
The Culture of Inquiry in School Libraries

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A culture of inquiry is emerging from research-based information literacy instruction that takes place in school libraries. An ethnographic approach views the culture of inquiry through two lenses: (1) cultural anthropology and an emerging theory of evidence-based information literacy instruction, and (2) Tylor's anthropological definition of culture which serves as a framework to examine the knowledge, beliefs, art, morals, law, and customs of instruction. An emerging theory of information literacy instruction unique to school libraries identifies constructivist learning theory as the knowledge source and evidence-based practice as the underlying belief. The art of teaching in this culture is described in ten corollaries to the theory. Morals and law emerge from 21st century initiatives that re-define the purpose of an education that is relevant to a dynamic information environment. Ethnographic research traditions mold customs that characterize a self-reflective school library community of practice motivated by self-improvement as well as the improvement of society. Such a culture drives decisions about best practice, as well as directions for future research.

Introduction

There is nothing so practical as a good theory. Kurt Lewin

The purpose of this paper is to develop a holistic view of the culture of inquiry in school libraries in order to determine directions for future research, as well as best practices that are research-based. What does such a culture look like in the everyday practice of school librarians? What are the issues of practice that drive a school library researcher's questions? How do these questions inform the methodology of school library research? What are the underlying theories that support and sustain ongoing research, often informing its methodology? An ethnographic approach constructed in this paper views the culture of inquiry through two lenses: cultural anthropology and an emerging theory of evidence-based information literacy instruction (Gordon, 2009a; 2009b). Culture was first defined anthropologically by Tylor (1871/1958): "Culture, or civilization, taken in its broad, ethnographic sense, is that complex whole which

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includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (p. 1).

Such a definition is useful as a framework for developing a rich description of the culture of inquiry in structured learning environments such as school libraries. The knowledge relevant to school library research resides in the domains of library and information science, cognitive psychology, and social psychology. The underlying belief is evidence-based practice that informs teaching decisions. The art of this culture emerges from the application of knowledge about school library inquiry, resulting in a creative pedagogy that elicits creative learning outcomes. Morals and law are dictated by scholarly traditions, legalities of information use, and imperatives set by 21st century educational reform. Research-based practices unique to school libraries establish the customs that characterize a community of practice that engages in a culture of inquiry. A rich description of the culture of inquiry as seen through this anthropological lens is not only a metaphor: It is also theory-based.

Evidence-based Practice as Cultural Belief and Research Paradigm

Evidence-based practice in school librarianship is the overriding concept for continuous improvement of practice. It is guided by the belief that evidence is the currency for performance improvement of learners and educators. Educators are empowered to direct their professional growth as learners to become their own best critics. Todd (2001) described three sources of evidence: evidence for practice, or the research that supports best practice; evidence in practice, or the expertise of professionals as they define their practice; and evidence of practice, or the evidence generated by practice. These functions of evidence challenge conventions of library and classroom environments characterized by top-down lines of authority, rule-bound communication, and homogeneous, depersonalized interaction that dictate a passive role for the young user-learner. There is a need to systematically and unobtrusively integrate the collection of evidence with instruction so that the phenomenon of inquiry in school libraries can be effectively studied by practitioners through reflective practice and by researchers through empirical study.

In addition to its practical application, evidence-based practice is also the paradigm that drives theory building (Dervin, 2005). The theory of evidence-based information literacy instruction (Gordon, 2009a; Gordon, 2009b) identifies action research and related practices such as authentic education (Wiggins, 2007) as tools of evidence-based practice. Paradigms are beliefs, values, or assumptions that are integral to change and reform. A paradigm shift from professional commitments to shared assumptions takes place when an anomaly "subverts the existing tradition of scientific practice" (Kuhn, 1970, p. 6). For example, the shift from tool-centered bibliographic instruction to learner-centered information literacy instruction (AASL, 1988) was a paradigm shift initiated by revised standards for school library instruction. Such a shift re-conceptualized librarianship to value the question "Did patrons learn anything?" rather than "Did patrons find what they need?" The paradigm of evidence-based practice adds the dimension of documentation of practice for two purposes: to inform remediation of learning to improve student performance, and to determine the difference school library instruction makes

in student achievement. School libraries represent a paradigm shift that Kuhn (1970) views as "scientific revolutions" or, "The tradition-shattering complements to the tradition-bound activity of normal science" (p. 6). The school library as innovation needs tools of evidence-based practice, such as action research, whereby practitioners systematically engage in the collection of evidence that informs their practice. The evidence-based paradigm constitutes a shift in the culture of teaching and learning in schools that has the potential to reform education. If research in school library instruction has a mission, this is it.

