by government. They recognize information as the raw material of learning and that unmediated access to vast amounts of information through digital technology calls for a pedagogy of intervention and help. This study indicates the potential for capturing the attention and advocacy of educators outside of the library profession. In addition school libraries support standards-based teaching and school curricula, but they go beyond minimal performance that defines achievement of basic skills measured by standardized tests scores to scaffold learning to attain more complex critical thinking that results in student creativity and innovation. While schools need to meet basic requirements for student achievement, this is a means to an end, and as such is no longer sufficient for preparing students for living and working in an Information Age that presents an increasingly complex information infrastructure. Through the services of school libraries schools can meet the challenge of producing a multi-literate population of young people who can be the traditions of scholarship and academic accomplishments that define our culture as a nation.

The findings of this study that richly describe the synergy between effective schools and effective school libraries indicate a pathway to shared responsibility for information and inquiry based learning that involves classroom teachers. This can be facilitated by the professional development role of school librarians. The result of a whole school approach renders school library research as a model for 21st century education for school administrators, policy makers, teachers, and parents to understand the importance of information processing and use, learning through inquiry,

support for traditional literacy and transliteracies, and the integration of technology in the education of digital youth.

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Choices, Chances, & Changes

"An idea of the learning commons is utilized to foster flexible learning opportunities while incorporating immediate access to information."

SHANNON ROBINSON

The 3 Cs of life: You must make a *choice* to take a *chance* or your life will never *change*.

These are the three simple words that resonated in my brain the summer of 2011 as I said goodbye to a district I had taught in for ten years and headed across the state to take on the role of library media specialist at the Morgan School in Clinton, Connecticut. Change can be intimidating, but staying stagnant and never progressing can be even scarier.

What follows is the story of my change. It was no small feat or an overnight sensation but a transformation that evolved from a symphony of ideas and collaboration among professionals in the field. French author C. Joybell defined perfection as "a collection of a variety of pieces that, when viewed and felt individually, are difficult and confusing; but when brought together as one, create a perfect picture." My school library transformation to a learning commons is a reflection of just that. There were various trials, reflections, and revisions that spanned the course of two years. What has grown from the revolution has ultimately become the foundation behind a brand new high school for Clinton that will open its doors to students in the fall of 2015.

The Morgan School is a public high school serving approximately six hundred students. The last time the 16,000 square foot library underwent a renovation was in the early 1990s. (Remember the days of card catalogs and reader's guides?) The space had an abundance of mauve countertops, walls, and carpet. The shelves were partly filled with outdated materials, and the only available technology for students was the six desktop computers that lined a side wall. My interview for this position began with a trip to the media center and a sheet of paper that simply stated, "What would you change?" It was pretty evident that the staff and students of this high school were ready for this renovation, a change that would require more than a splash of new paint and posters on the wall. Was I ready to take it all on? Challenge accepted!

THE SEED IS PLANTED

The interview brainstorming sheet was the first key to realizing that the administration was looking for a shift in practice. That was one major hurdle already out of the way. The next step to revolutionizing the space was examining how it could evolve. A global shift is happening in twenty-first-century education; media centers are transforming into areas of user-centric learning where self-discovery and collaboration take place daily. This is where my panel of experts, though they didn't know it at the time, really came into play. My first companion became the book *The New Learning Commons: Where Learners Win* by Loertscher, Koechlin, and Zwaan. The authors share a vision of the learning commons as "a center planned by both the youth and adults, drawn there by its inviting and collaborative atmosphere." An idea of the learning commons is utilized to foster flexible learning opportunities while incorporating immediate access to information. Throughout the book the encouragement to transform both the physical and virtual space is discussed, with the end result being a central network that offers boundless opportunities for growth and differentiated learning rather than a space where only print materials are offered.

BOOKMARKIT

KATHLEEN ODEAN

YA FICTION

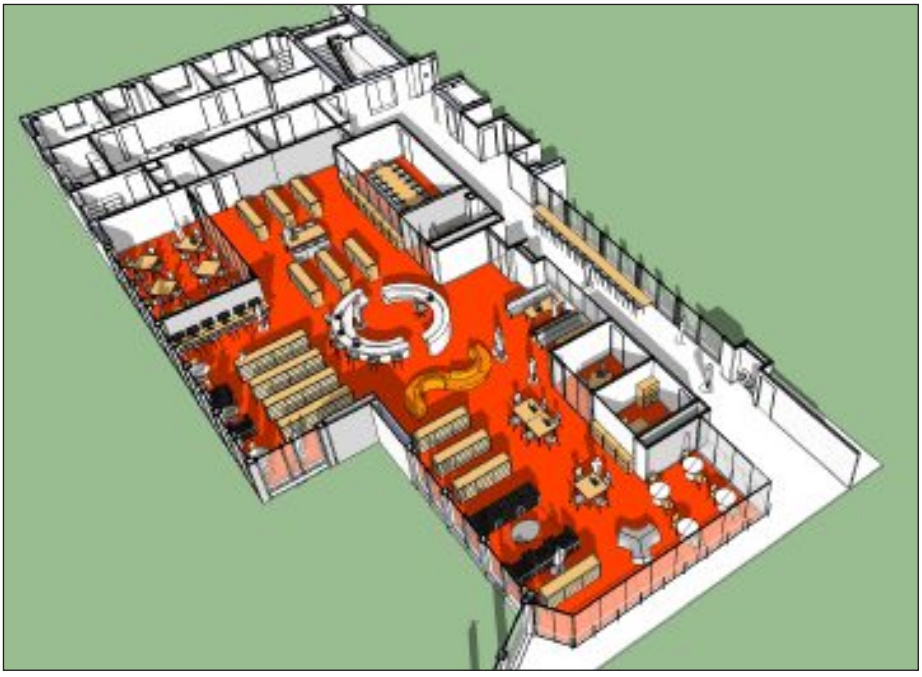
SPREADING THEIR WINGS

Benway, Robin. **Also Known As (AKA)**. Walker, 2013. 320p. $16.99. 978-0-8027-3390-0. $9.99 Trade pb. 978-0-8027-3545-4. Grades 7-10. Glamorous as it sounds to be the daughter of spies and an ace safecracker herself, Maggie, sixteen, wants to try something ordinary, so she jumps at the chance to go to school in Manhattan. Her assignment is to infiltrate the home of Jesse, a fellow student, and steal documents. She never expects to fall for Jesse or make good friends with irrepressible Roux. Fun and fast-moving.

Blackwood, Sage. **Jinx**. Harper, 2013. 368p. $16.99. 978-0-06-212990-1. Grades 4-8. After Jinx's stepfather abandons him in a magical forest, the boy is rescued by a wizard named Simon. Although Jinx was raised to believe wizards are evil, he thrives in his new surroundings where he learns to read, hoping to learn magic. But the time comes when he must leave on his own adventure and find out if he can truly trust Simon. A satisfying blend of familiar elements and originality.

Carriger, Gail. **Etiquette & Espionage**. Little, Brown, 2013. 320p. $17.99. 978-0-316-19008-4. Grades 6 up. Victorian-era tomboy Sophronia assumes her new finishing school will be dull and proper. Imagine her surprise when her classes include espionage and poisoning! One of her teachers is even a vampire. Sophronia, who's likeable and brave, develops her talents, makes friends, and tries to foil an evil plot in this highly entertaining steampunk spy adventure.

Zarr, Sara. **The Lucy Variations**. Little, Brown, 2013. 320p. $18. 978-0-316-20501-6. Grades 8 up. Lucy, sixteen, could have been a world-class pianist but she threw it all away—or that's how her mother and grandfather look at it. Lucy loves music but wants more in her life. When a charismatic young piano teacher starts to work with Lucy's younger brother, she begins to hope she can have it all: music, a full life, and even love. A sophisticated moving novel about a girl defining her own values.



Floor plan of the Morgan School learning commons.

With this in mind I began thinking about how I could create a space that would welcome students and staff for a variety of purposes, along with moving the whole school population into a twenty-first-century education model. The current space offered plenty of adaptable areas and possibilities. The more I read about the growing learning commons concept, the more I began to envision how my current conditions could adopt this concept with little customization.

LITTLE CHANGES = BIG SUCCESS!

Following a general meeting with my building administrator, I learned the following.

- Students' use of the space was limited to attending study hall.
- Teachers were not utilizing the space during class time.
- Circulation statistics showed that very few items were moving from the shelves.
- Students did not actively seek books purely for the enjoyment of reading, and a large portion of the yearly book budget was spent updating reference collections and encyclopedia volumes.
- Students were craving more technology usage in their courses, but teachers were hesitant to incorporate technology due to its lack of dependability.
- The school conditions supported limited wireless access and, until recently, had no onsite technology support.
- Often when teachers would attempt to incorporate the laptop cart or interactive board into a lesson, there was no one available to troubleshoot problems.

This information prefaced my proposal to move this learning community from a media center to a learning commons model. This small space had the foundation needed to accommodate individuals, small groups, and entire classes. If we could begin to support new technology, the space could embrace a learning commons structure.

The big surprise for me was when it was suggested that we tap the school's trust fund for financial support. Money is allotted each year by our alumni association to help create programs for students in areas that may not be covered under our regular allocated budget. The challenge would be convincing the alumni board that they would be investing this money in more than just new technology and furniture, but rather a cutting-edge, state-of-the-art school climate. With a new school built right around the corner, the board would require evidence that Morgan students

needed these additional tools and practice to increase their opportunities in a quickly evolving society. Our current students could not wait for the new building. We had to move now.

IF YOU BUILD IT . . .

With the board of trustees invested in our proposal, we were ready to begin the transformation. Once again I took to my resources and explored numerous learning commons that were already successfully established and shared on the web. I considered colors, space arrangement, furniture styles, and hidden gems. One learning commons space that intrigued me was Chelmsford High Library in Massachusetts. Valerie Diggs and company did an amazing job building an area that students saw as inviting as well as supportive. I was particularly fond of Diggs's idea to include a variety of seating options—even diner booths! It was clear that adaptable furniture and desirable seating for students was the direction to go. I looked into tables that had a traditional library appeal but could be easily moved to reconfigure the space on demand. I followed the lead of Chelmsford High School and ordered diner booths. I followed Loertscher and company's suggestion to involve students in the transformation. I attended a summer session of our student council and gave students the opportunity to share what type of seating they would like for the fiction area of the room. The students were eager to flip through catalogs and voice their opinion on "comfortable" seating options.

It would take time for the new furniture to arrive, and in the meantime, a new space with new ideas needed a fresh face. I wanted to make it a priority to change what I could quickly and efficiently. When students returned in the fall, I wanted them to be greeted with a new space that offered a fresh new outlook for learning. They would still have the comfort of a traditional library, but it would mesh with new services and support. My mind raced back to a Slideshare presentation by Valerie Diggs. She presented a learning commons as "a place of teaching and learning, group work, collaboration, professional development, creativity, change, inquiry, communication and community," not "a place designed primarily for finding information, a place where students only come to use the copy machine, a place where the 'librarian' is in charge, a place where students are greeted with rules as they enter, a place where bookshelves with outdated material fill open space." I wanted our space to be vibrant, colorful, and inviting, with a coffeehouse appeal that attracts patrons to stay a while for work or leisure. A group of art students, our local paint store consultant, and I met to choose a color pallet and wall adornments. All displayed artwork would be created by students.

I wanted to establish a separate space that could be used for small-group work, individualized testing, and silent study. It was determined that a small storage room off the main library was ideal to support such a collaborative space. I outsourced a wall of encyclopedias to make room for a

A variety of seating options in the new learning commons included diner booths (above) which promote collaboration. Expressly comfortable seating for the fiction area was selected with input from the students.

BOOKMARKIT

JOHN PETERS

PICTURE BOOKS

OH NO! MAKING MISTAKES

Balouch, Kristen. **The Little Little Girl with the Big Big Voice**. Little Simon. 2011. 32p. $12.99. 978-1-442-40808-1. Grades K-2. Little she may be, but so HUGE and LOUD is her voice that she frightens off even the elephant and the big, big snake. Balouch's incandescent art seems to ROAR right along with her—and with the big, big playmate she finds at last.

Emmett, Jonathan. **The Princess and the Pig**. Illus. by Poly Bernatene. Walker. 2011. 32p. $16.99. 978-0-8027-2334-5. Grades 1-2. Switched by accident, a baby princess is raised by a kind farming couple—and a piglet grows up in the royal palace. You'd think someone would notice, wouldn't you? A droll tale, illustrated in grand style.

