Evidence Based Library and Information Practice

Article

An Emerging Theory for Evidence Based Information Literacy Instruction in School Libraries, Part 2: Building a Culture of Inquiry

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Abstract

Objective – The purpose of this paper is to articulate a theory for the use of action research as a tool of evidence based practice for information literacy instruction in school libraries. The emerging theory is intended to capture the complex phenomenon of information skills teaching as it is embedded in school curricula. Such a theory is needed to support research on the integrated approach to teaching information skills and knowledge construction within the framework of inquiry learning. Part 1 of this paper, in the previous issue, built a foundation for emerging theory, which established user-centric information behavior and constructivist learning theory as the substantive theory behind evidence based library instruction in schools. Part 2 continues to build on the Information Search Process and Guided Inquiry as foundational to studying the information-to-knowledge connection and the concepts of help and intervention characteristic of 21st century school library instruction.

Methods – This paper examines the purpose and methodology of action research as a tool of evidence based instruction. This is accomplished through the explication of three components of theory-building: paradigm, substantive research, and metatheory. Evidence based practice is identified as the paradigm that contributes values and assumptions about school library instruction. It establishes the role of evidence in teaching and learning, linking theory and practice. Action research, as a tool of evidence based practice is defined as the synthesis of authentic learning, or performance-based assessment practices that continuously generate evidence throughout the inquiry unit of instruction and traditional data collection methods

typically used in formal research. This paper adds social psychology theory from Lewin's work, which contributes methodology from Gestalt psychology, field theory, group dynamics, and change theory. For Lewin the purpose of action research was social reform, while action research in education targeted self through the improvement of practice. The dichotomy between purposes of self and society is resolved by the Lewin-Dewey connection, where the reiterative cycle of action and reflection is the basis for a common intent for both types of action research. Dewey's approach comprises the metatheory for emerging theory: a philosophy of purpose and methodology that determines how the research is done.

Results – The emerging theory developed in this paper postulates that evidence based information literacy instruction uses action research for two purposes. Self-oriented action research (AR(S1)) targets self-improvement on the local level of teaching and learning in school libraries; social-oriented action research (AR(S2)) targets social reform on the global level of educational improvement. Corollaries of the theory indicate a research agenda and methodologies for the research.

Conclusion – Implicit in the content of the research is methodology that evolves from the distinction between the purposes of self- and social-oriented action research. Clearly, evidence is generated in the field of teaching and learning that is situated in theory-based practices, such as user-centered information processing, constructivist learning, and a culture of inquiry that grows from social processes. Librarianship is well suited to developing practitioner-researchers who are proficient in making the information-to-knowledge connection that informs their professional performance.

Introduction: Building a Foundation

The overall purpose of this paper, written in two parts, is to articulate a theory for evidence based information literacy instruction in school libraries. This introduction serves to summarize the foundation for theory building in Part 1 of the article, published in the previous issue of *EBLIP* (Gordon "Emerging"). A comprehensive theory is needed to guide formal research for this complex phenomenon characterized by:

- inquiry learning,
- information, resources, technology, and their attendant skills, and
- collaboration of school librarians and classroom teachers who bring their respective expertise in information skills and content knowledge to teaching through inquiry.

Their common intent is to design, implement, and evaluate learning tasks that facilitate an information-to-knowledge connection.

Understanding action research in this context is critical to theory building, which is described in Part 1 as evidence based inquiry learning. Teaching decisions are made from evidence continuously generated from student work. This kind of pedagogy is labeled "authentic learning" to denote its derivation from the authentic assessment movement in education, currently known as "authentic education" (Wiggins). For the purpose of this paper, it is a method of action research that aims to improve instruction and the performance of user-learners through transactions between learners and teachers characterized by continuous assessment and feedback.

A focused review of the literature in Part 1 presented research for building theory to support empirical study of this kind of instruction-specific action research (Gordon "Fish"; "Students"; "Putting"). User-learners in these studies engage in everyday information seeking ("Putting") and highly

structured, academic information tasks nested in real-world learning tasks ("Students"). The learning task is, in fact, a series of formative, activity-based assessments that continuously generate evidence of learning, as well as gaps and misconceptions. These studies reveal a distinction between micro and macro learning tasks that are useful for studying the learning task as a component of the inquiry process (Gordon "Emerging"). On the micro level user-learners confront information and engage in a series of information processing tasks, as described in Kuhlthau's Information Search Process (Kuhlthau "Facilitating"). User-learners apply basic information searching skills, as well as critical thinking, to craft connections between new information and existing knowledge. Micro tasks occur throughout the Information Search Process as the knowledge built from found information generates questions that require more information. On the macro level the learning task, designed by an instructional team of school librarians and classroom teachers, shapes the inquiry. User-learners relate emerging knowledge to a problem or issue in the real world. The learning task is relevant, engaging, and rigorous to sustain the user-learner's interaction with information and emerging knowledge. The macro level is characterized by continuous assessment through self-reflection, self-correction, and self-regulation as new knowledge is continuously built from found information. The role of evidence in determining the user-learner's progress is essential to both kinds of tasks, yet formal research studies do not differentiate between micro and macro tasks as part of inquiry learning. This distinction between tasks of information handling and knowledge building is critical to empirical research that studies the information-to-knowledge connection in order to determine how information searching informs knowledge construction, and how the learning task informs information seeking. The studies reviewed in Part 1 pointed to the need for more research on interdependent and group work, as well as individual user-learner information and learning behaviors.

One of the action research studies described in Part 1 identified action research as a tool of evidence based practice (Gordon "Study"). That project tested a three-dimensional action research training model, implemented by school librarians and collaborating teachers, which involved integration of authentic teaching with traditional qualitative research methods. The study investigated how the model worked and the impact of the action research experience on the practice of school librarians. The formal researcher operates in the third dimension, simultaneously collecting data and mentoring school librarians. In the first dimension, the librarians function as designers and implementers of authentic learning tasks and assessments. In the second dimension they are practitioner-researchers who identify a problem in their practice, and then develop and implement their own action research projects. The mentor-researcher guides school librarians in formulating research questions, outlining proposals, constructing theoretical frameworks, collecting and analyzing data, and presenting findings.

The research objective was to explore the elements of the three-dimensional model. The researcher collected data from email transactions, telephone conversations, interviews, meetings during on-site visits, a questionnaire, and a content analysis of the documentation submitted by the school librarians. Findings indicated that the three-dimensional training model elevated the quality of action research to that of formal academic research.

Practitioner-researchers engaged in research that modeled methodology for students doing inquiry learning and for teachers who collaborated with school librarians to conduct action research. Action research emerged as a professional development tool that uses the school library as a laboratory where educators, as well as students, can learn to be reflective and self-critical through systematic collection and analysis of evidence. While interactions between librarians and teachers revealed underlying tensions of collaboration, the

action research project had a positive effect on the librarians' practice, their confidence in managing the collaboration process, and their perceptions of themselves as leaders and researchers. The current study raises questions about the role of the school librarian in collaborative action research and the role of action research in school reform. Further research is needed to develop other training models, as well as models for implementing and studying action research as a tool of evidence based information literacy instruction. In subsequent years replication of this study has had a transformative effect on the school district. Decision-making in schools, especially in the context of instruction, is driven by a culture of evidence based practice, inquiry, collaboration, and action research.