Streatfield and Markless (1994) identify the artifacts of school culture as pedagogy, resources, organizational structures, and the key players in teaching and learning. They report that learning through the school library is influenced by the school culture in which the library operates. Research is needed to understand how inquiry and action research-based information literacy instruction in school libraries can influence school culture. However, there is no comprehensive theory to support research that studies the counter-culture of the school library learning environment in the mainstream culture of schooling. Such a theory emerges from theory-building based on the paradigm of evidence-based practice.

A paradigm is essential to scientific inquiry, as well as to defining best practice. "No natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism" (Kuhn, 1970, pp. 16-7). A Kuhnian approach defines paradigm in two ways:

On the one hand, it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. (Kuhn, 1970, p. 175)

The evidence-based practice paradigm, in the first sense of Kuhn's definition, suggests that the lay person has a role in generating new knowledge. This timely idea drives social networking, empowering individuals to participate in virtual communities to share knowledge, remix content, and create unique representations of content and knowledge. It is a mindset that thrives in a participatory and collaborative environment where each participant is a scientist who ponders problems and forms hypotheses (Kelly, 1963). Evidence-based practice not only values the relationship of research to practice; it plays a critical role in defining best practice. In other words, the model for 21st century teaching that is evidence-based is also a model for 21st century learning: students as well as their instructors are expected to be reflective, self-critical, and evaluative. This is especially important when information users explore digital environments where information is not mediated by the school librarian. Similarly, opportunities for intervention, when information-users present behaviors that indicate they need help, may be lost in complex digital environments with high volumes of information and communication. Action research, as a tool of evidence-based practice, not only generates evidence; it challenges learners and teaching practitioners to apply higher order thinking as they continuously improve their performance. Evidence-based practice becomes the paradigm, or overriding belief, for formal research as well. "One of the things a scientific community acquires with a paradigm is a criterion for choosing problems that, while the paradigm is taken

for granted, can be assumed to have solutions" (Kuhn, 1970, p. 37). Paradigms set the research agenda by indicating research questions that are relevant to the shifts in values and assumptions. Kuhn reminds us that "In the absence of a paradigm, or some candidate for paradigm, all the facts that could possibly pertain to the development of a given science are likely to seem equally relevant" (1970, p. 15). Hence, the issues and questions arising from the practice of school librarianship embrace the same evidence-based paradigm that engages scholars in the study of information literacy teaching and learning.

In the second sense of Kuhn's definition of paradigm, evidence-based instruction is inherent in action research as the "concrete puzzle-solution." It is an exemplar that can replace existing rules, i.e., traditional teaching practices exhibited by teacher-centered talk rather than learner-centered activity. New rules endorse active learning and self-reflection. The evidence-based practice paradigm raises questions about the nature of learning tasks, the role of evidence in improving learning and teaching, and the purpose and methodology of action research when it functions as a tool of evidence-based practice. In a broader sense, it frames the overarching question of educational reform for 21st century learning, presenting evidence-based information literacy instruction as a solution to outmoded paradigms of teaching and learning.

In summary, paradigm is a foundational concept for theory building. It bridges the gap between research and practice, and between problem and solution in the following ways: (1) Paradigm defines a culture of practice in a school community that sets the stage and functions as the context for the research; (2) Paradigm sets the research agenda, pointing to relevant questions and problems that originate in the school and school library culture and context to be studied; (3) Paradigm points to reform, setting the purpose for the research and indicating solutions to practical problems; (4) Paradigm suggests techniques, or research methods, to achieve the research purpose, thereby providing empirical evidence that has implications for best practice in the school library.

The Theory of Evidence-based Information Literacy Instruction

There has been recognition of the need for a generally accepted theoretical base to judge the value of existing programs and to provide direction for developing new programs of library skills instruction (Kuhlthau, 1987). A comprehensive theory is needed to synthesize diverse theoretical frameworks that drive school library instruction research including approaches from constructivist, socio-cultural, and phenomenological traditions. Such a theory synthesizes these approaches to identify the areas of inquiry that need to be researched and methodologies that best serve these investigations. For the purpose of this paper, theory of evidence-based information literacy instruction (Gordon, 2009a; 2009b) acts as a lens to observe and describe a culture of inquiry. This emerging theory draws from the theory and research of user-centric information behavior theory, constructivist learning theory, and social psychology theory developed from Lewin's work. It postulates that action research and related ethnographic methods such as authentic learning tasks and assessments are tools of evidence-based practice (Gordon, 2009a, 2009b). As such, action research includes authentic learning, or performance-based assessment practices that continuously generate evidence throughout the inquiry unit of instruction. These practices, known as formative assessments, include the use of rubrics, journals, portfolios, and specific interventions that address stages of the Information Search

Process (Kuhlthau, 1986), such as brainstorming, visuals and reflections sheets, graphic organizers, statements of intent, graphic analyzers, and peer review. The evidence generated by these interventions helps young information-users to self-diagnose and self-remediate while generating evidence of their progress for the teacher or the school library practitioner. In addition, action research applies traditional data collection methods typically used in formal qualitative research. This has implications for the researcher who may already be using similar ethnographic methods to study inquiry, and for the school librarian who may also want to use these methods to examine his or her daily practice.