Gutman, Dan. **The Day Roy Riegels Ran the Wrong Way**. Illus. by Kerry Talbott. Bloomsbury. 2011. 40p. $16.99. 978-1-599-90494-8. Grades 1-3. Relating a true episode that has passed into football lore, an ex-sportscaster tells his grandson about the unforgettable day a college player snatched up a fumbled ball and took it on an epic run—toward, unfortunately, his own team's end zone. Talbott's close-up illustrations let children run right along with "Wrong Way Riegels."

Offill, Jenny. **11 Experiments That Failed**. Illus. by Nancy Carpenter. Schwartz & Wade, 2011. 40p. $16.99. 978-0-375-84762-2. Grades 1-3. In a set of painless (for readers, anyway) and hilarious lessons in the scientific method, a young researcher discovers that no, messages in bottles can't be flushed down the toilet, a slice of bologna will not fly like a Frisbee, and nine other promising but similarly mistaken hypotheses are tested with disastrous results. Carpenter's precisely drawn illustrations lay out each experiment's materials and procedures in detail.

The fiction collection received a much needed update. Students can scan QR codes with their phones to get more information about each book.

projection screen and interactive projector that were ordered. By consolidating four reference shelves, I was able to create a location that could be used to house larger groups, including classes and presenters. Many of the reference books were re-cataloged and put back into student circulation.

The online card catalog helped clarify why students were not reading for pleasure. The average age of the fiction collection was 1993. For this to be an effective learning commons, the importance that print materials still held in the space, including providing a rich and diverse collection of books, needed to be attended to. After an extensive search of Goodreads, ALA Teen Choice, and summer reading selections from a variety of well-known high schools, I placed a large order of new, updated pleasure-reading books. These books would be put on dis-

play for students to see as soon as they entered the space. I reviewed the current periodical budget. Many of the magazines subscribed to were of little or no interest to students and were not readily available. Following a discussion with Sydnye Cohen, library media specialist at Brookfield High School in Connecticut, my periodical subscriptions went from 10 to 24. I subscribed to magazines that could be used for research as well as pleasure. I ordered magazines focusing on all interests of life, including music, technology, and sports. Magazines were put in an accessible location, with the newest edition's covers in full view.

I began enhancing the space using what was readily available to me. It was Pamela Colburn Harland's book *The Learning Commons: Seven Simple Steps to Transform Your Library* that helped me discover simple, effective adjustments to my practice using materials that were already at my fingertips. For example, in a traditional library setting, a librarian can spend a great deal of time retrieving supplies for students, such as scissors, glue sticks, and markers. To supply students with these materials without feeling like I was being interrupted throughout the day, I created a student production table. I purchased inexpensive bins from the local office store and loaded them with all the materials a student may need (pencils, paper, markers, glue, scissors, etc.) These materials were then placed in a public

Attention was paid to the Virtual Learning Commons, too, providing students with 24/7 access.

The learning commons provides access to iPads which students can use to peruse textbooks, e-books, websites, and other resources.

The learning commons space is flexible, good for groups for class or individual use (above). Students were asked to combine an old school presentation form(posters) with a 21st century big think(iPads). This student is listening to what an autistic student might hear in their own head on any given day.

area of the room where students could access anything they needed without having to ask.

Another time-saving change was creating a shelf in the learning commons that would house textbooks for all courses. This benefited students because they would no longer need to leave during a study hall to switch out books from lockers. Harland also offered great advice for getting subscription periodicals circulating more. Her suggestion to photocopy the cover page and table of contents to share with faculty members was brilliant! When the teacher comes across something that interests them, not only will they stop to check out the full source but you will also have the advantage of engaging them in conversation about what is taking place in their classroom and possible ways you can become involved.

MOVE TO THE VIRTUAL WORLD

For the technology portion of this movement, our tech team decided a mobile

laptop classroom would help round out and support the learning lab portion of the commons. A mobile cart of thirty iPad devices was ordered to help engage students in new twenty-first-century skills while also encouraging use of the learning lab area. Teachers were given the opportunity to become pilot iPad teachers. In return for having an iPad of their own to use with their class, they would report back to the technology team and administration how they were successfully incorporating this device into their classroom and what challenges they encountered.

Another update was intertwining technology and print, providing students with continual access to all the information the learning commons has to offer. Clinton Schools is a Google apps district, so it was not a difficult decision to turn our virtual learning commons into a Google site. I devoted a large amount of time perusing blogs posted by experts in the field for web tools, databases, and other relevant digital resources. The site was created with the idea that students would be able to locate what they needed in three clicks or less. I strove to make the site user friendly and attractive. I made sure there was easy access to databases offered for free by ICONN, our state library of databases. Each subject area database had an individual search tab. I included direct links to web tools that would support students in organizing and producing new material, including links to copyright-free music and images. Students were even offered a form to request new books for our growing collection. These simple changes would make the new learning commons a 24/7 accessible landing spot for the school community.

BRING IN THE CROWD

I rearranged the space, ordered materials, and prepared for students. Now what? How would my users expect the space to work? How would I encourage the shift in practice without totally losing the management piece? None of these questions would be answered without students in the space. The next step was to attract the crowd. Not being a classroom teacher, this could be difficult for me, so I needed to branch out and become involved with students outside the learning commons space. Sydnye Cohen suggested I look into becoming an advisor to a student organization. Since our school's Interact Club was previously run by the media specialist, this seemed like the simplest transition to make. Interact is a group of students that works closely with the town's Rotary Club. They are highly involved with community efforts in and out of school. Many of the members are natural leaders and well respected by the rest of the school. The students were eager to hear about all the new changes, and between them and all the groups I met with over the summer, I was pretty convinced the room would soon be flowing with curious minds.

To encourage staff to invest some of their teaching time in the updated space, I created a meet-and-greet sheet for all departments to complete. They were asked to

share assignments and projects they might be completing in the upcoming school year and what I could purchase for the learning commons that would support student success. This was also a great way to get acquainted with department curriculum, as well as how I would be able to offer my services to teachers throughout the year.

STILL EVOLVING TODAY

What does our school learning commons represent today? The update of the physical space has been successful, but it is the philosophical shift that will make it a true success story. We are now armed with a great space and intrigued students and staff. We strive to integrate into the evolving school community. Through the past two years, we have ventured into a more collaborative structure of learning where teachers seek advice from the media specialist and partner up for projects. Everything about the space continues to evolve. We sponsor online book clubs and encourage student exploration of contemporary production tools. Teachers are encouraged to share their successes and trials with technology through our monthly faculty meetings. When teachers have implemented a new piece of technology into an existing lesson, they are encouraged to share with others through teacher-run professional development and meetings. The learning commons has become a hub for community events, such as monthly PTA meetings and guest speakers. The virtual learning commons continues to be revised and updated to meet everyone's needs. After a three-day virtual seminar with David Loertscher, I worked to rebuild the site. The virtual learning space is slowly emerging from being a one-person-directed site to a learning-community-managed space. Clubs can publish important dates on our Google calendar, students can look for peer book recommendations, and staff can upload model student work to a growing project page.

At the beginning of the 2013 school year, we will have our very first student iTeam. As members of the iTeam, students will earn credit for being an active part of the learning commons. They will help manage our virtual commons space, work collaboratively with classrooms on twenty-first-century skill projects, and create student-directed tutorials that offer technology support to staff and students. Our diner booths will be equipped with stationary iPads, similar to that jukebox feel of the good old days. On these devices students will have immediate access to the online catalog, a virtual dictionary, and even virtual radio.

LOOKING TOWARD THE FUTURE

The transformation will be ongoing, and I learned that these changes could have been made regardless of monetary resources. The true purpose of a successful learning commons is to discover what the population needs to flourish as independent creators and learners and finding ways of providing the tools needed to achieve these goals. I also realized that not all changes would fall into place overnight, and not everyone is going to jump on board at once. In fact, after two years, some goals are still ongoing. The most exciting outcome of our change is that the learning commons model has now become the foundation on which our brand new high school is being developed and built—it will be the hub of our new building. The main space will offer students everything they currently have, along with a production room with interactive walls and tools including a green screen. Each wing of the building will house a collaborative space where teachers can take students out of the general classroom for new experiences. It will include tools for successful collaboration and even a small print circulation. The school's purpose is to cultivate intellect and character in partnership with families and the community. Students learn in a rigorous academic and student-centered environment that prepares them to become resourceful, productive, healthy citizens in a global society. As we continue to grow and develop this new space and practice, the Morgan School learning commons is quite a sight to behold.

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Revisiting the Case for the Leadership Role of School Librarians in Technology Integration

Daniella Smith
Daniella.Smith@UNT.edu
Assistant Professor
College of Information, University of North Texas

Abstract

The purpose of this study was to determine the self-perceived impact of technology training on the transformational leadership practices of pre-service school librarians who participated in a Master's degree program in library and information studies focusing on leadership development. A concurrent triangulation mixed method design was implemented using two paper-based self-administered surveys. The first survey measured transformational leadership behaviors. The second obtained demographic variables and the participants' perceptions of the skills they learned in five transformational leadership dimensions. The results indicate that the leadership curriculum taught the participants how to be transformational leaders by using technology. The participants also use technology in a way that is different from other teachers in Florida. The results provide evidence that it is possible for degree programs to train pre-service school librarians to excel as technology integration leaders.

Introduction

The Project LEAD program at Florida State University is a research-based curriculum that was specifically designed to provide preparation for National Board Certification and leadership development for school librarians (Everhart & Dresang, 2007). The curriculum consists of 12 credit hours that can be taken as a stand-alone certificate or a component of a masters or specialist degree. The participants of this study were the first cohort to complete the Project LEAD curriculum as a component of a masters degree

program. Project LEAD, which was funded by an IMLS grant, emphasizes the implementation of the most recent guidelines of the American Association of School Librarians [AASL] (2009) as found in *Empowering Learners: Guidelines for School Library Media Programs*. Project Lead is similar to other teacher education programs, in that it is built on the tenets of the guidelines for certification, by the National Board for Professional Teaching Standards (2008). Both sets of guidelines present blueprints for exemplary pedagogy and leadership behaviors in professional practice.

According to the AASL (2009), "The school library program is built by professionals who model leadership and best practices for the school community" (p. 45). The Project LEAD program taught the participants to model best practices and to exhibit leadership by emphasizing the principles of transformational leadership (Bass & Bass, 2008; Burns, 2003). These concepts were embedded into the curriculum via assignments and activities that required the participants to produce evidence of their leadership behaviors by interacting with both the school communities in which they taught and their cohort of peers, and introspectively by practicing reflective writing.

Upon the completion of the program, a mixed-methods study (Smith, 2011) was conducted to determine the factors that impacted the level of self-perceived transformational leadership potential in these pre-service school librarians who had participated in a master's degree program in library and information studies focusing on leadership. After analyzing the data, it became apparent that technology as a leadership tool in school reform was a recurring theme. Although the data presented here is a subset of the initial results, the implications reflect issues regarding professional development in technology for teachers, technology integration in school reform, and the preparation of school librarians to assume leadership roles in school reform by using technology integration.

Literature Review

Professional development in technology and teachers.

The world has rapidly become dependent on technology. The needs of youth have evolved to reflect this change. Today's youth are fluent in the use of technology in their everyday lives. They thrive in an environment where technology is second nature (Cooper, 2005; Dresang, 1999; Levin & Arafeh, 2002). "And they're connected to one another by a common culture. Major aspects of their lives – social interactions, friendships, civic activities – are mediated by digital technologies" (Palfrey & Gasser, 2008). When teachers do not acknowledge the need for technology in the learning environment, these "digital natives" experience a disconnect with their teachers (Levin & Arafeh, 2002).

It is essential for technology to effectively meet students' needs and keep them actively engaged during instruction. Consequently, technology has been interwoven into the fabric of education. Unfortunately, educators still require a substantial amount of professional development to understand how technology can be applied to teaching. For example, in a study about K-12 distance education, it was found that teachers were confident in their knowledge of content and pedagogy but that they were hesitant in their ability to apply technology to teach their subject areas (Archambault & Crippen, 2009). This was particularly unfavorable because these teachers were responsible for teaching students online, yet they had not fully grasped the technology.

In another study, pre-service teachers, who were themselves, digital natives, were found to be ill prepared in their ability to implement technology in the classroom (Lei, 2009). Despite being digital natives, it was reported that a majority of them used computers for social networking purposes rather than for learning-related activities. These pre-service teachers were fluent in their use of computers for basic functions such as word processing, but lacked the knowledge to link Web 2.0 technology to classroom activities.

Consequently, the study revealed that even digital natives need instruction in how to transition into teachers who use advanced and assistive technologies in the classroom. These studies illustrate that teachers do not embrace new technologies when they do not feel proficient in using them.