Theory building supports research that defines a culture of inquiry unique to school libraries in which evidence based practice and action research shape teaching and learning. The goal of building theory to support the study of action research based teaching and learning is twofold: To determine the purpose and the methodology for studying action research. This paper (Part 2) studies the purpose and methodology of action research to gain insights into why and how the study of action research is conducted. The framework used for theory building bridges practice and theory, creating a theory of methodology for researching evidence based information literacy instruction.

Methodology for Theory Building

The framework for theory building used in this paper is Dervin's Sense-Making Methodology and its three components: paradigm, substantive theory, and metatheory (Dervin "What" 26), as illustrated in Fig.1.

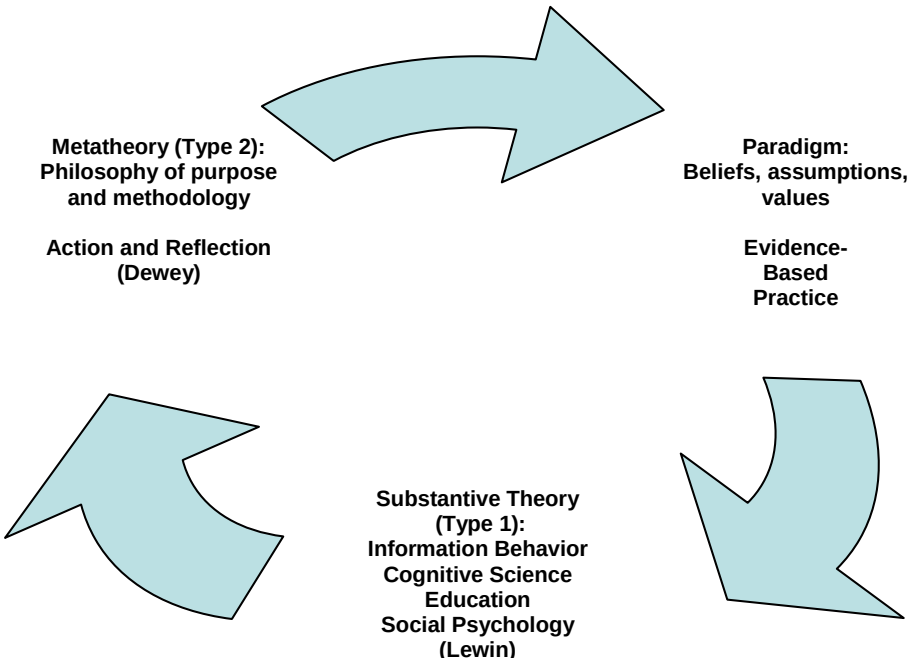

Fig. 1. Three Components of Theory Building (Adapted from Dervin "What" 26)

Paradigm and the Culture of Inquiry

The paradigm for building theory for the study of action research-based information literacy instruction is evidence based practice. A paradigm consists of the beliefs, assumptions, values and techniques accepted by a community of practitioners (Fig. 1). For example, everyone is considered a researcher in the evidence based practice paradigm. Evidence is valued as the currency for improvement by students and their teachers. Educators are empowered to direct their professional growth. Learners are empowered to become their own best critics. These beliefs establish expectations for teaching and learning, and they predicate roles. They influence dispositions to learning and decisions about what is worth knowing and learning to do. Evidence based practice is implicit in conceptualizing action research as a way for practitioners to improve their performance. Todd 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.
- Evidence of practice, or the evidence generated by practice.

When applied to instruction, evidence based practice is a function of best practice: Evidence based practice elicits documentation that demonstrates how school libraries, which can be considered agents of educational reform not yet integrated with mainstream education, make a difference in teaching and learning.

Paradigms 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 6). The anomaly that subverts traditional bibliographic teaching is instruction that is learner- rather than resource-centered. Such an approach re-conceptualizes librarianship to value the question, "Did patrons learn anything?" rather than, "Did patrons find what they needed?" Evidence based practice suggests shared values of self-reflection and the continuous improvement of practice. This paradigm shift adds the dimension of documentation for the purpose of determining the difference school library instruction makes in the teaching and learning mission of the school. While supporting this mission, school libraries go against the grain of traditional, classroom-centered schooling. This poses a conundrum for school librarians who support teaching and learning through school library based inquiry which challenges the way these commodities are delivered through traditional, classroom-centered schooling. These kinds of shifts are what Kuhn describes as "scientific revolutions", "the tradition-shattering complements to the tradition-bound activity of normal science" (6). Action research-based information literacy instruction constitutes a shift in the culture of teaching and learning in schools that has the potential to reform education. Streatfield and Markless define 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. 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 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 175).

The evidence based practice paradigm, in the first sense of Kuhn's definition, suggests the lay person has a role in generating new knowledge. This timely idea drives social networking, for example, 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). Evidence based practice values the relationship of research to practice, and the critical role theory plays in defining best practice. Action research, as a tool of evidence based practice, not only generates evidence; it prescribes techniques and methods that empower practitioners to continuously improve their practice. "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 37). Paradigms set the research agenda by indicating research questions that are relevant to the shifts in values and assumptions. "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" (Kuhn 15).

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. The new rules are exhibited by 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 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 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 culture and context to be studied; 3) Paradigm points to reform, setting the purpose for the research and indicating solutions; 4) Paradigm suggests techniques, or methods, to achieve the research purpose.

Substantive Theory and the Culture of Inquiry

Substantive theory, or Type 1 theory (Fig. 1), provides theory that is empirically tested to support further research. Part 1 of this paper takes an interdisciplinary approach, presenting a triumvirate of interlocking substantive theories: 1) User-centered information theory (Dervin and Nihlan; Belkin; Kuhlthau; 2) Learner-centered cognitive theory (Kelly's cognitive, affective, and behavioral perspectives of learning; 3) Interventionist teaching (Vygotskii's Zone of Proximal Development 4) Constructivist learning theory (Dewey's Experiential Learning; Piaget's Constructivism. These theories support the distinction between the macro learning task and micro information tasks that offer a way of studying how user-learners make the information-to-knowledge connection. Information behavior research and theory point to researchable questions about micro information tasks, i.e., the purpose of the research and methods appropriate to the purpose. Cognitive psychology and education

provide the same functions for theory based research of macro learning tasks.

Substantive theory results from observation (Dervin "What") and provides theoretical frameworks for empirical studies of evidence based information literacy instruction. Lewin's addition of social psychology to information and learning theory supports research needed to understand information behavior and learning through group processes, as well as through individual information processing. Highly collaborative instruction in school libraries and virtual environments present a need for this kind of research, which is supported by constructivism; Construction of meaning is seen as a social process (Vygotskii). It is understood as an interaction in which user-learners' thoughts and communicative actions take shape and where user-learners, in various ways, coordinate their actions. This interpretation is about intersubjectivity, which is connected to user-learners' action, both their verbal communication and the operations that they perform when they search for information through the library (Limberg and Alexandersson 1-2). While Constructivism recognizes that learning is social (Vygotskii), it is not often applied to interdependent, or collaborative learning to the extent that it is applied to independent learning. Limberg and Alexandersson reported students' interpretations of meanings of school libraries that they experienced reflected individual, rather than collective, action and understanding. They concluded that "…to inspire alternative meanings of the school library, teachers and librarians are the key actors and need to interact differently with students" (11). The addition of social psychology to the triumvirate of substantial theory adds a socio-cultural dimension to the way teaching and learning is viewed in the school library. Lewin's social psychology theory includes Gestalt psychology, field theory, group dynamics, and change theory, all of which contribute a cohesive set of beliefs and research techniques that inform action research purpose and methodology ("Action"; *Field*). Social psychology broadens the scope of the empirical study of inquiry learning in school libraries from individual learning to learning through collaboration and group processes.