In the process of theory building, two purposes of action research come to the surface for the practitioner: improvement of practice through self-improvement of performance, and social reform through change. The former leads to local improvement of practice, the latter to global reform. For Lewin, the original purpose of action research was social reform. When action research was later applied in education, it targeted self improvement (Corey, 1953). The emerging theory postulates that evidence-based information literacy instruction uses action research for both purposes. Self-oriented action research (AR(S1)) targets self-improvement on the local level of teaching and learning in school libraries; socially-oriented action research (AR(S2)) targets social reform on the global level of educational reform (Gordon, 2000a; 2000b). The theory resolves the dichotomy between purposes of self and society through the Lewin-Dewey connection, where the reiterative cycle of action and reflection is common to both types of action research.

Sense-making theory building (Dervin, 2005) is the method used to generate a theory of methodology through the synergy of substantive theory, or the contributing knowledge gained from research in information science, cognitive psychology, and social psychology, and metatheory supplied by Dewey's (1910) experiential learning approach. Lewin (1948) contributed social psychology theories, or substantive theory, including Gestalt theory, group dynamics, field theory, and change theory, all of which inform methodologies for the use of action research by the practitioner as well as the researcher. Through the concept of experiential learning and the importance of relevancy in education, Dewey's metatheory sets a progressive agenda for educating youth that is participatory rather than passive. It makes the connection between inferential thinking and the process of action and reflection essential to thinking and learning, not unlike Lewin's description of the action research cycle. The connection between Lewin's substantive theory and Dewey's metatheory results in a theory of methodology that has implications for practitioners and researchers. Teaching and learning emerge as two sides of the same coin: both are reflective processes that use inquiry methods to teach inquiry. The culture of inquiry that emerges is fueled by evidence generated in the field of teaching and learning.

Cultural Knowledge: An Interdisciplinary Approach

The body of knowledge that informs research and practice in school library instruction derives from an interdisciplinary tradition that includes library and information science, cognitive psychology, and social psychology. As this knowledge is generated, substantive theories evolve either as a result of the research, or as a framework for it. This cultural knowledge functions as the skeletal structure for describing a culture of inquiry, as well as the supporting structure for

adding new knowledge to the field of school library research. This section identifies core knowledge and theory.

Information behavior theory and research contributes a user-centric, rather than a system-centric approach that led to models of information seeking that were problem-oriented and grounded in cognitive science. User-centric research laid the foundation for a process approach whereby users learned information skills in the context of inquiry. The search process, it was theorized, progressed through phases beginning with a vague notion of a lack of information. Belkin (1981) identified an anomalous state of knowledge (ASK) in which there were inadequacies, such as misconceptions. User-centric research laid the foundation for an integrated approach whereby information skills are taught in the context of inquiry.

Cognitive learning theory states that knowledge acquisition occurs when learners relate new knowledge to what they already know (Ausubel, 1963). This important finding grows from foundational studies in education when Piaget (1928) studied his own children at play to formulate a constructivist learning theory that posits learners make their own meaning by building mental models, or constructs, that help them either accommodate or assimilate new knowledge. Constructivist learning theory is the foundation for the inquiry approach to school library instruction (Kuhlthau, 2003). It addresses information processing on the level of making meaning to develop new knowledge. It also supports a flexible model for student inquiry that allows for reflexivity, active engagement, and collaborative learning.

Constructivist type of learning is transferable to situations in the real world. Information users learn to think through issues that do not have prescribed responses or preset solutions. Information users learn to identify what is important to them, to construct new meanings, and to explain their new understanding to others in some way that is authentic to the topic. (Kuhlthau, 1997, p. 711)

The theory of personal constructs informs Kuhlthau's Information Search Process (ISP). It states, "A person's processes are psychologically channelized by the ways in which he anticipates events" (Kelly, 1963, p. 46). Kuhlthau's (1986) application of Kelly's theory to information searching is based on the premise that the search process is a process of assimilation and construction, involving feelings, thoughts, and actions. Since the ISP model is research-based and validated in subsequent studies (Kuhlthau, 1988; Kuhlthau, 1989; Kuhlthau, Turock, George & Belvin, 1990), it can serve as a diagnostic tool. Supported by Vygotsky's (1978) theory of the Zone of Proximal Development (ZPD) that represents the learner's inability to move forward without assistance, the ISP helps educators identify zones of intervention based on the symptoms exhibited in stages of the ISP. Intervention is conceived as Guided Inquiry when a collaborative team of school librarian and classroom teacher(s) provides help that is critical for young people to move along the continuum from novices to experts or independent learners (Kuhlthau, Maniotes & Caspari, 2007). The ISP and Guided Inquiry call for an evidence-based teaching approach where instructors gather evidence from the work of user-learners who may be trapped in the ZPD.