School districts have implemented strategies for providing professional development in technology for teachers. According to the National Center for Education Statistics (2009), 95 percent of the school districts responding to a national survey reported that they provide professional development for technology integration. Still, only 58 percent believe their teachers are adequately prepared to integrate technology into instruction. Perhaps it has been reported that teachers are not ready to integrate because of the types of professional development teachers are not required to attend. For example, the National Center for Education Statistics (2009, p. 18) also revealed that 84 percent of the reporting school districts did not oblige their teachers to attend professional development to learn how to collaborate with technology. Teachers in 68 percent of the reporting districts were not required to attend professional development in using technology to access or manipulate data to guide instruction, while 63 percent did not require teachers to learn how to assess and evaluate students with technology. In addition, 42 percent of the responding school districts indicated that their technology funding is not adequate (National Center for Education Statistics, 2009, p. 20). The combination of these factors implies that technology integration is a choice, not a requirement in schools.

Educational technology and school reform.

While research notes that effective implementation of technology in classrooms is still in its infancy (Archambault & Crippen, 2009; Levin & Arafeh, 2002; National Center for Education Statistics, 2009), technology has been identified as a catalyst for school reform (Holland, 2001; The White House, 2009). According to Culp, Honey, and Mandincha (2005), the theme of transforming education through technology has been present in policy reports since 1995. During this time, policy makers began concentrating on

technology as a tool for driving school reform as the Internet became integrated into aspects of daily life including civic, education, and business endeavors. During the twenty-first century, policy makers' attention has been directed toward using research to connect technology with educational professional practices.

Matzen and Edmunds (2007) concluded that technology improves the professional practices of teachers by moving them from structuralism to student-centered constructivist activities. Their findings also state, "When teachers see technology modeled using constructivist compatible, student-centered approaches, they are more likely to use it that way" (p. 427). Conversely, the constructivist use of technology may depend on the type of professional development teachers receive. The findings of Matzen and Edmunds (2007) are substantial because the National Center for Education Statistics (2000) noted that the implementation of technology in classrooms has been fostered by technological professional development that typically fails to focus on integrating technology into the curriculum as well as how to use it. Moreover, the more time teachers spend on professional development in technology, the more capable they feel using technology in the classroom. However, follow-up training is offered even less often than initial training. In addition, teachers' feelings of preparedness are directly related to their use of technology during instruction.

Researchers have identified several components of school reform through technology implementation that can be utilized by teachers who are comfortable using technology for instruction (Holland, 2001). These components include the implementation of assignments where teachers become facilitators for student learning, collaboration between teachers, flexible scheduling, and peer support for learning and implementing technology. There is also a need for a supportive infrastructure that includes support for teacher initiative and involvement. Holland (2001, p. 260) asserts, "Though technology in and of itself creates new and stimulating learning environments for teachers and students, without the necessary supporting

infrastructure . . . it will be difficult if not impossible for technology to realize its potential as a catalyst for school reform". Developing an infrastructure is necessary because of the stability it can provide. The need for stability through technology infrastructure is supported by the research of Bain (2004). According to Bain (2004), reform in schools is not about whether reform is intended; it is about changes that actually occur inside of classrooms. Conversely, without changes within classes, there is no reform. Classroom practices must manifest themselves as common cultures in professional practices that are based on research-driven beliefs and values used to create classroom tools. Bain (2004) maintains, "When the latter occurs consistently across classes, teachers and students, the conditions exist for the development of genuine educational technologies that can assist teachers, students, parents and administrators" (p. 168).

One case illustrating how instructional technology can be implemented across classes, teachers, and students was documented in the state of Florida (Everhart, Mardis, Johnston & Smith, 2009). Digital Harmony, a program supported by the Florida State University College of Communication and Information, was designed to connect middle school students with instructional technology in their homes. The program was implemented in a school in dire need of sustainable, culture-altering reform. In the year prior to the implementation of Digital Harmony, the school received a failing grade from the state's Department of Education. Digital Harmony was successful because the city commissioner who developed the program collaborated with school and community stakeholders to jointly work toward a vision of technological literacy and decrease the digital divide inside of the community. While technology integration may not have been the sole factor in the school's dramatic reform, it is difficult to deny that technology was a factor that contributed to the school's improved test scores, grades, and increased enrollment.

Transformational leadership in schools.

The implementation of the Digital Harmony program by the city commissioner can be likened to an act of transformational leadership, a bottom-up approach to leadership. This form of leadership accentuates the ability of any individual within an organization to act as a leader. Hence, individuals who have not been officially appointed as leaders in an organization or a school can be empowered to implement reform. Subsequently, it becomes less of a necessity to define the difference between formal leaders and followers (Uhl-Bien, 2003).

Several characteristics of transformational leaders have been identified (Bass & Bass, 2008; Burns, 2003; Kouzes & Posner, 2007). Transformational leaders are role models who help to create shared visions by encouraging the individuals around them to achieve goals. They take risks to find proactive ways to solve problems. Most importantly, transformational leaders approach leadership by addressing individual strengths and needs. This approach transforms organizations by changing the underlying beliefs and assumptions that form cultures. Therefore, it can be seen as a set of behaviors.

Transformational leadership and its culture altering behaviors are considered to be, an effective form of leadership for schools because administrators are often required to create change in resistant environments (Cohen, 2003). Transformational leadership enables principals to empower school stakeholders such as teachers, community leaders, parents, and students, which serves numerous purposes. First, this empowerment encourages reform commitment because individual interests are synced with the needs of the organization. Secondly, catering to the needs of teachers and other stakeholders produces harmony within the school. Specifically, teachers experience job satisfaction, which has a positive impact on students (Griffith, 2004), who then benefit from the synergy that occurs. Finally, transformational leadership creates long-term reform because of the distributed leadership and commitment. In instances where principals leave

their schools, the reforms they began continue because they are deeply ingrained in the culture of the school.

School librarians and technology leadership.

One group of school stakeholders in an advantageous position to act as leaders in technology integration is school librarians. The guidelines for school librarians suggest that they lead by engaging in activities such as becoming curriculum leaders, collaborating with teachers, and connecting school communities with technology (American Association of School Librarians, 2009). Often, school librarians can assume these roles because they are not assigned to specific classrooms and can interact with entire schools. Consequently, numerous studies have shown that school librarians can be leaders within schools by collaborating and becoming curriculum leaders (School Libraries Work, 2008). Moreover, Brewer and Milam (2006) have reported that school librarians are technologically savvy and often have the responsibility of promoting technology within schools.

Jacobskind, Sandberg, and Spota (2000) and Dutt-Doner, Allen, and Corcoran (2005) have documented how school librarians can be instrumental in assisting teachers to integrate technology. The school librarians in these studies were able to create positive changes within their schools by taking primary roles in assisting students and staff to acquire information skills. These are skills, which the teachers, and students most likely would not have gained, without the help of the school librarian. Still, in spite of the proven value of this role, the guidelines describing it, and the difficulty of achieving it, there is a void of specific research-based strategies defined for performing the role of leader in technology integration.

Statement of Purpose and Research Questions

The purpose of this study was to determine the self-perceived impact of technology training on the transformational leadership practices of pre-service school librarians who participated in a master's degree program in

library and information studies focusing on leadership development. The following research questions guided the investigation.

(1) How did technology training facilitate leadership development in the participants?
(2) How did the participants report using technology for school reform?
(3) How did the participants' use of technology differ from the typical teacher's reported use of technology in the state of Florida?

Methodology

Population.

In total, 30 teacher-leaders from six counties in the state of Florida were chosen to participate in Project LEAD. The Project LEAD directors assessed the leadership potential of the teacher-leaders by awarding them points on a sliding scale for their scores on a questionnaire, a leadership rubric completed by their principals, and their grade point averages. The teacher-leaders were also allotted points if they met certain diversity criteria pertaining to their ethnicity, age, the subjects they taught, and their gender. The teacher-leaders with the highest scores were admitted into the program as a cohort and are the population in this study.

Data collection and analysis.

A concurrent triangulation mixed method design with a purposive sample was used to implement this study. This type of methodology was chosen since the participants were chosen because they were leaders. A statistical analysis may not have revealed the subtle similarities and differences between the participants. A closed-ended survey would not have divulged these differences.

The participants were mailed two paper-based self-administered surveys along with a cover letter. The first survey was the Leadership Practices Inventory (LPI) that measures transformational leadership (Abu-Tineh,

Khasawneh, & A-Omari, 2008; Brown & Posner, 2001). The LPI is a valid and reliable instrument (Brown & Posner, 2001; Fields & Herold, 1997) that has been used in many contexts including education (Koh, 2008; Laflin, 2009). The instrument measures the five transformational leadership dimensions: Modeling the Way, Enabling Others to Act, Encouraging the Heart, Enabling Others to Act, Inspiring a Shared Vision, and Challenging the Process. These areas support the types of leadership goals taught during the Project LEAD program.

The second survey was supplemental and was designed by the researcher. It included closed and open-ended questions. These questions were designed to obtain demographic variables and the participants' perceptions of the skills they learned in each of the five transformational leadership dimensions. Pre-existing data from the Florida Innovates (2008) technology integration survey was also collected.

Nvivo software was used to code the qualitative data collected on the second survey into themes. The differences between the study population's mean scores on the LPI were compared to the national population norms reported by Kouzes and Posner (2007) by using SPSS to complete a t -test. The results were used to answer research question 1.

Findings

The first significant finding of this study was that there were significant differences between the mean scores of the self-perceived leadership practices of the study population and the national population in two areas of transformational leadership. Table I shows that the study population scored significantly higher on the subscales – Modeling the Way, t (47.01)=3.865, p =0.001 (two-tailed) and Enabling Others to Act, t (49.39)=2.610, p =0.014 (two-tailed). The qualitative analysis revealed that the participants learned technology skills that helped them to exemplify each of the five transformational leadership dimensions identified by Kouzes and Posner (2007). The frequency of responses was reported in the following order:

Challenging the Process (66.7 percent), Inspiring a Shared Vision (53.3 percent), Encouraging the Heart (33.3 percent), Enabling Others to Act (26.7 percent), and Modeling the Way (26.7 percent).

Leadership training for school librarians was the purpose of the Project LEAD program. According to their responses, the respondents reported acquiring methods that allowed them to feel comfortable with being placed in leadership roles. They were confident that they could create positive impacts on their schools because of the leadership skills they learned. One participant wrote, "I feel that I learned what a leader is, what they do, and how to use that knowledge when I become a media specialist". The qualitative statements support the quantitative findings and confirm that the Project LEAD curriculum was effective in teaching the students how to be transformational leaders.

The participants' comments also demonstrate that the Project LEAD curriculum taught them to be transformational leaders by using technology. The development of new technology skills was highly recognized among the respondents. During the degree program, they were introduced to a multitude of Web 2.0 applications. Many of the students considered applying these applications to be part of their risk taking behavior because extensively using technology to enhance their teaching skills was something they were not accustomed to doing. A respondent commented, "One of the things I saw missing at my school was integrating technology into instruction. Project LEAD classes taught me how to use technology and encouraged me to share the technology integration with my school staff and administration".

Their technology skills became a tool for engaging students, volunteering for new projects, and improving the resources available to students, faculty, and staff. The respondents specified that their new skills helped them to strengthen interactive lessons for students. For example, one wrote, "I try new technology more readily. I am not afraid to fail if it helps me learn to succeed". Social networking sites such as Facebook and Twitter became

popular amid the Project LEAD cohort. Their new technology skills complemented their information sharing techniques as they began creating blogs, podcasts, listserves, web sites, and wikis. Their new sites have been used as a way to network with their community, friends, and other professionals, indicative of the respondents' advanced usage of their technology skills in a leadership capacity.

Another finding of this study was that the Project LEAD students use technology in a way that is significantly different from other teachers in Florida. This result supports Ertmer's (2005) suggestion that one way to help teachers use technology is to expose them to methods of using the technology that are immediately applicable to instruction. Figure 1 displays the frequency of the uses of technology described by the Project LEAD students. Florida Innovates (2008) provided data regarding the percentage of schools reporting more than 50 percent of teachers using technology for a variety of purposes. Figure 2 displays data from Florida Innovates (2008).