In summary, substantive research supports emerging theory in the following ways: 1) Substantive theory provides a family of relevant research, making it possible to move theory through generations to maintain its relevancy to evolving practice; 2) Substantive theory functions as a foundation for creating distinctions in phenomena, such as macro and micro inquiry tasks, that are contexts for research; 3) Substantive theory, like paradigm, originates in practice and suggests researchable questions for the research; 4) Substantive theory provides models of methods relevant to the emerging theory and subsequent research. This article adds social psychology theory to the body of substantive theory to expand the purpose of and methodology for studying action research-based information literacy instruction to include interdependent learning, or group processes. Lewin's methodologies offer interesting options for the application of field theory and group dynamics, for example, to study social learning.

Metatheory and the Culture of Inquiry

The third component to theory-building is metatheory (Type 2 theory) which provides the philosophy behind the purpose and methodology of emerging theory (Fig. 1). The Lewin-Dewey connection forms the metatheory for the emerging theory of action research-based information literacy instruction. 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. In addition, metatheory based on Dewey's philosophy of education makes the connection between inferential thinking and the process of action and reflection, 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.

Relationships among Paradigm, Substantive Theory and Metatheory

This paper proposes that sense-making theory building (Dervin "What") clarifies the purpose of action research and suggests methods that ensure its legitimacy so that it can be a viable subject for study through empirical research. Paradigm, substantive theory, and metatheory are not discrete components of theory building. Rather, they inform each other, in no particular order, to define purpose and methodology inherent in emerging theory. This seemingly chaotic model "…catapults us into an world where we must accept the idea that different observers whose observing are driven by different theories are necessarily operating in different worlds and creating different (Type 1) theories even while looking in the same direction from the same vantage point." (Dervin "What" 25-6) The significance of the relationship between paradigm, Type 1, and Type 2 theory is not unlike the relationship between practice and theory. For example, evidence based practice establishes a culture of inquiry that has implications for research. It contributes beliefs, values and assumptions of that culture. Paradigm is critical to establishing what best practice looks like. Because it is practice, rather than theory, it provides rich opportunities for identifying problems and issues that spark empirical research, and implies solutions to be tested by empirical research, which in turn, become substantive theory for further theory building.

The rationale for using this framework is borrowed from Dervin's Sense-making Methodology, which is "…based on the premise that it is philosophically anchored methodological consideration which builds the bridge between these two kinds of theory" (Dervin "What" 26). Dervin considers this kind of methodological explication that connects substantive theory with metatheory to be a third kind of theory - theory for methodology (Fig. 2). Dervin's theory for methodology provides a rationale and framework for studying what methodology does to theory, particularly with regard to the connections between substantive theory and metatheory. The relationships among these three types of theory generate a conceptualization of action research that clarifies its purpose, or how we think about it, and its methodology, or how we do it.

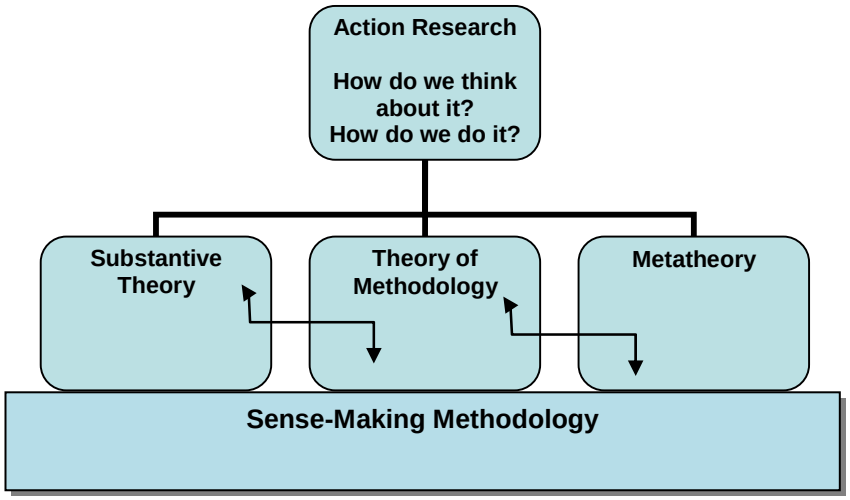

Fig. 2. How We Think About Action Research and How We Do It (Adapted from Dervin "What" 26)

The substantive theory and metatheory that contribute to a theory of methodology for studying action research based teaching are embedded in social psychology through the work of Lewin, and in the philosophy of education through the work of Dewey. In this study of theory building, substantive theory, as shown in Fig. 2, is Lewin's social psychology theory describing the cycle of action research methodology (Type 1 theory). It dovetails with metatheory (Type 2 theory), as shown in Fig. 2. Since "…it is widely agreed there is no observing which is not guided by theory", metatheory consists "…of philosophically grounded assumptions about the phenomena and about how to study it" (Dervin "What" 25). As noted earlier, Dewey's philosophically grounded assumptions are known as learning by doing, or experiential learning. Dewey's descriptions of action and reflection that lead to inferential thinking processes add cognitive structure to the transparent processes of reflective thinking. This structure indicates how to study learning and thinking processes. The Lewin-Dewey connection constitutes the theory of methodology for action research-based information literacy instruction.

Lewin's Substantive Theory and its Role in Action Research Purpose and Methodology

The Lewin-Dewey connection forms a theory of methodology for studying action research-based teaching. The discussion of this connection between substantive theory and metatheory is prefaced by an exploration of how Lewin's work in social psychology contributes to defining action research purpose and methodology. Although consensus is lacking concerning the origin of the term, "action research", Lewin ("Action") is generally accepted as the first to coin the term (Argyris, Putnam, and Smith; Kemmis and McTaggart). Lewin distinguishes action research from formal research.

> The research needed for social practice can best be characterized as research for social management or social engineering. It is a type of action-research, a comparative research on the conditions and effects of various forms of social action, and research leading to social action. Research that produces nothing but books will not suffice (Lewin *Field* 202-3).

The Dichotomy of Self and Society in Action Research Purpose

Lewin's work clearly established the social purpose of action research by applying group dynamics to problems of drug addiction, crime, and the rehabilitation of World War II veterans. In this tradition action research is "the systematic collection of information that is designed to bring about social change" (Bogdan and Biklen 223). Although Lewin used scientific experimentation, action research for social purposes resembles ethnographic research in its cultural and contextual sensitivity. Action research has spread beyond the boundaries of social psychology and social purpose to health and education, where it is has assumed the goal of improvement of practice. Initially, however, educators viewed action research as an agent of social change when applied to school reform. Schwab developed a holistic perception of curriculum that identified four commonplaces of schooling: teachers, students, subject matter, and milieu. As the definition of curriculum narrowed to what was explicitly taught, attention shifted to instruction. Stenhouse noted, "...we should move from product and process models of curriculum development toward a research model" (125). He believed that curriculum development presupposed that teachers engage in systematic study of their own work, because the world of school can be changed only by teachers who understand it. This influenced McKernan, who developed a handbook of curriculum in which he stated, "Curriculum will only be improved by researching our teaching" (262). Carr and Kemmis described Moreno's definition of this brand of 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 (162).