Lewin's work contributes substantive theory from social psychology. The psychological descriptions of change process (i.e., unfreezing, confusion, acceptance) inform Lewin's description of action research as a spiral of steps (see Figure 1 on page 79). "Each ... is

composed of a circle of planning, action and fact-finding about the result of the action" (Lewin, 1948, p. 206). By applying group dynamics to problems of drug addiction, crime, and the rehabilitation of World War II veterans, Lewin established action research as a tool of social reform. In this tradition, action research is "the systematic collection of information that is designed to bring about social change" (Bogdan & Bilken, 1992, p. 223). Action research has

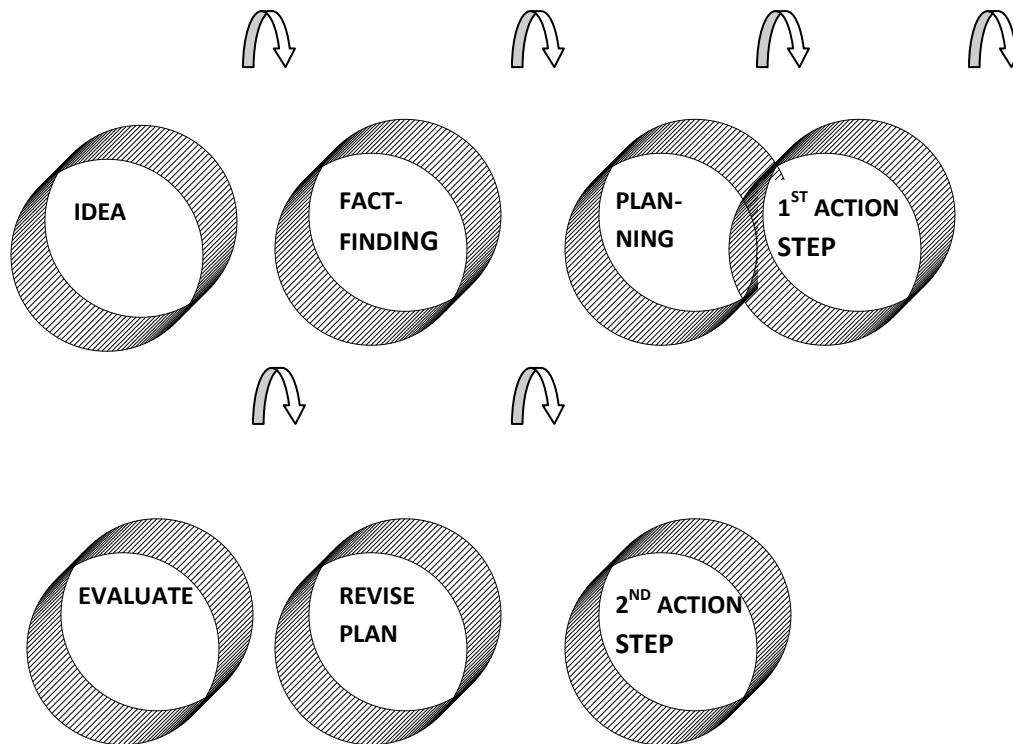


Figure 1. Conceptualization of Lewin's Action Research Methodology (Adapted from Lewin, 1948, p. 206).

spread beyond the boundaries of social psychology and social purpose to health and education, where it has assumed the goal of improvement of practice or self-improvement. McTaggart described action research as:

simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out. (McTaggart, 1994, p. 313)

A culture of inquiry emerges as teachers become learners, learners are self- and peer-taught, and everyone becomes a researcher.

The collaborative dimension of school library instruction is informed by Lewin's theory of interdependency. Brown (1988) noted that field theory contributes the concepts of interdependency of fate and task interdependence which explain that groups form "when