Table 1. Project Lead Students' LPI Subscales Compared with National Norms

	Test value	Population means	*t*	Df	Sig. (two-tailed)
Modeling	47.01	50.30	3.865	29	0.001*
Inspiring	44.34	44.13	−0.129	29	0.899
Challenging	46.11	46.83	0.611	29	0.546
Enabling	49.39	51.76	2.610	29	0.014*
Encouraging	47.05	49.26	1.740	29	0.092

Note: *Significant at $p < 0.05$

Figure 1: The Uses of Technology Reported by the Project LEAD Students

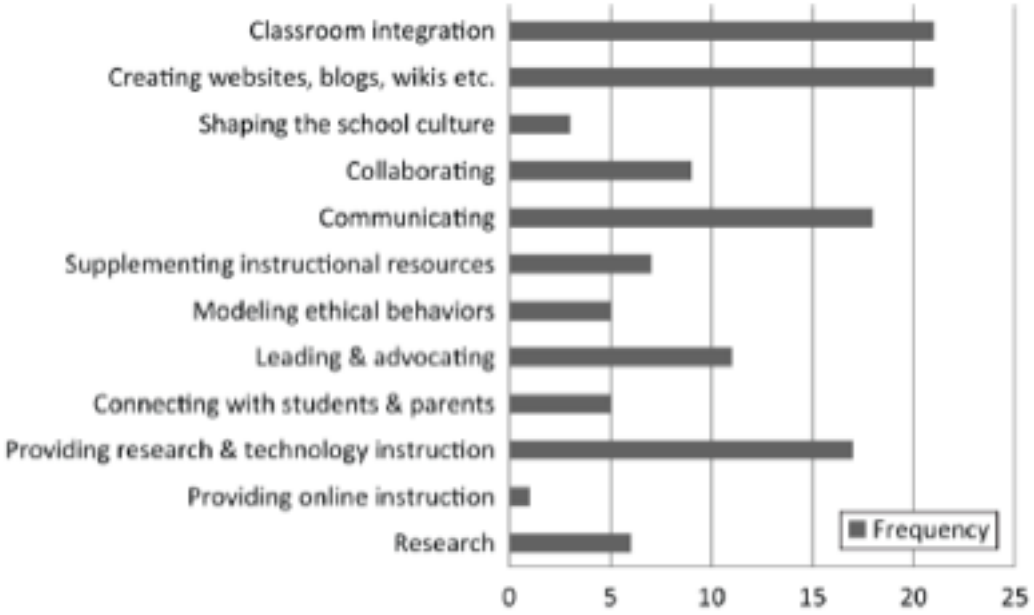
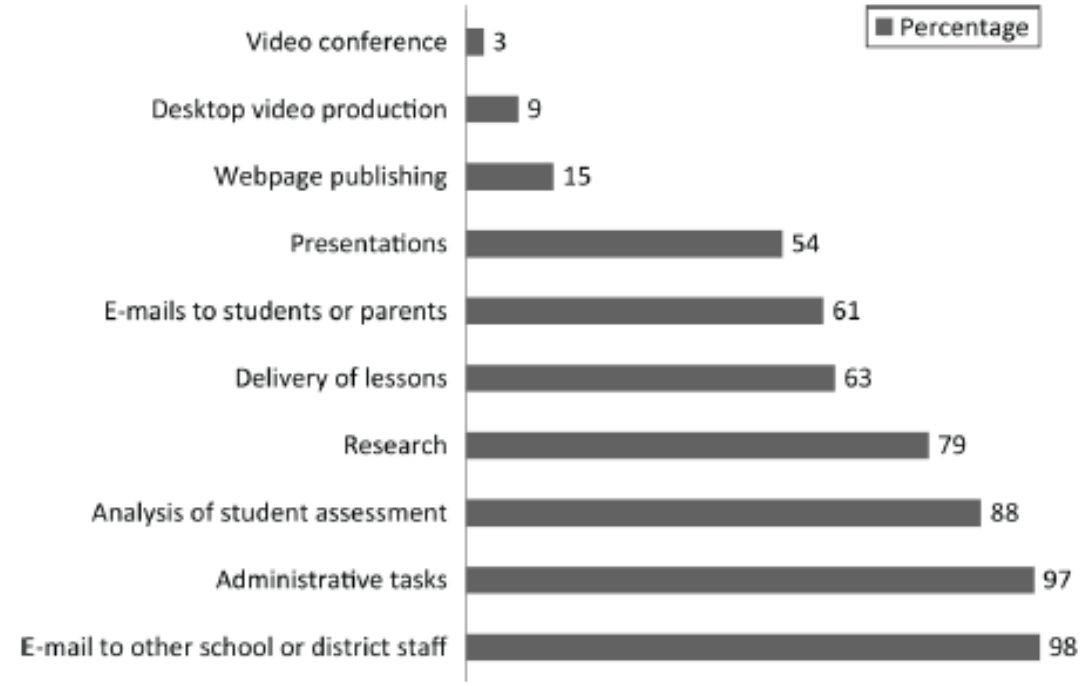


Figure 2: Percentage of Schools Reporting More than 50% of Teachers Using Technology for a Variety of Purposes



Source: Florida Innovates (2008)

The figures show noticeable differences in the common types of activities used by the Project LEAD students and typical Florida teachers. According to the Florida Innovates data, typical teachers in Florida are still using technology tools a majority of the time for basic tasks such as sending e-mails to people within their school districts and completing administrative work. The findings signify that the Project LEAD students do mimic these activities. On the contrary, the training they have received has also helped them to attempt more complex tasks with technology. These activities include collaborating, advocating for technology integration, and providing research and technology training.

The responses of the students also support the assertion that teachers need to be taught specific strategies for integrating technology into the classroom (Ertmer, 2005; Matzen & Edmunds, 2007). If they are not taught they are less likely to grasp how to use the technology they have learned. A respondent wrote, "I have become increasingly confident with technology and feel I can lead other teachers in using multimedia applications". Moreover, since the training the teachers received in this program was acquired over an extended period-of-time, the teachers were afforded technology professional development that went beyond initial training. This was especially helpful for helping them realize how to use the technology they learned.

The responses of the participants also point to three barriers to integrating technology into the classroom. First, it was students indicated that their school administrators and environments were not receptive to trying new strategies. This response echoes the sentiments of a number of participants. "My administration is very careful and not willing to take risks with online and web 2.0 applications. I have suggested them". Second, prior
to Project LEAD, the students did not have the knowledge they needed to implement technology into the classroom. This is one example of a response: "I feel I have gained the education needed to meet the information needs of my students and teachers. I have gained information regarding

resources in the real and virtual worlds". Many of them were not aware of Web 2.0 tools and how they could be used to enhance their professional experiences. Once they were introduced to the tools, they created innovative ways to use them. Finally, they lacked the confidence to integrate technology. "I try new technology more readily. I am not afraid to fail if it helps me learn to succeed". Confidence seemed to be closely aligned with their knowledge of technology tools.

It is evident that the participants were using technology before they began the program. Each participant had to describe their use of technology on the questionnaire they completed before entering the program. Likewise, it is obvious that the Web 2.0 tools the participants learned had an immediate impact on their professional practices. Because some of the teachers did not feel confident in using technology, felt their administrators did not support technology integration, or were not aware of Web 2.0 tools, this study concurs with other research finding that an infrastructure needs to be developed to support technology integration inside of schools (Holland, 2001).

Florida teachers work in a high stakes test environment. It is likely that the administrators who did not want to implement new technology were concerned about creating changes that might have confused students. However, an existing infrastructure probably would have already kept these participants and their administrators up-to-date on Web 2.0 technology integration. In this case, the administrators may have been more receptive to change.

Suggestions, Recommendations, and Implications

The role of higher education in technology integration.

In 1983, the landmark report, A Nation at Risk declared that all students should receive instruction in the four core subjects as well as computer science (United States Department of Education, 1983). In 2001, No Child

Left Behind reiterated the need for students to be technologically literate. Still, a report from the United States Department of Education(2008) remarked that effective educators are an essential component for education reform. Yet, the same report remarked that little is actually known about how to develop exemplary teachers.

Research has indicated that a great deal of teachers receive technology professional development from institutions of higher education (National Center for Education Statistics, 2000). This study provides evidence that educator preparation programs can place a great emphasis on technology integration and create a substantial impact on how technology is integrated into schools. After all, colleges and universities are responsible for preparing teachers to be effective in the classroom. The current state of technology integration in schools makes the case that this type of instruction needs more emphasis during degree programs and continuing education courses.

Creating an infrastructure for technology integration,

Institutions of higher education are not solely responsible for technology professional development. Once educators have learned how to use technology tools, they need a place in which to practice them. Some of the participants encountered obstacles when they tried to integrate their knowledge of technology into their schools. This decreased the effect of the reforms that could have taken place. For this reason, this study shows that the establishment of an infrastructure to support teachers begins with administrators who are receptive to change. An act as simple as lifting filters for selected Web 2.0 tools and web sites can be the beginning of an infrastructure that supports teachers in creating student-centered learning activities.

Professional development and technology integration.

A national survey found that teachers had a tendency to use technology for presentations and for providing students with access to information (Becker,

2001). Nearly a decade later, Florida Innovates (2008) depicted similar results. This study shows that sustained professional development can make a difference in the pedagogy of teachers. Many of the participants cited increased confidence as a result of completing the Project LEAD degree program (Smith, 2011). The assessment used to screen for leadership dispositions was an indicator that all of the participants had the potential to be school library, media leaders before they began the program. However, their lack of confidence was a symptom of their need for professional development in areas such as technology integration.

It is well known that technology professional development is offered by a majority of school districts (National Center for Education Statistics, 2009). Nevertheless, as evidenced by this study, the knowledge gained from these short term experiences often fail to make educators confident in their use of technology for instructional purposes. According to the findings of this study, sustained, project-based experiences with feedback provide the best opportunities for teaching educators how to implement technology.

Technology training does not necessarily have to be face-to-face. Nor does the training have to be for expensive technology. Project LEAD, a distance-learning program, was highly effective in teaching students how to implement free resources found online. Tools such as Blackboard and Moodle are cost-effective ways of providing professional development at a distance.

School librarians as transformational leaders in technology integration.

Technology integration is a familiar role for school librarians. For example, many school librarians have begun to engage in activities such as transitioning to learning commons, engaging in digital curation, and creating flipped library lessons. Such technology leadership activities are important for school librarians to engage in. For example AASL (2007, p.2) explains, "Technology skills are crucial for future employment needs. Today's students need to develop information skills that will enable them to use

technology as an important tool for learning, both now and in the future". The American Association of School Librarians' opinion is mirrored by the National Board for Professional Teaching Standards, the International Society for Technology in Education, the Association for Education Communications and Technology, and the National Council for the Accreditation of Teacher Education.

Schein (2004) asserts that reform occurs in organizations when cultures are changed. Cultures are the products of assumptions, beliefs, and behaviors. Each school has its own specific culture. However, the actions of the participants in this study are examples of how small changes can whittle away at longstanding behaviors within schools. In the case of technology integration, the summation of small changes can equal lasting reform.

Conclusion

The process used to educate the participants of this study was unique because it was founded on a research-based curriculum designed to teach school librarians to be leaders and prepare them for the National Board Certification process. According to their comments, the curriculum successfully taught the participants how to be transformational leaders. One area in which the participants reported learning an abundance of transformational leadership skills was technology integration. The program has been able to connect research, professional practices, and the theories supporting the guidelines for school librarians by teaching these skills. Inasmuch, this study documents the program participants' ability to connect technology, pedagogy, and content.

While this study has shown how professional development in Web 2.0 tools can lead to an increase in transformational leadership, more research studies should be conducted in response to the findings. For instance, the Project LEAD students have shown that a structured curriculum can be used to teach pre-service school librarians to lead through technology. Further research is needed to examine how they will perform in this leadership

capacity after they graduate. In regards to classroom teachers, what methods of professional development are needed to make them comfortable with technology integration? Can extended professional development delivered at a distance, infused with feedback, and practical classroom activities, assist teachers with technology integration? How are teachers and school librarians applying Web 2.0 tools to instruction? How do teachers and school librarians define technology integration? How does technology integration in school libraries impact learners? Lastly, what progress have institutions of higher education made in preparing teachers to integrate technology? Surely exploring these essential inquiries will aid educators in teaching twenty-first century skills to "digital natives".

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There Has Always Been a Tech Team

Sydnye Cohen
Previously Library Media Specialist Brookfield High School
Currently Tech Integrator New Canaan High School

When I first became a high school English teacher, the technology tools I had at my disposal were a mimeograph machine for distribution of materials, a 16 millimeter movie projector for viewing and a portable record player if I wanted my class to have audio capabilities. I was terrible at using the mimeograph. The English Department secretary would take pity on my purple hands and my stuck papers and she would offer her help. I was also terrible at threading the movies through the projector. Fortunately, I had a senior in my class named Steve. I was a 22 year old new teacher and Steve had a crush on me and would have done anything I asked of him, including threading the movie into the projector so that the film did not go flapping around randomly, but was reeled into the take up reel, as it was supposed to be. I was a whiz at the record payer. Steve was my go to AV guy.