Lewin used collaborative action research with teachers at the Teachers Training College at Columbia University, leading to its application in educational settings. In this setting Corey (70) defined action research as the process through which practitioners study their own practices to solve personal practical problems by their involvement in the research as well as the application of solutions.

> We are convinced that the disposition to study…the consequences of our own teaching is more likely to change and improve our practices than is reading about what someone else has discovered of his teaching.

When action research takes on self- rather than social-orientation, it is defined as a "deliberate, group, or personally owned and conducted, solution oriented investigation" (Boomer 8). The teacher-as-researcher movement of the 1970s exemplified the application of action research for the purpose of improving practice.

Action Research in Education

Action research, as it applies to education, and particularly to information behavior and inquiry in school libraries, inherits both facets of purpose: Improvement of practice on the local level and global educational reform. In either case, action research is an instrument of change., but in every case it involves changing the behavior of individuals. The purpose of action research, then, is defined by its outcome rather than by its origins. Concurrent social- and self-oriented intentions of action research are demonstrated by its evolution in education, where a duality of intent is not only possible, but perhaps inevitable.

The following notation is useful to distinguish the two intentions of action research identified in this paper:

> AR(S1) = action research that targets self-improvement of practice
> AR(S2) = action research that targets social reform

Lewin's social psychology theory accommodates an integrative, rather than dichotomous interpretation of action research intent. He wrote, "There is nothing more practical than a good theory" (*Field* 169). He viewed the role of theory as an instrument that could produce insights into problematic situations. Inherent in theory are possible solutions, or pathways to solutions. "The creation of an empirically verifiable theory, Lewin knew, was the essence of science; research therefore had to be guided by the need to develop an integrated concept of the processes of group life" (Morrow 183). However, one will not find a theoretical framework for action research explicitly stated in Lewin's work. It resides, instead, in the corpus of his work, which provides a source of substantive theories that address action research processes. These theories include Gestalt theory, field theory, and group dynamics, as shown in Fig. 3.

Field theory clearly serves a social purpose, since it is situated in real world problems. However, field theory is rooted in theory, a highly individualistic construct. "A gestalt is a coherent whole. It has its own laws, and is a construct of the individual mind rather than 'reality'" (Lewin *Field* 240). This kind of subjectivism is friendly to the insider nature of action research as the individual practitioner interprets the workplace where action research takes place in a social context, regardless of its orientation. The relevance of Gestalt theory to action research aimed at self-improvement is enhanced when the connection among Gestalt, field theory, and group dynamics is made. Lewin (*Field* 240) defined a "field" as "the

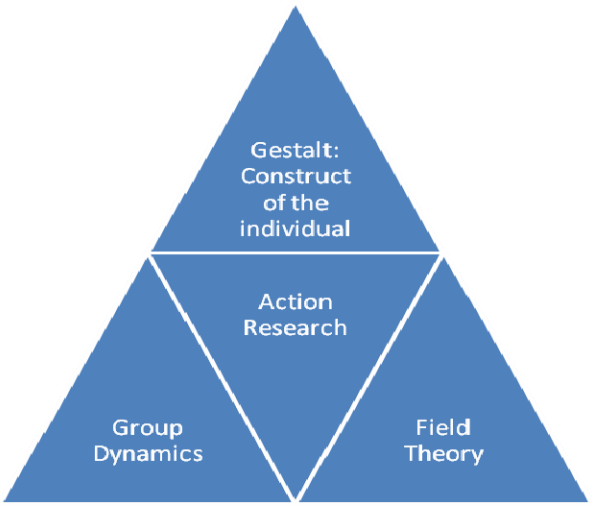

Fig. 3. Substantive Theory That Informs the Purpose of Action Research

totality of coexisting facts which are conceived of as mutually interdependent." Lewin's theory proposed that the whole psychological field within which individuals behaved, is called "life space," (Lewin *Principles* 16) which has to be viewed to understand behavior. Individuals operate in multiple life spaces, such as family, work, and school. Lewin's conceptualization of "life space" as the whole psychological field of human behavior, including family, community, and school can be applied to the personalized learning of young people in a formalized learning environment of the school library. Personalized learning through information behavior is clearly exhibited in digital environments when young people participate in online communities, or simply search for information on the World Wide Web. A public type of information behavior occurs in school, for example, when young people engage in structured information searching that is connected to specific learning outcomes. Personal and public information behaviors are concurrent in the school library, for example, when the "life space" includes formal information behavior such as searching the library catalog or subscription database, as well as the everyday social networking behaviors of the millennium generation. The school library presents the potential for formal and informal "life spaces" to co-exist.

The theory of life space suggests not only a purpose, but a method for research that involves qualitative instruments such as observation, interview, and focus groups. An example of how Lewin's conceptualization of life space could inform an emerging theory for inquiry learning in school libraries is suggested in the work of Maniotes, who theorized about connecting the student's world to schooling. Maniotes (*Guided* 32; *Transformative*) described a third space comprised of the interaction of personal experience and curriculum content. She considered the student's everyday life as the first space; while school life, including content of the curriculum, was the second space. The third space is created when the first and second space come together in equal amounts. The third space is the context for studying the design and implementation of school library instruction; it clarifies dimensions of learning that may be studied through empirical research.

Group dynamics and field theory have significant implications for defining the purpose of action research and its transformative effect on the culture of teaching and learning. When the life space is the workplace, such as a school library, there are social implications even when the purpose of the research is to study self-improvement of practice. When it appears that the school librarian or teacher acts gather and use evidence to inform and reform their practice,

they are functioning as leaders of their respective professions who have the capacity to initiate social reform through education. The distinction between self and social intent becomes blurred as the practitioner interacts with the work environment and becomes part of it.

On the theoretical level, a more integrative, rather than dichotomous, view of self and society is supported by Lewin's equation for human behavior, described more fully in *Principles of Topological Psychology* (12). The equation states that behavior is a function of personal characteristics and environment.

$$B = f(P, E)$$

When applied to the school library, information seeking and knowledge building behavior is a function of the personal, everyday information behaviors of user-learners and educators, as well as an environment unique to the school library. Unlike classroom environments, school libraries have the option to conduct instruction in many modes, including those that accommodate the personal characteristics and needs of the user-learner. In addition, collaboration between school librarian and teachers contradict the educational tradition of the teacher as sole authority. These collaborations take on mutual intentions and dependencies that did not exist prior to the collaboration. A culture of inquiry emerges as teachers become learners, learners are self- and peer-taught, and everyone becomes a researcher. This is a rich context for the researcher who applies methods of group dynamics and field theory to the study of evidence based information literacy instruction. Another aspect of the culture of inquiry in the school library informed by Lewin is interdependency. Brown (28-32) argued that Lewin's concepts of interdependence of fate and task interdependence contradicted psychoanalytic theory that attributed behavior to impulse. He based his argument on Tesser's view of behavior:

> …our behavior is purposeful; we live in a psychological reality or life space that includes not only those parts of our physical and social environment that are important to us but also imagined states that do not currently exist (Tesser 340).