people ... realize their fate depends on the fate of the group as a whole" (pp. 28-32). In the school library, interdependency can be problematic when school librarians and teachers collaborate. Collaboration between school librarian and classroom teacher that involves the design and implementation of inquiry learning tasks is problematic because it contradicts a culture of teaching that can be isolationist and individualistic. Lortie (1975) noted that teachers do not show enthusiasm "in working together to build a stronger technical culture": instead, he noted, they "punctuate their work" into small units "concentrating on short-range outcomes as a source of gratification" and "do not invest in searching for general principles to inform their work" (pp. 211-212). Conservatism is the most evident obstacle to change. The only changes that teachers deemed desirable, Lortie argued, were ones that amounted to "more of the same"; confirming current "institutional tactics" by "remov[ing] obstacles and provid[ing] for more teaching with better support" so that teachers had "a preference for doing things as they have been done in the past" (Lortie, 1975, p. 209). This poses a conundrum for school librarians who promote an integrated approach to school library instruction that presents information skills in the context of content-specific learning tasks, particularly for core curriculum subjects such as history, language arts, and science. Such pedagogy presupposes strong collaborative work among teachers and school librarians who design, implement, and evaluate inquiry units as instructional teams. While teachers may not see that their success depends on working in a group, the school librarian operates in multiple layers of collaborations between learner and teacher, learner and librarian, and between and among learners. Teaching and learning in these collaborations are co-dependent processes. Studying one or the other ignores the relationship between the two.

Figure 2 on page 81 illustrates a model of the relationship between self- and social-oriented action research with respect to independent and interdependent learning. Both the self- (AR(S1)) and social- (AR(S2)) oriented modes of action research-based teaching employ independent and interdependent modes. Theoretical support for interdependent learning that situates the learner in formal or informal groups is supported by Lewin's field theory. The concept of life space, as well as Gestalt theory and group dynamics, inform collaborative patterns in an inquiry-based learning environment. These theories are useful to the researcher who studies collaboration as a key component of the culture of inquiry and to the practitioner who can use them as methods for collecting evidence, as Lewin did in his field studies.

Morals and Law

The discussion of moral and legal aspects of a culture of inquiry focuses on 21st century educational reforms that are relevant to inquiry-based instruction in school libraries. In the United States, several developments signify a change in classroom and school library instruction that add a moral imperative to providing equitable and universal information literacy instruction for all learners. The first is the shift from information- to knowledge-centered teaching through the school library. The American Association of School Librarians (AASL, 1988) introduced this conceptualization of information literacy with the publication of revised information standards.

AASL (1988) defines information literacy as the recognition of an information need and the ability to search, find, evaluate, and use information. These standards set benchmarks for

information literacy but did not develop the concept of information use. They were revised by AASL (1998) to include two important additions: (1) school librarians and teachers work as instructional partners to teach these skills in the context of academic school curricula and state and national standards; and (2) performance-based assessments (or authentic assessments) (e.g., rubrics, journals, and portfolios) provide ongoing feedback, or evidence, to information users through self- and peer-evaluation, as well as teacher-student interactions (AASL, 1998).

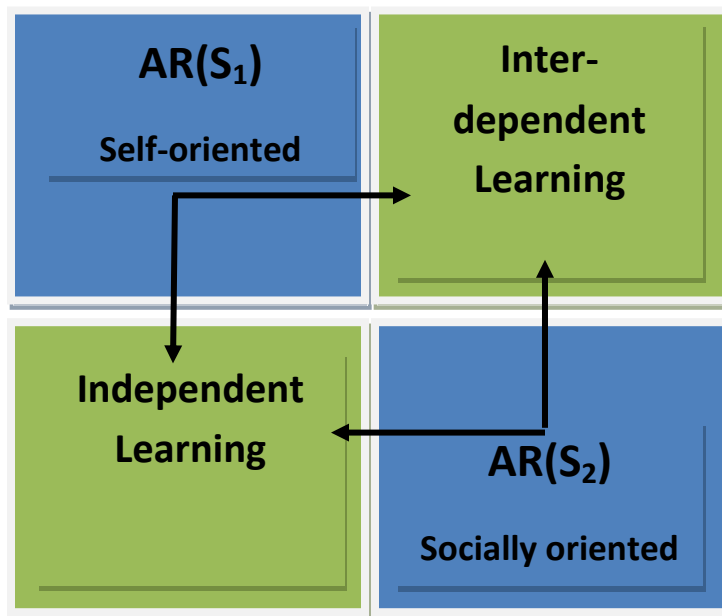


Figure 2. A model of independent and interdependent learning in self and social oriented action research.

This teaching approach is a significant shift that places the teacher in the role of facilitator and provides opportunities for school librarians to create meaningful, inquiry-based learning tasks and assessments. Researchers have studied the effectiveness of the integrated approach through research on Guided Inquiry using the Student Learning Impact Measure (SLIM) packet (Kuhlthau & Todd, 2005) to document how knowledge changes during the Information Search Process. In practice, however, school library instruction continues to focus on the basics of information searching and finding.