When I taught middle school to gifted and talented students in the 1990's, the technology had come a long way from the mimeograph machine. I had the first internet connection in our school in my classroom. I had a clamshell blue mac computer and a computer in my room that took 5 1/4 inch floppies that had the programs on them with side 1 and side 2, like old 45 records. I had a digital camera that had to be plugged into the computer to download the images and I had students interested in helping to navigate those tasks. I had students who learned html to make the first web site our school ever had. I had student who learned Hypercard Studio from the manual and taught me and other students how to use it to wow their teachers with their presentations. I was not as good at Hypercard studio as the students and I only minimally could write anything in html. Those kids were my go to AV guys.

Over the years since I have been a Library Media Specialist, I have had student "teaching assistants" who excelled at a variety of technology tasks. Some were experts at creating web pages and could use CSS Style sheets for the perfect look. Others were gifted in spreadsheets and

could help me track database usage over the year and make great graphs and charts. Still others were design experts who could make posters to advertise our Brown Bag Book Club meetings.

Much more recently, the school in which I worked decided to adopt a 1:1 model. We chose iPads as the technology we distributed to 9th grade students in 2011, and rolled out iPads to another class of 9th graders in the fall of 2012. This year, the third class to receive them will have them by September 1st. There will be 750 students with iPads at Brookfield High School during the current school year. I am much better at using technology than I was as a new teacher and I like to think I can navigate my way around an iPad with the best of them, but I am not a match for 750 students. During the fall of 2012, 18 tech savvy and exceptional communicators were recruited to be the first BHS Tech Team. They had one year of iPad experience under their belts and collectively they knew so much more about using the device and navigating the apps than I ever could.

If You Are Hired, What Will You Bring To The Table?

When we asked students to join the Tech Team, we looked for a few qualities that would ensure success. We needed students with tech skills, but also with the patience to work with teachers who were much less well versed in iPads than the students were. We needed students who could visit classrooms where iPads were being used and help students navigate their devices. We needed students who were willing to learn new apps and share their knowledge via blogs and tweets and iBooks. We wanted the Tech Team to be a “cool” place to be seen at BHS. Our goal was to have at least two students every period stationed in the Library Learning Commons for drop in visitors, or for teachers to call the library learning commons to request help.

Now That You Are Hired, What is Your Job Description?

As the year evolved, we found that each student could bring different and specialized skills to the table much as my individual student teaching assistants had done. We began the year by introducing each of the students to iBooks Author. Each year the teachers at BHS receive and Information Technology Manual. The Learning Commons' rules, the school databases, a few tutorials for using school wide technologies like Google Apps for Education and how to sign up for the computer labs were updated every year in this manual. Last year the Tech Team took on the task of turning this pdf document into an iBook to be distributed to all of the staff. When they completed this task, each of them reached out to a staff member to work on a second iBook project. Some worked on texts for homebound students, some review chapters, and some found pertinent information about specific units or chapters of texts that teachers distributed them to their classes. We wanted a blog presence and a twitter presence. Each week, one student was responsible for blog post about technology. One of the Tech Team members took on the job of proofreading all the blog posts and posting them to the blog. Another was experienced with Wordpress and set up the blog platform. Every day someone was responsible for tweeting a tech tip. They set up the twitter account at @TechTeamBHS and monitored it and publicized it with QR codes posted around the school. When our school was nominated for an Apple Distinguished Program Award, s few of the tech team students who had taken a video production class, stepped up to film and edit our movie submission. We scheduled a parent night for 9th grade parents in the fall and tech team members were the instructors for the parents, teaching them some of the apps we used with our students. We had an iPad fair evening and Tech Team students set up tables to showcase apps they were most comfortable with. I learned some new things from the students with whom I had been working for months. Students on our Tech Team serve as an extra pair of expert hands during a technology-driven class period and they also were able create video and written tutorials on software and hardware.

The Application Process

At the beginning of the second semester on the 2012-2013 school year and at the end of the school year, we advertised for some new tech team members and asked students to fill out a short application via a Google Doc form. We asked students to let us know which apps they were most comfortable with, whether they were independent workers, and whether they paid close attention to details. There were questions that gave scenarios for the students to problem solve. We asked how many hours students spent daily on their iPads. Applications were reviewed and based on the students schedules, and their tech and personality aptitudes, they were selected for the job. Students either received community service credit or opted for .25 credit and gave up their study halls to be members of the tech team.

Looking Forward and Backward

When I first started teaching, I had Steve and the English Department secretary to help me manage my technology. They were my Tech Team. Over the years, I have had one or two capable students as tech helpers. Last year we had 18 amazing 9th and 10th graders who were willing to learn new skills and tools to make teaching and learning with technology on the cutting edge at Brookfield High School. The Library Learning Commons became their incubator as they worked together with each other and with us to help students and teachers succeed with the technological tools we are using today. There have always been AV clubs and students who gravitate toward technology. Our goal at BHS was to find them, to give them carte blanche to explore both the devices and the apps that can make it magical.

Students are great resources. They are capable and creative and good teachers and communicators. It is impossible for a faculty member to know everything, their content, the best methods of delivery, and every

nuance of the technology they have been instructed to use with their students. The students make it doable. The BHS Tech Team were invaluable in the teaching and learning process. There are more students out there that can not make their schedules work with the Tech Team. Teachers can also harness their skills, their expertise, and their curiosity. Even without a formal program like ours, students are partners in teaching and learning with technology. Because our Tech Team was not an after school club, because they were available every period of the day to work with students and teachers, they succeeded.

I could not master the mimeograph machine in my early days of teaching. I needed some help from others to do that. I can sort of use html when I need to, but I have students who are so much better at it than I am, I rely on their expertise. There are thousands of cool apps for iPads, and Chromebooks and Android phones. Teachers can not be expected to know them all. Learn from students, give them a voice and let them help lead the way.

See the video about research in the Library Learning Commons at: http://www.youtube.com/watch?v=gDqTuxf5hew&feature=youtu.be

Sydnye Cohen • email: sydnye.cohen@ncps-k12.org

Personalized Learning is Coming to the Learning Commons

Jennifer Robins
University of Central Missouri

The Diamond Age: Or Young Lady's Illustrated Primer, a science fiction novel by Neal Stephenson, has a personalized learning system as a key component of the plot. What was science fiction in 1998 when *Diamond Age* was published is reality in 2013. In the novel a wealthy industrialist asks an engineer to design a personalized learning system for his daughter. It is to be embedded in book form and is to be 'subversive' enough to teach her to become an independent thinker. The engineer, impressed with his product, steals a copy for his own daughter, then loses it to a young thief, who in turn, gives it to his little sister.

In science fiction technology is only limited by imagination. Occasionally, as is the case with personalized learning systems, the technology catches up. EReader software can perform many of the functions of the *Primer* in Stephenson's novel, and more functionality is coming soon. Textbook companies are following directives from the federal government and are producing eTextbooks for future adoption cycles. The adoption of eTexbooks puts eReaders into the hands of every student. That, coupled with national directive to bring high Internet bandwidth to every student in the United States, creates a technological infrastructure capable of supporting personalized learning.

Educators are considering the impact personalized learning might have on education (Office of Educational Technology, 2010; Wolf, 2010). The model Stephenson envisions is that of a technology operating free from the confines of schools and teachers, but even the author sees the limitations of this and brings in a teacher as a main character in his novel. The learning commons is

ideal as the site of personalized learning because technology is accessible and the space can accommodate multiple students. Also the teacher librarian is likely to understand the technology, the learning activities, and the resources used in instruction. This paper presents characteristics of personalized learning, including its benefits, current implementation models, and models on the horizon. This discussion includes how, with personalized learning, curriculum standards are viewed as both affordances and the objectives for instruction. The paper concludes by exploring the role of the teacher or teacher librarian in a personalized learning system.

Characteristics of Personalized Learning

A key impediment to learning is the traditional practice of covering a curriculum on a predetermined schedule. Regardless of whether students have attained the skills and knowledge required, the teacher moves on to a new topic. Some students are bored with the pacing of a lesson, others fall further behind. Time and place are the constants in the classroom while achievement is the variable (Wolf, 2010). The alternative is to organize curriculum content into "natural progressions of information and skill as opposed to artificial levels based on age (grade levels)" (Marzano, 2010, p. 120). Personalized learning accomplishes this.

Personalization refers to instruction that is paced to learning needs, tailored to learning preferences, and to the specific interests of students. In an environment that is fully personalized, the learning objectives and content, as well as the method and pace, may all vary (Office of Educational Technology , 2010, p. 12). Teaching personalized learning has been compared to teaching in a one room schoolhouse, because students have a wide range of background knowledge and experience. However, unlike the one room schoolhouse, which had a fixed and relatively small canon of knowledge to attain, students actively engage transmedia literacy to sort through and select from the knowledge available to them as they progress through learning

objectives. With personalized learning, students take on more of the work of teaching and learning.

Curriculum Standards and Personalized Learning

The burden of teaching in a personalized learning environment can appear overwhelming. Tracking the progress of each student, designing activities at each student's skill and knowledge level, and finding suitable instructional resources all add to the work needed for personalized instruction. However tools are available to make progress tracking manageable for teachers and teacher librarians and to provide a way for students to be engaged in the assessment process. Curriculum standards provide the learning objectives for students and can be used as tools to map student progress. They can facilitate access to information and resources as well.

Curriculum standards reflect the cannon of knowledge that society has a deemed important enough to pass on to the next generation through public education. In 2013 forty-five states had adopted the Common Core State Standards (CCSS) (Common Core State Standards Initiative, 2012), creating a technological advantage in that personalized learning systems which are standards-based can be developed around a single set of standards, rather than 45 different sets of standards.

Curriculum standards serve as boundary objects in personalized learning. A boundary object is a focal point for discussions between different members of the (school) community (Star & Griesemer, 1989), such as students, teachers, teacher librarians, administrators, and parents. Communication about assessment and accountability can be done in terms of standards, using standards-based grading. Standards based grading replaces report cards with traditional 'A' through 'F' grades. Standards-based grading also enables a personalized learning system to identify possible future sequences for instruction.

Figure 1 shows a K12 standards-based grading tracking tool for a school district. It depicts all the top level standards, grades 1 – 12, for the state of Missouri in use in 2008, before CCSS was adopted.

Figure 1

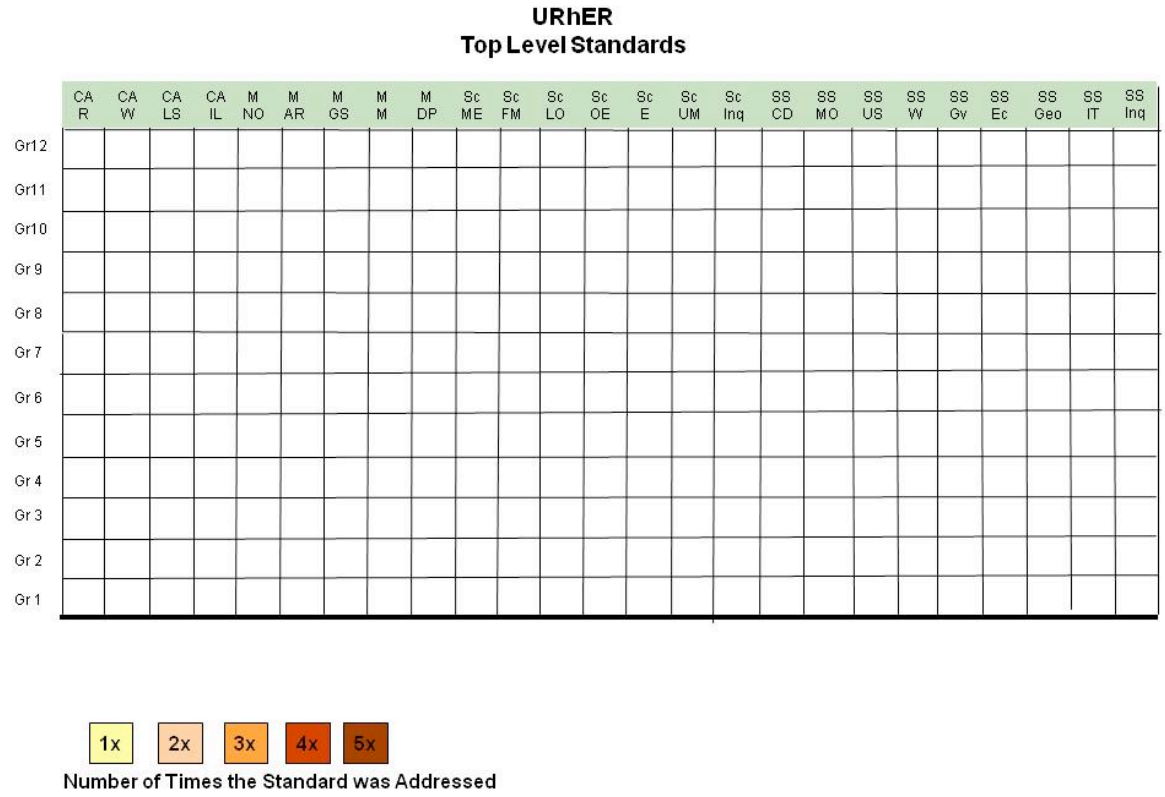


Figure 2 illustrates how the tool maps the progress of a single student. Note that with a 'mouseover,' hovering the mouse over the label representing the standard, the name of the standard appears.