Brown (28-32) posited that field theory contributes the concepts of interdependence of fate and task interdependence. Interdependency of fate explains that groups form "…when people in it realize their fate depends on the fate of the group as a whole" (Brown 28). An example of interdependency in the school library is the problematic phenomenon of collaboration between school librarian and classroom teacher. Collaboration is critical to designing the learning task that is the context for inquiry learning, yet it contradicts the culture of teaching that is essentially isolationist and individualistic (Lortie 73-4). Collaboration between the school librarian and teacher is problematic because teachers do not see that their success depends on groups. Implicit in the role of the school librarian are multiple layers of collaboration throughout the inquiry process. They include collaborations between learner and teacher, between learner and librarian, and between and among learners. Teaching and learning are synergistic and co-dependent processes. This has significant implications for the study of teaching or learning: studying only one or the other risks ignoring the synergistic relationship between the two.

Another appropriate subject for research is interdependency in social learning, when user-learners participate in networked discussions in Web 2.0 environments such as blogs or wikis. Interdependency also occurs in the real environment of the school library when user-learners work in groups. Fig. 4 illustrates the relationship between self- and social- oriented action research with respect to independent and interdependent learning.

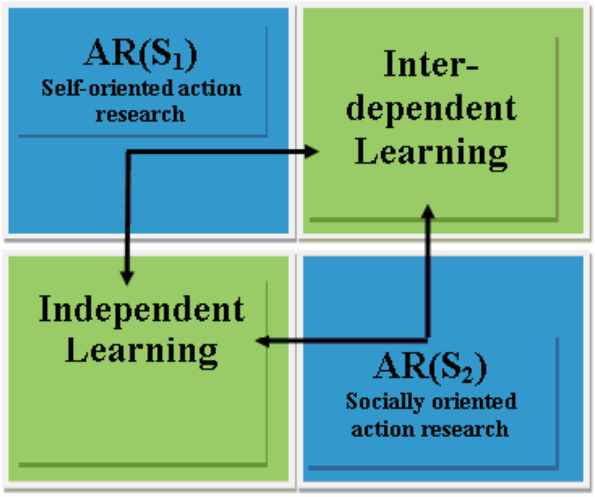

Fig. 4. The Relationship of Independent and Interdependent Learning in Self and Social Oriented Action Research

Both the self- (AR(S1)) and social- (AR(S2)) oriented modes of action research-based teaching employ independent and interdependent modes, regardless of whether the purpose of the research is self improvement or social reform. 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 the learning environment that constitutes a culture of inquiry known as evidence based instruction. When applied to school library instruction, the social outcome is educational reform; the self-oriented outcome is improvement of the practice of an individual or small collaborative group. When this duality of purpose is viewed as dichotomous, it fragments definitions of action research's purpose and methodology.

The Lewin-Dewey Connection: A Methodology for Studying Action Research for Self and Social Outcomes

While Lewin's substantive theories from social psychology, noted in Fig. 3, clarify the purpose of action research in terms of self and society, Lewin's change theory gives insights into the way action research is undertaken.

Change theory supports a model of action research as an iterative inquiry process using problem solving in a collaborative context. Data-driven collaborative analysis is applied to understand causes and enable predictions about change (Reason and Bradbury). It describes change in three stages (Table 1). The first stage, "unfreezing," occurs when the force field is altered. A force field supports the stability of human behavior, based on "quasi-stationary equilibria" (Schein). When restraining forces, such as personal psychological defenses or group norms are removed, equilibrium can be more easily shifted. These restraining forces are embedded in the culture of a community (Schein). The change occurs in the second stage, which precipitates a period of confusion and transition. The third stage, called "freezing," occurs when a new mindset becomes accepted and comfort levels return to their original state.

Table 1 contains two scenarios that illustrate how change theory informs the methodology of two hypothetical action research studies. Column 1 describes a study that adopts the self-improvement purpose of action research targeting improvement of practice; column 2 describes a study that targets educational reform.

Table 1
Methodology Informed by Lewin's Change Theory (Adapted from Schein; Reason and Brandbury)

	Column 1 **Improvement of Practice**	**Column 2** **Educational Reform**
Problem Solving Action Research questions that drive formal research methods	How can the school librarian improve the unit of inquiry and do it better next time?	How can school librarians, working with administrators, change the classroom paradigm of instruction using 21st century learning methods?
Collaborative Context	Form partnerships with teachers to collect user-learner surveys for unit revision.	School librarian works with the principal to adopt inquiry learning in the classroom.
Data Driven Collaborative Analysis	School librarian meets with teachers to analyze and discuss findings.	School administrators analyze school data to identify areas of testing that do not meet Annual Yearly Progress on state tests.
Stage 1: Unfreezing Remove restraining forces that resist change	Remove personal psychological defenses of teachers who resist working outside the classroom; principal mandates collaboration.	Remove group norms of little red schoolhouse, classroom centered teaching; plan virtual and blended resource-based courses that use technology.
Stage 2: Confusion	Integrate changes in the unit based on discussion with teachers	Choose courses for online development; collaborate with teachers to develop courses.
Stage 3: Acceptance	Implement changes in the unit for the next year.	Provide training and support; implement virtual and blended courses.

Both studies investigate phenomenon in the field and are conducted by practitioners. However, the purposes and methods of these studies can be the same as those used in formal research, meeting rigorous standards for reliability, validity, and transferability, using triangulation to ensure attainment of these standards. In this way, action research purpose and methodology inform formal research that researches evidence based information literacy instruction using action-research based teaching.

The psychological descriptions of change process noted in Table 1 (i.e., unfreezing, confusion, acceptance) inform Lewin's description of action research as a spiral of steps (Fig. 5). "Each…is composed of a circle of planning, action and fact-finding about the result of the action" (Lewin *Resolving* 206).

In the first step an idea is generated and examined. "Unfreezing" occurs as the idea is accepted. Planning consists of fact finding, an overall plan to reach the objective, and a decision about the first step of action. Planning usually results in modifying the original idea (Lewin "Action" 205). This is when confusion and transition occur: the process is recursive. It is "composed of a circle of planning,