For several years, teaching and learning in school libraries has been shifting from behavioral, tool-based instruction to a constructivist user- and learner-centric approach. During the first forty years that libraries operated in schools in the United States, tool-specific instruction focused on reference sources such as *The Readers' Guide to Periodical Literature* and the *World Almanac and Book of Facts*. Scope and sequence library curriculum mimicked core content curriculum, dictating when information skills were taught by grade level, with little relevance to what was happening in classrooms. In the United States, The Partnership for 21st Century Skills (2004, <http://www.21stcenturyskills.org>), a consortium of educators, corporate

technology companies, stakeholders, and policymakers, developed a framework for 21st century teaching (see Figure 3 on page 10).

The outer rim of the rainbow in Figure 3 includes Life and Career Skills, Learning and Innovation Skills, and Information, Media and Technology Skills. These skills center around

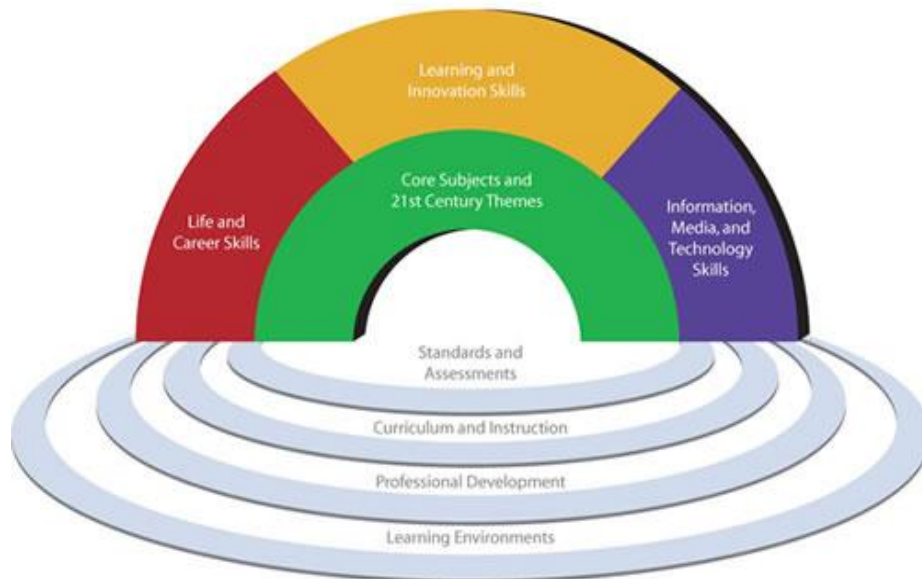


Figure 3: Framework for 21st Century Learning.

Source: <<http://www.21stcenturyskills.org/>>. Used with permission of the author.

Core Subjects (i.e., science, language arts, mathematics, social studies, and history) and 21st Century Themes (e.g., globalization and the environment). The pool at the foot of the rainbow illustrates the support systems for teaching this curriculum: Standards and Assessments, Curriculum and Instruction, Professional Development, and Learning Environments. School libraries have the potential to play a significant role in these support systems. Research on these roles is needed to re-conceptualize the school library from a 21st century perspective. For example, the shift from 20th century terminology such as “library facilities” to 21st century “learning environments” is a shift that points to learner-centric thinking about the elements of the school library program.

The Partnership for 21st Century Skills (P21) curriculum framework influenced the learning goals of the national information literacy standards set by AASL (2007):

Learners use skills, resources, and tools to:

1. Inquire, think critically and gain knowledge.
2. Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.
3. Share knowledge and practice ethically and productively as members of our democratic society.
4. Pursue personal and aesthetic growth.

These developments indicate a major shift in how information literacy is defined. It goes beyond information searching and retrieval to incorporate inquiry and critical thinking. The destination is no longer information, but knowledge, with a strong focus on information ethics, productivity, and personal growth. The P21 framework and AASL standards clearly represent a paradigm shift to a holistic approach to information literacy instruction. The shift considers the needs of young people who are being educated for a world characterized by fast-paced change and global competition in a high tech, collaborative environment, where innovation and problem-solving are essential skills. Educational “basics” are re-defined by these developments, yet school libraries are not fully integrated into school curriculum to ensure equitable delivery of a 21st century education for all students.

The Art of Teaching (and Researching) in a Culture of Inquiry

Several corollaries to the theory of evidence-based information literacy instruction address major tenets of self and social action research that are useful in describing the art of teaching in a culture of inquiry. The corollaries also serve as a research agenda for school library researchers. They imply a theory of methodology for researching evidence-based information literacy instruction that derives from the Lewin-Dewey connection that posits action and reflection as a method of inquiry, blurring the line between action research and formal research and the boundary between school library practice and school library research

Corollaries for Self-Oriented Action Research: (AR(S₁))

Corollary 1: Evidence, action, and reflection are central to self-oriented action research (AR(S₁)). User-learners, as well as educators, improve their performance through evidence that informs the revision of their work. Teaching and learning become synergistic in this model. To study either in isolation loses the synergy of evidence-based transactions between learner and teacher. Clarification of the role of evidence in teaching and learning and development of ways to manage diagnoses, interventions, and feedback are part of these transactions.