Figure 2

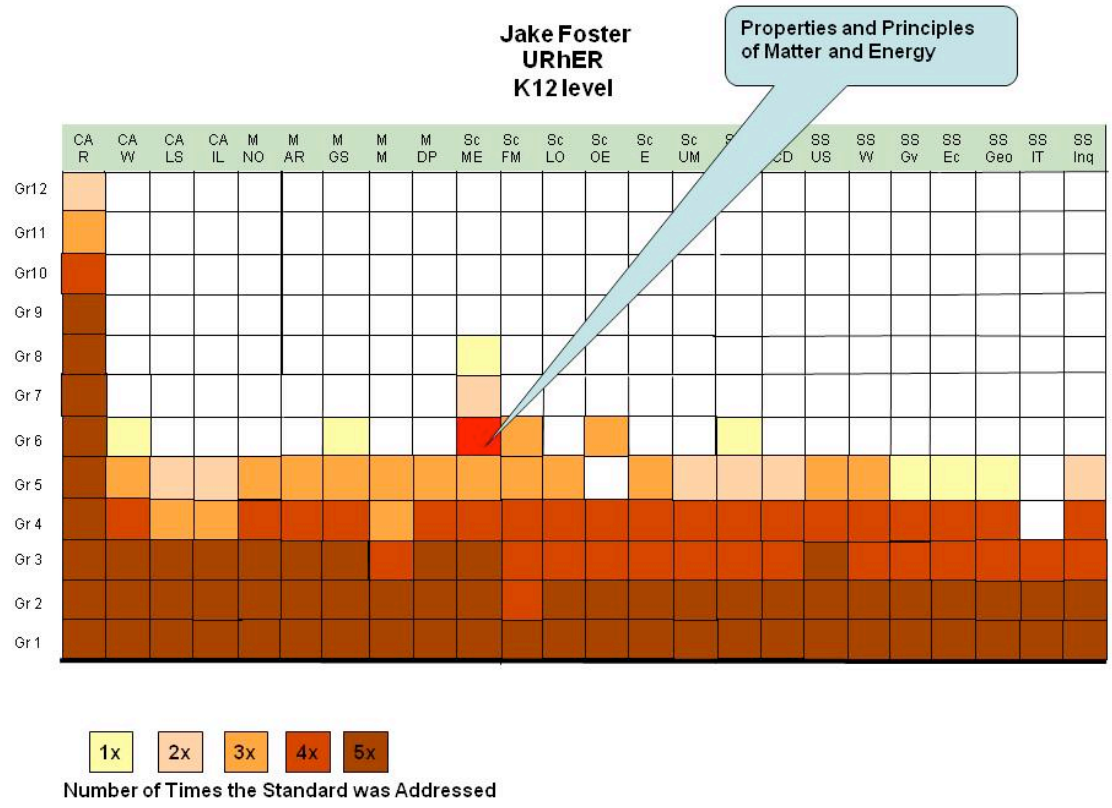


Figure 3 shows the single student's progress through middle school. Note that grades can be considered equivalent to a 'level' in a personalized system. So a similar tool could be used in a personalized learning system or for a system where students are grouped by grades by age.

Figure 3

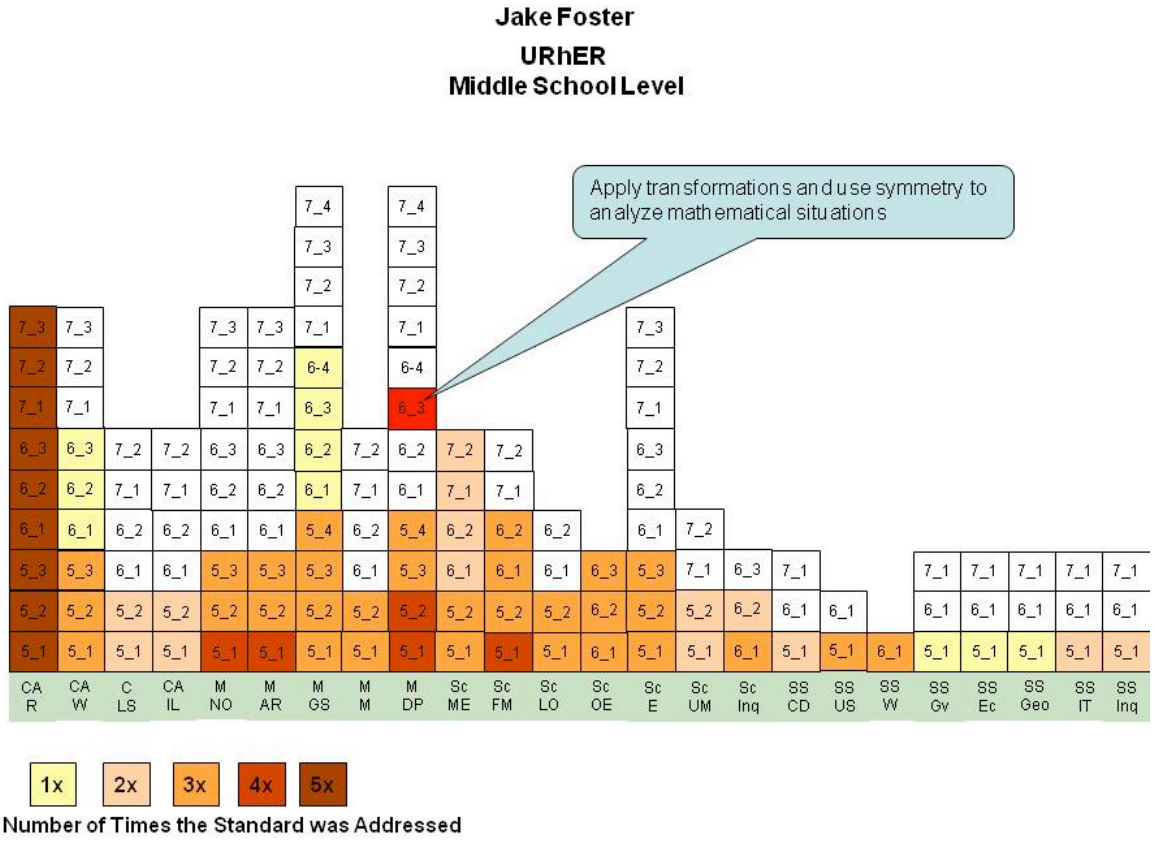
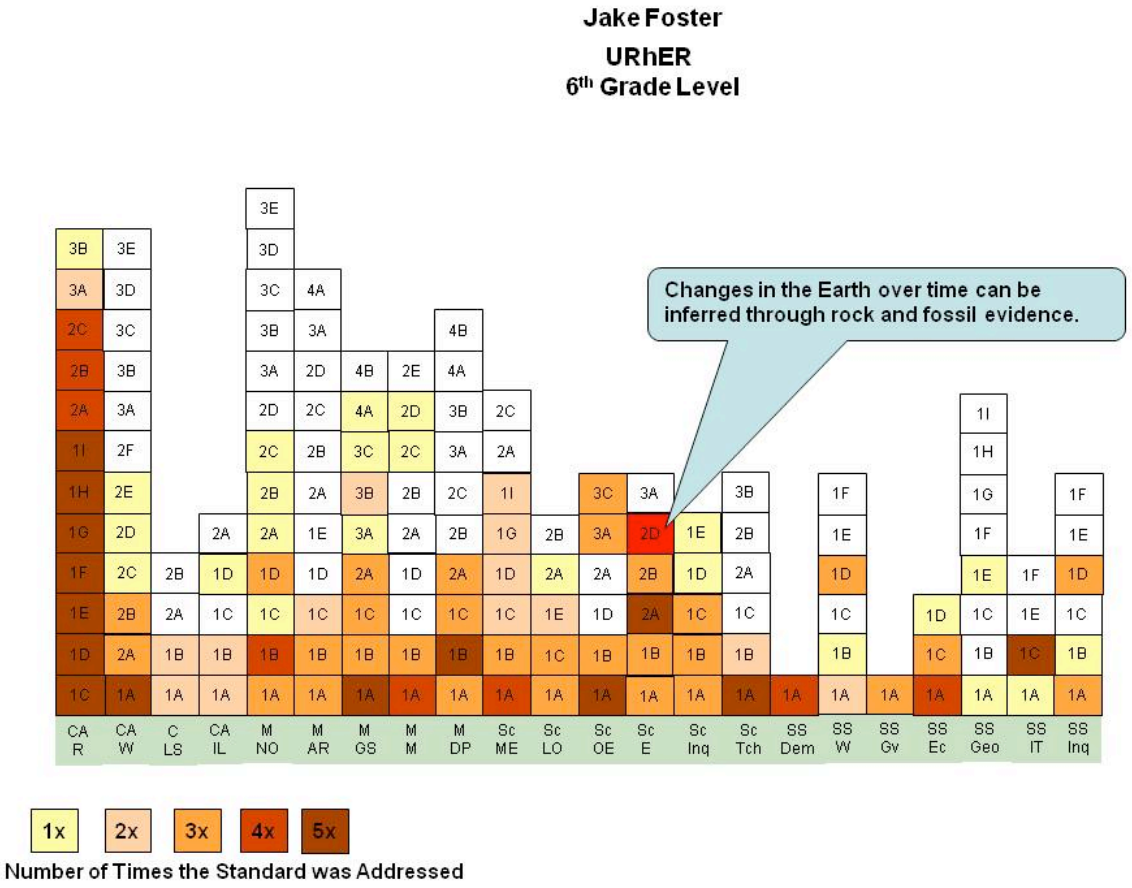


Figure 4 drills down to show the student's progress for a single school year.

Figure 4



Curriculum standards provide agreed-upon lesson objectives which can be expressed in a language students understand. Standards present the enduring understanding and essential questions and that drive learning (Wiggins & McTighe, 2005). They enable personalized learning because they specify a map of instruction for a student, but do not have to predetermine the instructional path or sequence. Rather they can track overall progress and be used to highlight deficit areas where educator intervention or additional instruction are needed.

Standards play one additional role in personalized learning. Library and Web resources can be identified in terms of the standards they address. Using metadata, a computerized system like one used for personalized learning can be programmed to make recommendations for resources the students can

use based on the standard being addressed. These recommendations can be made to students directly, to teachers, teacher librarians, and to parents.

Models of Personalized Learning

> Prior to the Internet, building a complete pedagogical model of the learner was not practical. Today we have sufficient knowledge and technology to make very steady progress in linking individual students to ever more meaningful and engaging learning experiences. –Madian, p.4

School districts are exploring the personalized learning model. Near the end of the 20th century, the Chugach School District in Alaska employed personalized learning to address poor student achievement. The district faced unique challenges as students were scattered across 22,000 square miles. The move to a personalized instructional model raised students' scores dramatically. The school district was awarded the first Malcolm Baldrige National Quality Award for Education in 2001 (Chugach School District, 2001; National Institute of Standards and Technology, 2013). Winning a Baldrige award requires a strong focus on active learning, where students are encouraged to take more responsibility for their education.

The experiment in personalized learning that began in Alaska continues. There are school districts across the US working, with varying levels of intensity, on transforming instruction. The effort is being supported by the US Department of Education as specified by the 2010 National Education Technology Plan (Office of Educational Technology, 2010) as well as by groups like the Association for Supervision and Curriculum Development (now known as ASCD), and the Counsel of Chief State School Officers (Wolf, 2010). Many more school districts have adopted standards-based grading, a first step toward personalized learning.