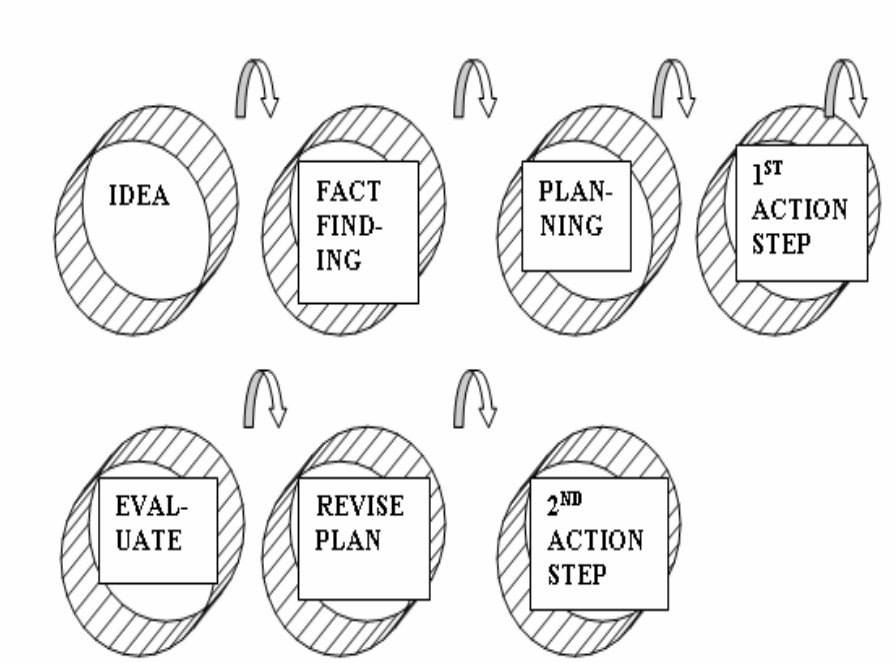

Fig. 5. Conceptualization of Lewin's Action Research Methodology (Adapted from Lewin *Resolving* 206).

executing, and reconnaissance or fact finding for the purpose of evaluating the results of the second step, and preparing the rational basis for planning the third step, and for perhaps modifying again the overall plan" (Lewin "Action" 206). In this process change is accepted, and equilibrium is restored.

Change theory also describes the emotional and behavioral components that accompany these steps. The model strongly suggests a problem-solving approach that externalizes internal processes. "The action of action research, whether in a small or large scale, implies change in people's lives, and therefore in the system in which they live" (McNiff 3). Action research is political, consistently effecting change.

The Relationship Between Lewin's Model and Other Theoretical Perspectives

Lewin's reflexive model of action research spirals from reflection to action to more reflection to new action. Some detect a kinship between this spiral of action and reflection and grounded theory (Glaser and Strauss; Strauss and Corbin). Like grounded theory, action research is reiterative. Theory is not imposed on the action research at the onset; it evolves from the practice itself. The theory reflects the practitioners' perspective (McNiff). Action research, as noted in Part 1 of this paper (Gordon "Emerging"), is a legitimate form of qualitative research when data collection is carefully monitored. As such, action research is not only a tool of evidence based practice, but also a tool for formal research. Like qualitative research, action research takes place in a naturalistic setting using participant-observation methods of ethnographic research. It is collaborative and includes characteristics of case study methodology (Belanger). Anderson, Herr, and Nihlen defined action research as "insider research done by practitioners using their own site as the focus of their study…it is oriented to some action or cycle of actions that practitioners wish to take to address a particular situation" (2). Garner saw it as a cyclical process, but action research is often defined as linear. Takala identified steps in the process of action research: formulating the question, creating a solution, implementing the solution, evaluating; and modifying ideas and actions. Gummesson labeled its components as data collection, analysis, action, decision making, implementation, and

change. Consensus resides in the concepts of reflection, inquiry and action, and the repetitive nature of the cycle (Patterson and Shannon "Reflection"). Kemmis and McTaggart viewed action research as a spiral in which each cycle increased the participant's knowledge of the question, leading to a new solution and a new question.

Like a variety of forms of action research that have evolved, Fig. 6 illustrates a methodical, iterative approach that includes problem identification, action planning, implementation, evaluation, and reflection (Carr and Kemmis). The model describes the movement from plan to action through observation and reflection. Reflection, complementary to the iterative nature of action research, can be used to generate models from a body of prior knowledge that reframes a problem. This is followed by experiments that bring about outcomes that are subjected to further analysis. This model is called reflection-in-action (Schon). It recognizes that there is little separation between research and practice, or between knowing and doing. When the plan is revised, the cycle begins again. The insights gained from the initial cycle inform the planning of the second cycle. The action is modified and the process is repeated.

McTaggart cautioned that it is a mistake to think that following the action research spiral constitutes "doing action research…. Action research is not a method or a procedure for research but a series of commitments to observe and problematize through practice a series of principles for conducting social enquiry." As a tool of evidence based practice, action research is concerned with collecting evidence, or data, in a systematic way that ensures that the analysis and findings have integrity. This evidence then defines a new practice, or modifies existing practice. In order to study the phenomenon of evidence based instruction, it is useful to use this function of action research and study it in a systematic way. The instruments, procedures, and findings of action research, as a tool of evidence based information literacy practice, inform the methods used to study action research (Gordon "Study"). This is not to say that commitment to observe and problematize is not a prerequisite, or that a series of principles for conducting action research are not needed. However, building a theory of methodology for the study of action research

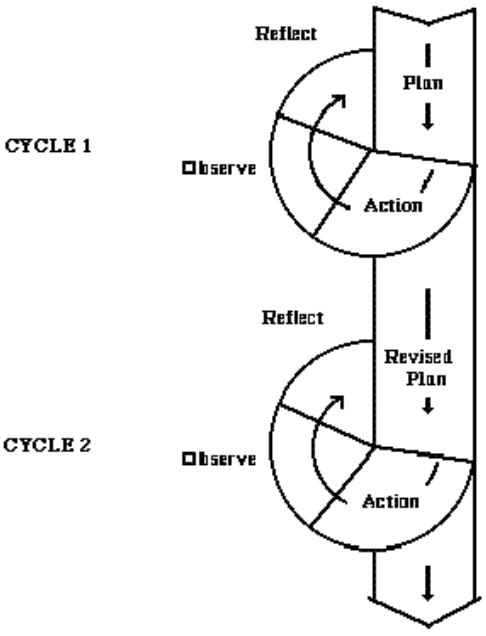

Fig. 6. The Action Research Cycle (Kemmis and McTaggart)

rests on the premise that action can be systematic and predictable in its execution. This paper posits that authentic learning methods, as well as traditional qualitative research methods, comprise an instruction-specific form of action research that informs the formal research that studies it as a phenomenon of teaching and learning.

The strong connection between purpose and methodology for action research assumes that practitioners need to know why they do what they do in order to be able to make informed teaching decisions. This kind of practice-based theory is the only valid form of action research theory (McNiff). This paper posits that since the boundary between research and practice is fuzzy, practice must be theory-based. This is demonstrated in a study (Gordon "Study") where the action research training model contained a theoretical component that required practitioner-researchers to identify a learning theory that informed their research question, or supported the way they collected evidence, or reinforced their findings. It is possible for action research to bring theory, formal research, and practice into alignment. The role of theory in action research is practical in the sense that it drives methodology. Logical argumentation, rather than a proposed plan, develops the action research as it evolves. This is not to say that methodology in action research does not exist or that it always exists, but that it can exist. Action research is a creative way to effect change through the continuous improvement defined through theory that drives best practice. It requires acceptance of the problematic and unstable nature of professional practice (McNiff).