Corollary 2: Self-oriented action research (AR(S₁)) is generated by authentic learning and the evidence that results from performance-based or formative assessments. This teaching methodology can be viewed as a tool of action research. The evidence serves two functions: (1) to help user-learners perform self- and peer-evaluations and to revise their work; and (2) to inform the teaching decisions and revision of teaching strategies of school librarians and teachers. Play is an aspect of the authenticity of inquiry-based school library instruction. In digital environments learning is self-directed, problem-based, and ‘ludic’ or playful, though the importance of play in learning is not widely accepted beyond pre-school education.

Corollary 3: Self-oriented action research (AR(S₁)) takes place in the context of inquiry learning defined by two types of tasks: (1) micro level information tasks that include basic information literacy skills (e.g., searching and retrieving information); and (2) macro level learning tasks that are the context for information tasks. As such, they inform information searching behavior. The learning task is related to real world contexts, problem-solving, and

decision making. On the macro level the learning task, designed by an instructional team, shapes the inquiry. The learning task is relevant, engaging, and rigorous in order to sustain the interest and interaction of the user with information and emerging knowledge. The macro level is the level of instruction whereby the learning environment, or task, fosters self-reflection, self-correction, and self-regulation. The role of evidence, and action research as a tool of evidence-based practice, is critical to micro and macro levels of information literacy instruction. However, the line between micro and macro tasks blurs when the user-learner interacts with information in varying degrees of intensity and depth. In this process information becomes the raw material for creating new knowledge or expanding existing knowledge. For example, user-learners exhibit information interaction when they interact with information to evaluate it, or paraphrase it, or use it as the raw material for building knowledge. User-learners engage in another level of interaction when they use critical thinking to apply, analyze, evaluate, and eventually synthesize information that has become knowledge (Anderson & Krathwole, 2001). The synthesis, whether it is writing a paper or creating a podcast or a wiki, is an act of creativity. In other words, the transformation of information to knowledge is not the end but the beginning of problem-solving and decision-making. User-learners not only interact with information, but in an ideal scenario they interact with knowledge as well. In both instances, critical thinking skills craft the interaction. The distinction between micro and macro levels of information and knowledge tasking provides the researcher with a way of tracking these information and knowledge interactions. Research is needed to examine the relationship between and among information and knowledge functions.

Corollary 4: Self-oriented action research (AR(S₁)), or action research that purposefully focuses on self-exploration and self-improvement of user-learners and educators, addresses inner processes described by constructivist learning theory as they occur in interdependent, or collaborative learning, as well as independent, or individual learning. AR(S₁) explores the importance of interdependent learning and how information behavior differs in individual and social contexts. The identification of new modes for evidence-based strategies and models includes finding methods for collecting, organizing, and storing evidence generated by interdependent learning and applying creative ways of analyzing evidence that are efficient and accurate.

Corollary 5: Self-oriented action research (AR(S₁)) supports the study of the information-to-knowledge connection in which instructional teams of school librarians and classroom teachers contribute their respective expertise of information processing and use, as well as curriculum content specific to academic disciplines, to design, implement, and evaluate micro information tasks and macro learning tasks. Collaboration, critical to this connection, is the art of inquiry-based learning that employs authentic teaching in simulations of real world contexts. Such a contextual approach requires the expertise of the classroom teacher as content area specialist as well as the school librarian as information specialist. The common intent of the collaboration is to design, implement, and evaluate learning tasks that facilitate information and knowledge interactions and connections. Collaboration between school librarian and classroom teachers

contradicts the educational tradition of the teacher as sole authority while creating a dependency that enhances instruction.

Corollaries for Social-Oriented Action Research: (AR(S₂))

Social reform can be viewed on a continuum that includes local and global change. Action research for the purpose of social reform is local when it effects change in a school or school district. In this case, the reform is also embedded in action research for self-improvement when the school librarian assumes a leadership role in instruction, a professional development role that informs classroom teaching, and a management role that informs the direction of the profession.

Corollary 6: The school librarian's role as instructional leader originates in methods that empower learners and teachers to self-evaluate and revise their work. The methods of authentic learning, for example, are instruments for reform-oriented modes of teaching because they are situated in macro tasks that raise the user-learner's awareness of relevant social problems and issues, such as the environment, globalization, fiscal awareness, and personal health. These issues are identified as 21st century themes integrated with core subject areas in order to educate youth to live and work in a fast paced society driven by technology.