School districts such as Adams County 50 in Denver, CO are committed to a personalized learning model (Adams 50, 2009). In Adams 50 standards define what students need to learn to move from one level to the next. Learning is

personalized in that students are able to select their learning targets and move through the standards at their own pace. Standards are written in a language that students understand. They are grouped into manageable sets of activities by teachers. Each set is referred to as a 'capacity matrix,' which students use to assess and record progress and to demonstrate what they know. Students determine when they are ready to be tested on the objectives of a standard.

The Adams 50 model was created in response to a student's question, "Why can't learning be more like a video game?" A similar idea is expressed by Jane McGonigal in her book *Reality is Broken: Why Games Make Us Better and How They Can Change the World.* McGonigal notes that "97% of all youth play computer and video games" (McGonigal, 2011, p. 11). Even Stephenson's *Primer* follows the pattern of a fantasy game. However the challenges to building a personalized learning system based on a gaming model are significant. What distinguishes learning from play is that play involves voluntarily overcoming unnecessary obstacles (McGonigal, 2011, p.22), while standards-based learning is deemed necessary. Also students engage in fantasy games for rewards that propel them forward in the game and often bestow additional status as the player progresses through game levels. What rewards would propel a student through an instructional curriculum? Status in the real world is much more complicated that status within a fantasy game and tends to be culturally defined.

Cost is another major barrier to the adoption of a gaming model for personalized learning. The video game industry is large and profitable. As of 2010, the game World of Warcraft alone had 11.5 million subscribers (McGonigal, 2011, p, 52). The profitability of games makes high-quality production possible. Educational games have a difficult time matching the quality of the games created for entertainment. However Common Core State Standards create a significant audience for personalized learning systems based on a gaming model and so create a potential for a market large enough to support high quality game-like applications for personalized learning.

Adaptive personalized learning systems that resemble games require technology like the system created by Knewton (2013a) which combines a recommender engine with curriculum. Knewton is partnering with Pearson, Houghton Mifflin Harcourt, and other textbook vendors to, "bring personalized learning to the world" (Knewton, 2013b). Other organizations, like the Khan Academy, are also working on gaming platforms to deliver curriculum. A consideration that might be overlooked in the design is both the role of the teacher librarians and the extent of implementation within the learning commons. These are explored in the next section.

The Human in the Loop

History offers several examples of educational systems meant to replace teachers, starting with the invention of the textbook 400 years ago. In the 20th century, television was to take the place of teachers, and large swaths of television bandwidth in the US were set aside for educational programming. The personal computer in the 1980s was to revolutionize education, followed by the Internet in 1994. All of these technologies impacted education, but changes since the 1600s are incremental rather than transformative. Personalized learning systems that do not take advantage of the expertise of teachers and teacher librarians are likely to produce additional incremental changes.

The first limitation of an adaptive, game-like system, is that the content that can be addressed is limited to what is measurable and quantifiable, while the chief characteristic the industrialist wanted for his *Primer* in Neal Stephenson's novel was that it produced an education that is subversive. A subversive form of education will teach students to challenge ideas, to criticize assumptions, and to pick apart and question everything. These are not skills that computers emulate well. The CCSS emphasizes critical thinking skills. The computer is not likely to provide productive feedback on these.

Assuming personalized learning systems are used in a learning commons where a teacher librarian is present, they are still likely to be used in a limited way to do the type of instruction computers do best, skill development in

basic reading, math, and the physical sciences. Computer-aided instruction like this can be offered in schools during time spent in learning centers or other blocks of time set aside for this type of work. It can occur in the classroom, but the learning commons provides a more conducive atmosphere for independent work. If the developers of these adaptive systems explored how to incorporate the work of teacher librarians into their products, much like the role of the teacher in Neal Stephenson's story, the impact of personalized learning systems might be much greater.

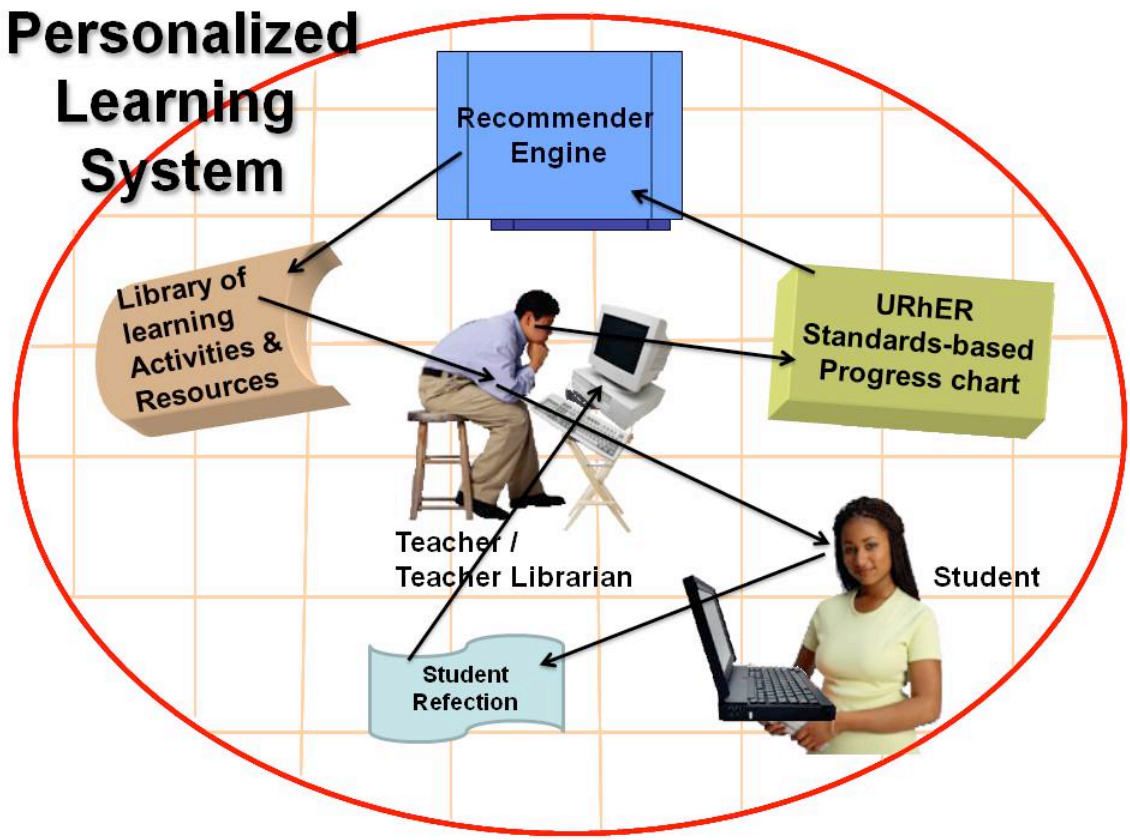
If it were possible to include contributions of teachers and teacher librarians, educational transformation might begin with personalized learning. Educators do more than monitor students' progress, they encourage and coach them. Turning the monitoring of student progress over to a computer might be a welcome change. Grading with a single mouse click, as is done with a system like the one illustrated in figures 1 – 4, is appealing. But teachers and teacher librarians are much more likely than a computer to understand where and why a student struggles for understanding, and are far better than a computer or any testing system at assessing what students have learned.

Searching for learning activities and suitable resource for each student can be daunting, but a personalized learning system that can offer helpful suggestions would simplify the task, possibly allowing the educator to direct student activities with a drag of a mouse. The potential of a personalized learning system to augment a teacher librarian's performance is perhaps greater than the prospect of having a computer deliver a predefined curriculum, no matter how adaptive it is to a student's knowledge and skill level.

Figure 5 presents a possible example of what a personalized learning system could be like that includes a human, say a teacher librarian, in the instructional loop. The teacher librarian can monitor the activity of students in real time using technology. The standards-based progress tracking module tells the computer system which activities and resources a student is ready for by associating the student progress with a standards-based curriculum map.

Recommendations are presented to the teacher librarian for approval or revision. Teacher librarians review and accept or select activities and resources for each student by dragging a mouse. Students perform the assigned readings and activities with the guidance and encouragement of the teacher librarian. When finished, students reflect on the learning experience, writing a brief, online description of the activities and resources they found most beneficial. From the point of view of the personalized learning system, the brief reflection serves a role similar to the 'like' button in a social networking system. The teacher librarian reviews the student's written reflection, assigning a value associated with the activity with the click of the mouse, again accepting or overriding the system. The recommender engine analyzes student preferences with each set of learning activities, building a learner profile that informs the next recommendation for activities and resources, completing the loop.

Figure 5



As a byproduct, the written reflection created by the student provides writing practice, Though this reflection need not be wordy, it requires the student to do some high level thinking; evaluating activities, selecting one and describing it, and explaining the reason for the choice. Once reviewed by the teacher librarian, this reflection can become an entry in the students' portfolio, providing evidence that the standards have been addressed satisfactorily. If viewed by a parent, the reflection also answers the proverbial question, "What did you do in school today?"

Conclusion

Personalized learning is possible today due to the convergence of three factors; the Common Core State Standards, the adoption of eTextbooks and thus eReaders by schools, and the availability of high speed access to the Internet. It can move beyond the computer-aided instruction paradigm to the creation of a personalized learning system designed to augment the capacity of teacher librarians to do the work they do best; mentor, coach, and encourage students. Technological means exist to create systems that track student progress, map progress to curriculum standards, identify possible learning activities, and provide access to an abundant supply of resources. The teacher librarian can review system recommendations, choosing those that best meet the needs of each student and evaluating the success of those recommendations.

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A Unique Opportunity for Collaboration and Increased Visibility
Information Needs in "Common"

Linda Jacobs Swarlis, Ph.D.
Columbus School for Girls
Columbus, OH

The Common Core State Standards Initiative (CCSSI) and the new push at the state and national level for revised educational standards offer unique opportunities for school library advocacy through collaborations that include more broadly based and less commonly utilized partnerships, and afford great potential for school librarians as an integral part of the educational process. With the heightened national public and professional awareness of the CCSSI assessments by the Partnership for Assessment of Readiness for College and Career (PARCC) and the Smarter Balanced Assessment Consortium (SBAC), and with those assessments slated to begin in 2014, a significant information gap exists about the CCSSI and its potential impact on K-12 students at school, at home, and beyond. A *Knowledge Quest* article mentions CCSSI as a future subject for collaboration for one public library and one school district, but does not explore the topic fully (Dorrill & Fine, 2013, p. 51), nor does it mention the potential for collaboration with academic librarians.

School librarians can leverage this opportunity for greater visibility as educational partners and demonstrate their expertise by applying Rule VIII from Sandy Schuckett's Political Advocacy "Always" List:

> VIII – Always offer assistance and build coalitions
> Educate others in the community
> Let all know how a strong library helps them (Schuckett, 2007, p. 113).

and the letter V (Visible) from "A School Library Advocacy Alphabet" (Gruenthal, 2012, p. 17). This proposal is a restructuring of those suggestions and an extension of Zmuda and Harada's recommendation about collaborating beyond the school, although their suggestion included purchasing consortiums and resource sharing, rather than professional development partnerships (2008, p. 106).

The intersection of information need and school librarian expertise gives school librarians the opportunity to introduce 21st-century skills, the concept of the learning commons, and the CCSSI connection to libraries and information skills. The need for more information about CCSSI is great. Most of the school library articles address the "Common Core" in terms of impact on school systems and instruction within a district or school, such as a recent *YALSA* article on the CCSSI and New York City school libraries (Naylor-Gutierrez, 2013). Public librarians seek information about the new literacy standards and the possible implications for collection development, homework centers, and programming so that their programs match the needs of the learners who visit their libraries. Academic librarians ponder the potential changes to the college curriculum as students arrive with stronger skills in research, writing, and reading as a result of the Common Core. Parents are asking about the impact of CCSSI on curriculum and assessment and need to know what resources exist to help their children. This information gap is one that school librarians and school library organizations can fill with relative ease.

This paper describes a unique regional collaboration involving public librarians, academic librarians, library science students, and school librarians, as well as local, state, and regional organizations. The collaboration provided a rare venue for dialogue about education and 21st-century skills among groups and individuals who ordinarily have little or no opportunity for conversation or common professional development. In the post-event survey evaluations, participants reported high levels of satisfaction with the collaboration and indicated a strong interest in further collaborations. As the

2014 deadline for the beginning of the actual testing looms near, interest in the CCSSI and state standards affords a rare opportunity for school librarians, information specialists, and state school library associations and agencies to take the lead in helping to reach and teach interested constituencies, as well as constituencies currently unaware of the implications for their area. While the current testing culture is not ideal and other forms of assessment are more arguably more valuable, our professional duty necessitates meeting the real and immediate information needs of our students while also educating those who may be part of our students' present and future (parents, public librarians, and academic librarians).