Dewey's Metatheory

Dewey's descriptions of action and reflection offer the metatheory that complements Lewin's action research spiral. In fact, there are several points of intersection between the work of Lewin and Dewey. In terms of understanding learning behavior, Lewin's change theory accounted for behavioral and affective components. Dewey's metatheory describes cognitive processes predicated on

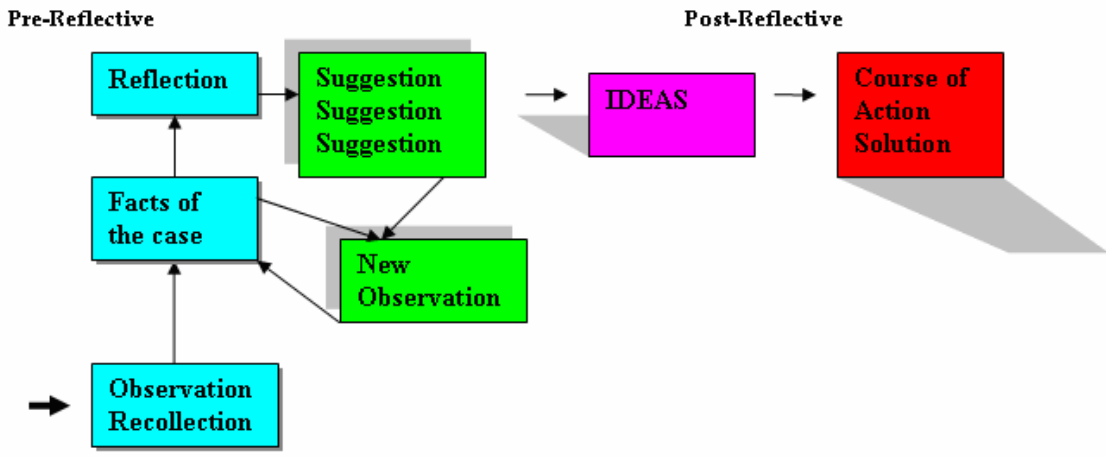

Fig. 7. The Conceptualization of Pre- and Post-Reflective Thought (Adapted from Dewey *How We Think*)

principles for talking about thinking. This has important implications for action research methodology (Fig. 5) and the cycle of action research (Fig. 6). Dewey analyzed reflective thinking as a process that goes from a pre- to a post-reflective state. The process begins with observing the surrounding conditions (Fig. 7), which Dewey called the "facts of the case." Coupled with recollection, or observations rooted in the past, reflection is a way of exploring a situation to discover the facts.

Facing the conditions, or situations, to discover facts requires effort until the habit of thinking is formed. Suggestions compete with each other as the person seeks the best solution. Facts and suggestions guide new observations, which is an important aspect of the reflective thought process. The continuous interaction of facts, disclosed by observation, and suggestions, or suggested proposals of solutions, continues until some suggested solution meets all the conditions **(**Dewey *How We Think*).

The interaction of perceived facts and suggestions generates ideas (Fig. 8). The observed facts are called the data. Data are material to be interpreted, explained, managed, and utilized, resulting in suggested solutions that form ideas.

Data and suggestions form indispensable and correlative factors of all reflective activity. This process is accomplished through inference, going beyond what is actually observed or projecting what is possible. It proceeds by anticipation, supposition, conjecture and imagination. What is inferred demands a double test: 1) The process of forming the idea or supposed solution in constant cross-reference to conditions observed (facts); 2) The idea after it is formed is tested by acting upon it. The consequences of the action confirm, modify, or refute the idea (Dewey *How We Think*).

Dewey's (1910) model of reflective practice comprised of action and reflection is a kind of metatheory: It is a set of beliefs that reasonably explains the complex phenomenon of thinking around which educators can build a set of values and practices about what teaching and learning looks like when it best serves the learner. When these models of thinking connect with action research conducted in school libraries, pedagogy of self-reflection evolves. Instruction is never perfect; sooner or later something goes wrong. Even when instruction goes well, the question of improvement arises. In either case, there is a cycle of action and reflection that is continuous. For example, typical problems

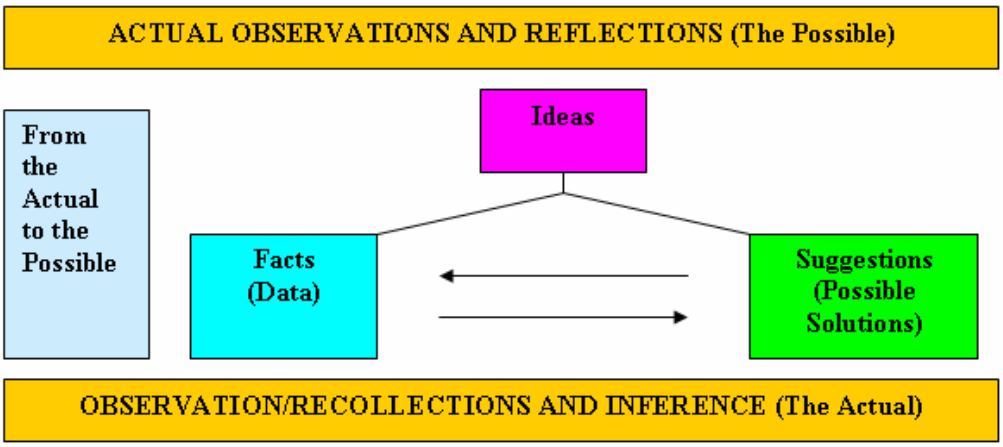

Fig. 8. The Generation of Ideas (Adapted from Dewey *How We Think*).

that school librarians identify in their practices include plagiarism, student indifference to subscription databases (Gordon "Study"), and "reporting" rather than researching (Gordon "Fish"). Dewey's model applied to these "cases" includes observation and recollection of past experience that generate the facts of the case, or the data. Without a deliberate and conscious process, perceptions and misperceptions may masquerade as fact as the school librarian struggles to define the problem. Past experience may even hinder a clear understanding of the problem. Unaware of the fallacies, the school librarian begins to generate ideas that are flawed because they are not based on the actual facts of the case. A process is needed to help the librarian test ideas or supposed solutions in constant cross-reference to conditions observed. The process structures the testing of actions that result from acting on the idea. Action and reflection are synergistic components of action research process. This is an example of how Dewey's thinking model adds cognitive structure to the reiterative model of action research, offering a method for thinking about the action and reflection (Fig. 6). It is also applicable to the thinking processes of students who engage in self-reflection through authentic learning, as described in Part 1 of this article (Gordon "Emerging") and explained in Fig. 7 and 8. The connection between Dewey's metatheory and Lewin's substantive social psychology theory generates a theory of methodology (Fig. 2) for studying action research-based teaching informed by the methods prescribed in Lewin's work and the cognitive processes described by Dewey.

Implications of Action Research as a Tool of Evidence Based Information Literacy Instruction Theory

Two purposes for action research are defined in this paper. They are viewed as complementary, rather than dichotomous. This section of the paper explores the relationship of self (AR(S1) and social (AR(S2)) oriented action research, followed by an explication of the theory and its corollaries.

The Relationship Between Self-Oriented and Social-Oriented Action Research

The emerging theory developed here postulates that evidence based information literacy instruction uses action research as a tool for two purposes: improvement of self and society. Self-oriented action research (AR(S1)) targets self-improvement at the local level through teaching and learning in school libraries. Authentic learning, as well as traditional data collection methods, generates evidence for user-learners to critique and revise their work and for educators to revise their teaching, based on evidence of student work and progress. Dewey's experiential learning supports this teaching methodology that encourages creativity and innovation. Often called "active learning', it incorporates the critical element of reflection which internalizes learning, making it specific to individual learners. Lewin addressed the behavior of group members, advocating participant observation whereby they were emotionally involved, but could observe themselves with objectivity, similar to Dewey's self-reflection. Lewin's methods resemble Dewey's active learning: he advocated the use of film and other cognitive aids to engage group members.