Corollary 7: The school librarian's role as professional developer raises the level of action research from self-improvement to social reform. In this role the school librarian transforms the teaching profession by shifting the paradigm from classroom-centered learning to inquiry learning that integrates resources and technology. This form of social-oriented action research (AR(S₂)) infiltrates learning through the macro learning task and incorporates real-world problem-solving. Evidence-based instruction inspires pedagogical products and processes that reflect deep understandings, rather than shallow fact-finding. School librarians lead the instructional team, helping classroom teachers to craft learning tasks that develop competencies specific to the information and knowledge interactions in technology-driven life and work contexts. Challenges for 21st century researchers include researching new models of teaching that are multi-modal, multi-media, and multi-disciplinary and that enable user-learners to be creative problem-solvers.

Corollary 8: Socially-oriented social reform can be achieved through the school librarian's role as manager who conceptualizes the school library program as an educational reform program universally applied to all students, rather than as a specialty or supplement to the school's instructional program. A 21st century learning environment challenges the restrictions of time and place that characterize traditional schooling and opens opportunities for school library practices to transcend the walls of the library, contributing in a broader context of school reform. Social-oriented action research requires methods of effecting political change that have long range benefits. The school librarian, as manager, engages the school community in practices that are evidence-based for the purpose of making education relevant to an increasingly disengaged generation of learners. Virtual learning environments and alternative ways of schooling present rich opportunities for educational reform through evidence-based

information literacy instruction. In this role, the school librarian may venture into the world of politics and legislation to apply evidence-based advocacy. Evidence is generated from various dimensions of the school library program, in addition to instruction. For example, the school librarian uses public media, strategies for parental involvement, publication of evidence-based instruction using action research, and other modes of promotion to inform and model the role of the school library in 21st century learning. This is a neglected area of research that views the managerial role of the school librarian as an extension of her instructional role.

Corollaries for Self- and Social-Oriented Action Research: (AR(S₁)) and (AR(S₂))

When considered together, self- and social-oriented intents of action research suggest corollaries that point to research that studies the reform of the school library and teaching professions.

Corollary 9: Self- and social-oriented action research (AR(S₁) and AR(S₂)) call for development of additional action research training models for school librarians and classroom teachers that empower these practitioners to transform schooling from the perspectives of self and society. These models are needed for pre-service teachers as well as for practicing teachers to include the role of information, technology, and inquiry in 21st century teaching and learning. A discrete approach to professional preparation that isolates self- and social-oriented reform through teaching loses the dynamic of a holistic approach to reform education in classrooms and libraries, as well as in digital environments.

Corollary 10: Self- and social-oriented action research (AR(S₁) and AR(S₂)) are the building blocks for a culture of inquiry in school libraries and in the school community that is evidence-based. Evidence-based instruction requires a socio-cultural perspective in which:

students' contact with artifacts and people--in and through the school library--as participation in a socialization exercise where the school library can be understood as a "cultural tool" with a communicative function. The activities that take place in or through the school library are social and communicative. They are part of a cultural context and can vary from school to school, but they can also have a great deal in common. (Limberg & Alexandersson, 2003, p. 3)

The Ethnographic Tradition as Custom

The ethnographic tradition in the study of teaching and learning helps educators understand not only which methods work, but why they work. The ethnographic tradition is evident in the research that has produced a body of knowledge and theory that supports school library research and in the translation of that research to effective instructional practices. Our understanding of how young people process information and learn is the legacy of the ethnographic tradition. Careful and systematic observation and analysis of phenomena yields contextualized evidence from fieldwork in schools, classrooms, and school libraries. This tradition is often ignored in practice, as more immediate external manifestations of learning dominate teaching choices. The disconnection between theory and practice results in educational decisions counterproductive to 21st century initiatives that prepare youth to be knowledgeable, creative decision makers and problem solvers. The imperative for 21st century solutions that educate youth to these ends continues to be classroom-based. A 20th century

Industrial Age paradigm dominates the education of 21st century youth who have discovered the power of a digital lifestyle. Assessment, for example, based on testing designed to calculate minimal attainment of learning standards, drives the daily learning routine of children throughout the world. Data-driven initiatives in schools, for the most part, are restricted to a positivist point of view that sees quantification as the only measure of student progress. Ethnographic research has not successfully achieved comparable credibility. A tool such as action research that is embedded in an ethnographic tradition empowers practitioners to execute informed change and improvement. It is important, however, for evidence-based information literacy instruction to realize its sociological and global potential as well. School library research that is rooted in evidence-based information literacy instruction that is inquiry-based recognizes learning needs on the level of the individual, or self, as well as the needs of a 21st century knowledge society. The study of these aspects of a culture of inquiry presents an ambitious research agenda and type of engaged scholarship that embraces a research to practice connection.

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