In August 2012 and August 2013, CO-ASIS&T, the Central Ohio chapter of ASIS&T (the Association for Information Science and Technology) sponsored information sessions about CCSSI and state learning standards in Columbus, Ohio. These sessions were led by an INFOhio Instructional Integration Specialist. INFOhio (Information Network for Ohio Schools) provides equitable access to digital library resources for PreK-12 students, professional development for school librarians and educators as well as support for school library automation. Attending the events were participants from all three types of libraries as well as library science students. The INFOhio representative gave overviews of the CCSSI and state standards, the new requirements, and timelines for implementation.

The sessions were resoundingly successful. Survey results indicated that public and academic librarians viewed school library professionals as valuable resources for further information.

During the August 2012 program there were 42 attendees with a post-event survey response rate of 67% (29 people). The mean response to the question "Do you feel that you learned something useful?" was 4.45 out of a possible 5.0 (see *Figure 1*)[1]. The August 2013 session had 22 attendees with the same

[1] From CO-ASIS&T. (2012, September 17). *CO-ASIS&T Program Evaluation 9.2012 Common Core*. Unpublished manuscript.

spectrum of participants; the answer to the same question was 4.54 out of 5, indicating very high interest and usefulness. The 2013 event date conflicted with the first week of school and impacted the attendance of school librarians and teachers, but did not impact public and academic librarian attendance (CO-ASIS&T, 2013, p. 1).

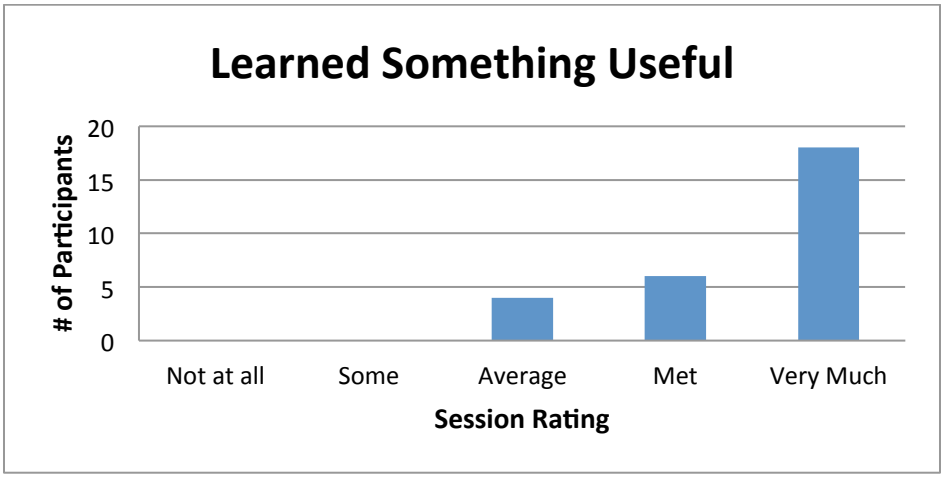

*Figure 1.*August 2012 Survey Response to Do You Feel You Learned Something Useful?

In August 2012, fourteen, or half of the 29 respondents, added comments requesting additional learning opportunities, including information on the third grade reading guarantee and its meaning for public librarians, the implication of CCSSI on collection development, and how public librarians can help children and parents with CCSSI-related items and 21st-century skills. The August 2013 session was designed as a response to the 2012 survey comments. CO-ASIS&T offered two back-to-back presentations: an introduction to the CCSSI and state standards and a closer look at the resources available to help the librarians and educators. In both presentations, the INFOhio representative distributed information about online resources available through INFOhio and agreed to share and archive the presentation slides on the chapter website. The slides added to the chapter website

increased visibility and served (and continues to serve) as references and guideposts to additional resources. Those resources are available at:

http://www.asis.org/Chapters/coasis/2013/08/06/back-to-back-programs-rigorous-learning-and-future-ready/
http://www.asis.org/Chapters/coasis/2012/08/22/rigorous-learning-the-common-core-standards-and-21st-century-skills/

Other regional collaborations have been organized and replicated in response to the success of our original collaborative effort, and local public librarians have requested professional development on CCSSI. Often, school librarians define collaboration largely as efforts within a school or a school district across subject areas or grade levels. School library collaborations occur regionally and sometimes at the state level, but most frequently include other school libraries and some public libraries.

In Ohio resource-sharing collaboration, Libraries Connect Ohio (LCO), enables different types of library organizations, academic (OhioLINK), public (OPLIN), school (INFOhio) libraries and the State Library of Ohio to create a core collection of web-based information resources that can be used by the patrons of all three types of libraries. Some power exists in being strategically visible in multiple professional arenas and providing information on a topic, such as CCSSI, with the potential to disrupt current programming and plans in the public libraries and the curriculum in the academic libraries.

Libraries and schools seek external collaborations with businesses for real audience, authentic assessment, or external funding and frequently have not realized the range of possibilities available through collaboration with other kinds of academic, library and professional organizations. The ALA/AASL Standards for Initial Preparation of School Librarians briefly address external collaborations in Standard 4.4 Advocacy, but broader joint collaborations are not directly addressed, “Candidates identify stakeholders within and outside the school community who impact the school library program. Candidates

develop a plan to advocate for the school library and information programs, resources, and services (American Library Association & American Association of School Librarians, 2010, p. 15). The target assessment states "… engage in social and intellectual networks that address best practice in school libraries" (American Library Association & American Association of School Librarians, 2010, p. 15). In Standard 1.3 the context is the individual school or library professional organization "offering professional development to other educators as it relates to library and information use" (American Library Association & American Association of School Librarians, 2010, p. 2) but the description could be expanded to include stakeholders who do not fit the definition of "educators," but are involved in the educational lives of our students.

CCSSI offers a rare opportunity to strategically collaborate across many domains and benefit students in ways not commonly explored. School librarians can use interest in CCSSI to raise awareness of the concept of the Learning Commons and demonstrate the importance of the role of the librarians in 21st-century education. Perhaps it is time to make a slight revision to the diagram of the Learning Commons Winners Circle (see *Figure 2*) which would include outside support for learners in the form of public and academic libraries as well as regional, state and national consortiums (Loerscher, Koechlin, Zwaan, & Rosenfeld, 2011, p. 218). Learning Commons support need not stop at the physical walls of the library or the school building. We have the opportunity to build strong bridges to outside resources and stronger communities of support while simultaneously advocating for vibrant and active learning commons within our home schools and districts. CCSSI is one of many possible topics for large scale collaborations, but it is both a timely topic and one which offers an opportunity to serve as a bridge to others. Other potential topics include collaborating around the maker space concept, sharing expertise, resource recommendations and working toward common goals or developing 21st century skills through joint programming. Additionally, school librarians need to be visible within the professional associations of other subject areas and foster collaborative efforts especially

for pre-service training and during times of significant curriculum change. One type of collaboration could be informal agreements with school library organizations at the state level. One state organization would work with one subject area and another with a second until school libraries are represented in some way in many of the professional organizations. Just as school libraries ceased functioning as stand-alone silos at the individual school level and became part of a larger collaborative network of shared resources at the district, regional, and state levels, it is time to rethink the current configuration, and formulate and execute a different kind of collaboration. School librarians cannot be active and visible in every organization or venture; however, strategic collaborative efforts would result in greater visibility for school librarians and increase public understanding of the role of the library commons in creating a powerful educational experience where all learners win.

Learning Commons Winners Circle[2]

[2] From Loerscher, D. V., Koechlin, C., Zwaan, S., & Rosenfeld, E. (2011). The new learning commons where learners win! Reinventing school libraries and computer labs (2nd ed.). Salt Lake City, UT: Learning Commons Press. p. 218. Copyright 2011 by Learning Commons Press. Reprinted with the permission of the authors.

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Meet Sally Reis

Sally M. Reis, Ph.D.
Vice Provost for Academic Affairs
Letitia Neag Morgan Chair in Educational Psychology
Board of Trustees Distinguished Professor
University Teaching Fellow
University of Connecticut
352 Mansfield Road Unit 1086
Storrs, CT 06269-1086
sally.reis@uconn.edu

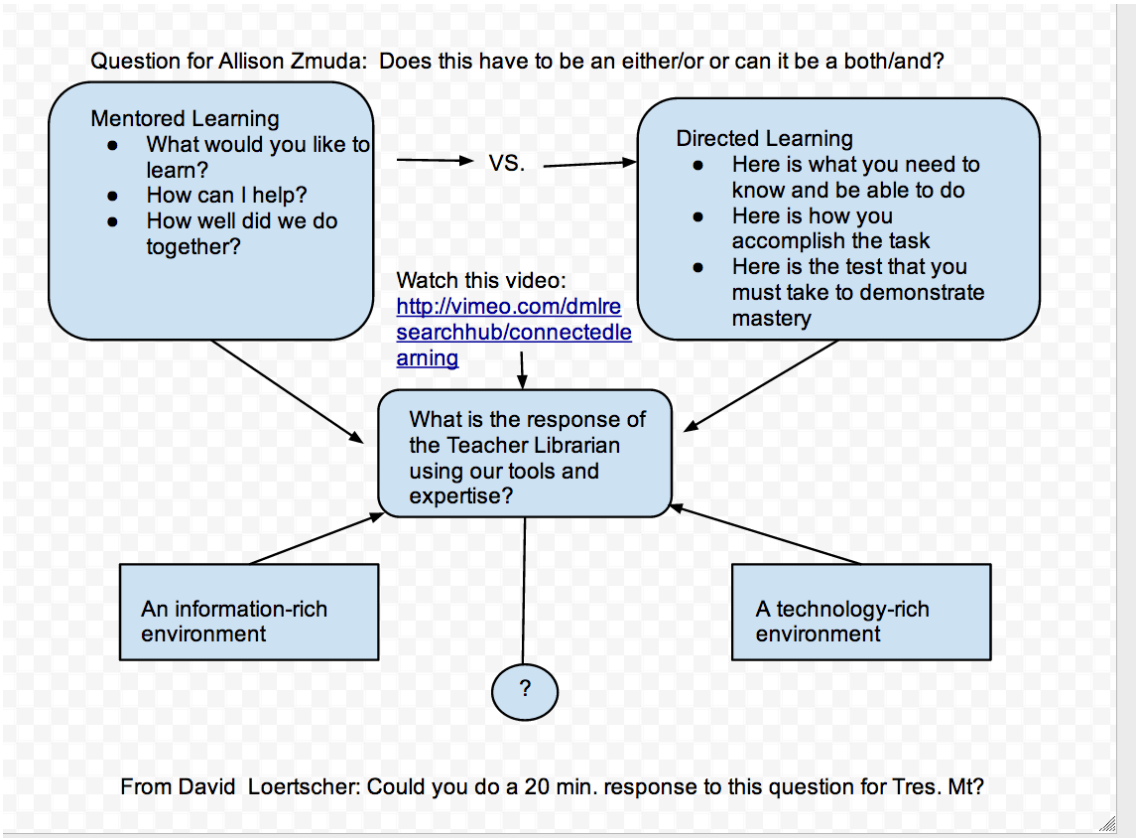
Sally M. Reis is the Vice Provost of Academic Affairs and a Board of Trustees Distinguished Professor at The University of Connecticut. She holds the Letitia Neag Morgan Endowed Chair in Educational Psychology. She was a public school teacher for 15 years, 11 of which were spent working with academically talented students on the elementary, junior high, and high school levels. She is a well-known scholar and has authored or co-authored over 250 articles, books, book chapters, monographs and technical reports. Her research interests related to academic talent development, differentiation of instruction, enrichment programs, and diverse groups of talented students. She is also interested in extensions of the Schoolwide Enrichment Model for academically talented students and as a way to expand offerings and provide general enrichment to identify talents and potentials in all students. Sally is a past President of the National Association for Gifted Children, has earned multiple awards for distinguished scholarship, and is a fellow of the American Psychological Association.

Sample article: "Counseling Needs of Academically Talented Students with Learning Disabilities," by: Sally M. Reis and Robert Colbert (2004) At: **http://tinyurl.com/khk75fg**

Partial bibliography of interesting articles by Sally Reis: **http://tinyurl.com/k5du36n**

Mentored Learning vs. Directed Learning

A Question for Allison Zmuda[1]



[1] Allison Zmuda is a well known educational consultant living in Virginia Beach, VA

Index