The social orientation of Lewin's action research and Dewey's action and reflection models also complement each other on social and political levels, Democratic values, not unfamiliar to libraries, are central to their work. Lewin ("Patterns") explored the effects of various types of leaders on the structure of groups and the behavior of group members. Three leadership models, democratic, autocratic, and laissez-aire, were compared in a terms of the effects they elicited from group members. Reid (115) reports that democratic leadership was the most effective in eliciting creativity, positive group feelings, and friendliness while the other leadership models elicited more hostility, aggression and dissatisfaction. Dewey was also interested in democracy in terms of learning behavior. Allport points out the kinship between Lewin and Dewey.

> Both agree that democracy must be learned anew in each generation, and that it is a far more difficult form of social structure to maintain than is autocracy. Both see the intimate dependence of democracy upon social science. Without knowledge of, and obedience to, the laws of human nature in group settings, democracy cannot succeed. And without freedom for research and theory as provided only in a democratic environment, social science will surely fail. Dewey, we might say, is the outstanding philosophical component of democracy; Lewin is its outstanding psychological component. More clearly than anyone else has he shown us in concrete , operational terms what it means to be a democratic leader, and to create democratic group structure (xi).

Social-oriented action research (AR(S2)) targets social reform on the global level of educational improvement. This occurs when administrators, policy-makers, and government agencies incorporate action research into their decision-making processes. In this case, the purpose of the action is reform imposed from the top. For example, a national department of education may use evidence based practice to study the effectiveness of uniform learning standards. As a result of the evidence collected, a top-down decision may mandate differentiated levels of standards, not merely minimal standards, for testing and evaluating student achievement. This dimension of educational reform is outside of the province of school librarians and classroom teachers. However, this is not to say that local action research-based reform (AR(S1)) cannot effect global consequences when the school librarian assumes the role of professional developer, for example. Action research situated at this level (AR(S2)) effects a grassroots type of reform, where practitioners reform teaching and learning from within their practices, and their findings and results are disseminated to create a new paradigm or norm. For example, locally generated educational reform could be considered a type of social reform that is a by-product of evidence based practice and action research. Further study is needed to assess social oriented action research for the purpose of global educational reform, particularly in terms of 21st century learning in virtual environments (Gordon "Emerging") that challenge traditional assumptions about where and how education takes place.

Corollaries to the Theory of Evidence Based Information Literacy Instruction

Emerging theory posits that evidence based information literacy instruction uses action research as a tool of evidence based practice. An investigation reveals two purposes of action research that originate in self-improvement and social change. The former leads to local improvement of practice; the later to global educational reform. Exploration of methodology concludes that authentic learning is a tool for action research that aims at improvement of practice. Sense-making methodology generates a theory of methodology through the synergy of substantive theory and metatheory. Lewin's social psychology theory and Dewey's metatheory of inferential thinking provide behavioral, affective, and cognitive dimensions for studying evidence based information literacy instruction through action research. Corollaries to evidence based information literacy instruction theory address the major tenets of self and social action research as defined in this paper.

Self-Oriented Action Research - AR(S1)

Action research for the purpose of self-improvement or improvement of one's practice has several corollaries that inform the theory of evidence based information literacy instruction. Inherent in the corollaries that address these two purposes is a theory of methodology that derives from the Lewin-Dewey connection.

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 that generates evidence through performance based 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; 2) to inform the teaching decisions and revision of teaching strategies of school librarians and teachers.

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 (searching and retrieving information) and advanced information literacy skills (evaluating and applying, or using information; 2) macro level learning task that is the context for information tasks. The learning task is related to real world contexts, problem-solving, and decision making. This distinction between micro and macro levels of tasking provides the researcher with a way of tracking the information-to-knowledge connection while preserving the integrity of information searching and knowledge building.

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 is seen as critical to this connection.

These corollaries indicate research directions for self-oriented action research aimed at improving school library instruction. Implicit in these directions are methods specific to constructivism and social psychology, including Dewey's description of inference.

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 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 leader in instruction 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 integrating 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-knowledge connection and technology-driven life and work contexts. Challenges for 21st century educators call for 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, conceiving the school library program as an educational reform 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.

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, as well as 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 that blurs the distinction between the two.

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 and Alexandersson 3).

Conclusion: Implications for Research Driven by the Emerging Theory

Emerging theory of evidence based information literacy instruction and its corollaries indicates a research agenda for studying evidence based instruction in school libraries, as well as virtual environments that is rich in information, resources, and technology. At the heart of the theory are evidence and action research conceived as tools for thinking and building knowledge, commonly called "learning".

> The Greeks acutely raised the question: How can we learn? For either we know already what we are after, or else we do not know. In either case, learning is impossible… (Dewey *Democracy* 142)

John Dewey tackled this dilemma and concluded:

> The dilemma makes no provision for *coming to know*, for learning; it assumes either complete knowledge or complete ignorance. Nevertheless the twilight zone of inquiry, of thinking, exists. The possibility of hypothetical conclusions, of tentative results, is the fact which the Greek dilemma overlooked.…
>
> Systematic advance in invention and discovery began when men recognized that they could utilize doubt for purposes of inquiry by forming conjectures to guide action in tentative explorations, where development would confirm, refute, or modify the guiding conjectures. While the Greek made knowledge more than learning, modern science makes conserved knowledge only a means to learning, to discovery (Dewey *Democracy* 142-3).

The theory of evidence based information literacy instruction views evidence based information literacy instruction and action research as instruments for teaching youth how to think and for raising the bar for teaching to accommodate the "twilight zone of inquiry". It goes beyond teaching information use in the guise of information literacy, visual literacy or technological literacy, to teaching knowledge use.

> While all thinking results from knowledge, ultimately the value of knowledge is subordinate to its use in thinking. For we live not in a settled and finished world, but in one which is going on, and where our main task is prospective, and where retrospect - and all knowledge as distinct from thought is retrospect - is of value in the solidity, security, and fertility it affords our dealing with the future (Dewey *Democracy* 146).

A theory that supports the pedagogy of school libraries as an alternative to instruction oriented to the "right answer," where testing is the measure of knowledge, and mistakes are equated with failure rather than opportunity to discover, is highly relevant to much needed research for alternatives. A theory that accommodates research embedded in digital environments, where information seeking and use and knowledge construction are all self-directed, points to a pedagogy for the future and is, in itself, a social reform. Librarianship seems the logical profession to lead the

systematic and methodical development of models for evidence based practices that inform the educator's decision-making and problem solving. Like the medical model for bridging theory and practice, the instructional model of action research for librarianship depends on the training of practitioners to apply evidence to practice. Librarianship is well-suited to developing practitioner-researchers who are self-reflective in their practice and proactive in helping patrons to make the information-to-knowledge connection. The implications for self-improvement in teaching and learning that leads to educational reform on a social scale that is lead by the library profession reinforce the paradigm shift that redefines librarianship as it moves from an information age profession to that one enables a knowledge society.

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