

Learning-Centered Libraries: Implications from Research

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How many research studies on school library media centers does it take to influence practice? Researchers in this field do not generalize about practice from a single study, nor probably even two or three studies. Practicing library media specialists do not have the time to translate research findings into daily, in-the-trenches librarianship and then to share results with the field. But outstanding research is being published, and school library media specialists have an obligation to rethink library programs based on the findings of these studies.

One such research study is the dissertation of Judy M. Pitts, titled *Personal Understandings and Mental Models of Information: A Qualitative Study of factors Associated with the Information Seeking and Use of Adolescents*.⁽¹⁾ As a researcher, Judy Pitts would not have generalized from her study to suggest broad implications for practice. A library media specialist, however, has the freedom to interpret research findings, translate them into changes in a library program, implement the changes, assess the results, and modify the program as needed. This article offers both interpretation and translation of Judy Pitts' work.

The implications for practice from her dissertation touch many facets of the library media center program, but most specifically the instructional program. The overarching implication is that library programs must be based around learning, not around libraries. One small example from the dissertation demonstrates the effect of making library media programs learning-centered. Judy Pitts discovered that students (and teachers) often had a mental model about finding information in magazines that led them to pull bound volumes of right-sounding magazines from the shelf and browse the tables of contents to find relevant articles. If we want students to be able to use magazines in their information search, and if we recognize their mental model, we will have to overcome our library definition of indexes as reference books and move the indexes and instructions for use into the physical path of magazine access.

The process of rethinking a library program based on research about learning seems daunting. First we must identify from the research what we know about learning. Then we must derive the implications from those findings for learning, planning, and teaching through the library. Finally, we must evaluate honestly the effect of our programs on student learning.

Learning

If we are to base our programs on learning, it is important to have a clear vision of what we mean by learning. Learning means understanding. It means that learners have been confronted with new ideas and have changed their previous understandings to incorporate those new ideas. Learning implies a change in the mind of the learner; therefore, learning cannot be defined as a

collection of information, as knowledge that can exist outside of a learner, or as simply a process unrelated to content.

Learning Involves Constructing a Mental Model

Research on learning has shown that developing new understandings involves an active mental process by the learner to put new information into a context, framework, or mental model. This process may involve reorganizing ideas or reconstructing an old framework until the new pieces fit logically (at least to the learner). The learner reflects on the fit, actively adds new pieces, then reflects again until a model is constructed. The resultant mental model will survive if it is flexible enough to adapt to new situations and incorporate new understandings.

Key ideas in this theory are the active construction of understandings (called constructivism in current educational terms) using reflection and self-assessment to modify ideas as needed; the connectedness of knowledge implicit in mental models; and the fact that learners are naturally inclined to be logical in their approach to new ideas (although their logic may not be immediately apparent to observers).

Prior Learning Affects Now Learning

Children begin constructing personal knowledge as soon as they experience the world. Pitts summarized current educational thinking about attributes of personal knowledge as follows:

- intuitive (children form ideas about the world based on their own experiences, without any formal instruction; e.g., trees cause wind);
- naive (even after children have been confronted with accurate facts, they may retain their naiveté by developing a slightly modified version of their intuitive understanding that does not contradict expert opinion; e.g., air pressure causes wind but it's windier at the tops of trees than at the base);
- implicit (learners may not be able to identify or express their own underlying assumptions or understandings);
- persistent (when confronted with a problem, learners tend to fall back on their previous personal understandings); and changeable (when the mental model no longer provides adequate support, learners will change it, incorporating the new ideas and rearranging the framework.(2)

We understand, therefore, that neither are students blank slates waiting for teachers to fill with knowledge, nor are students full of prior learning that can be built upon with no impediments. Some of their personal knowledge may be inaccurate, and educators will not succeed in changing students' limited or incorrect mental models unless the models themselves are addressed. Educators must help students identify what those mental models are and where additional information or experience is needed.

Learning Involves Both Content and Process Learning Strands

Any learning experience involves several different strands, one of which is usually content and the rest of which are processes, such as information seeking and use or decision making. If the processes of thinking and learning and communicating are defined as inquiry and expression skills, as TheodoreSizer has suggested,(3) then each learning experience probably involves two strands—one content and one process. These strands are inextricably interwoven throughout the learning. Pitts' very important finding is that instruction in information seeking and use must be integrated with content for subject matter learning to occur. Students have to be supported on all learning strands for significant learning to occur on any.

Learning Is Social

Lev Vygotsky has identified a concept called the Zone of Proximal Development (ZPD), which he defined as the distance between where a student's understanding is and where the student could reach with expert guidance.(4) Central to this concept is the fact that students cannot proceed through their ZPD without a peer or an adult confronting their ideas and showing them the potential for growth. A complacent student, or one isolated from others more knowledgeable, will not develop new understandings.

A social context for learning provides more than confrontation and support. It also guarantees feedback throughout the process of learning and reveals the complexity of ideas. The variety of points of view and the opportunity for intellectual sharing shape a multifaceted context for the development of complex understandings.

Learning Is Deeper When Supported by a Learning Framework

Research has shown that when students focus on a framework for their learning, such as a problem-solving model, they are able to look past the specific activities and short-term goals to the larger goal of understanding. When students are confronted with a problem in their process of learning, they can draw upon the learning framework to provide the next steps.(5) Resnick and Klopfer have suggested that the steps should lead to developing "generative concepts," those understandings that are broad and flexible enough to be applied to more than one situation.(6)

To find out if students have developed generative concepts, the assessment of learning should be based on students' understandings and on their processes of learning, not on the specific appeal of their final product. Traditional assessment has given way to the tenets of authentic assessment, which provide for ongoing assessment of both process and content, for student thoughtfulness and reflection, for products that are rich in content and real-world meaning, and for collaborative efforts.

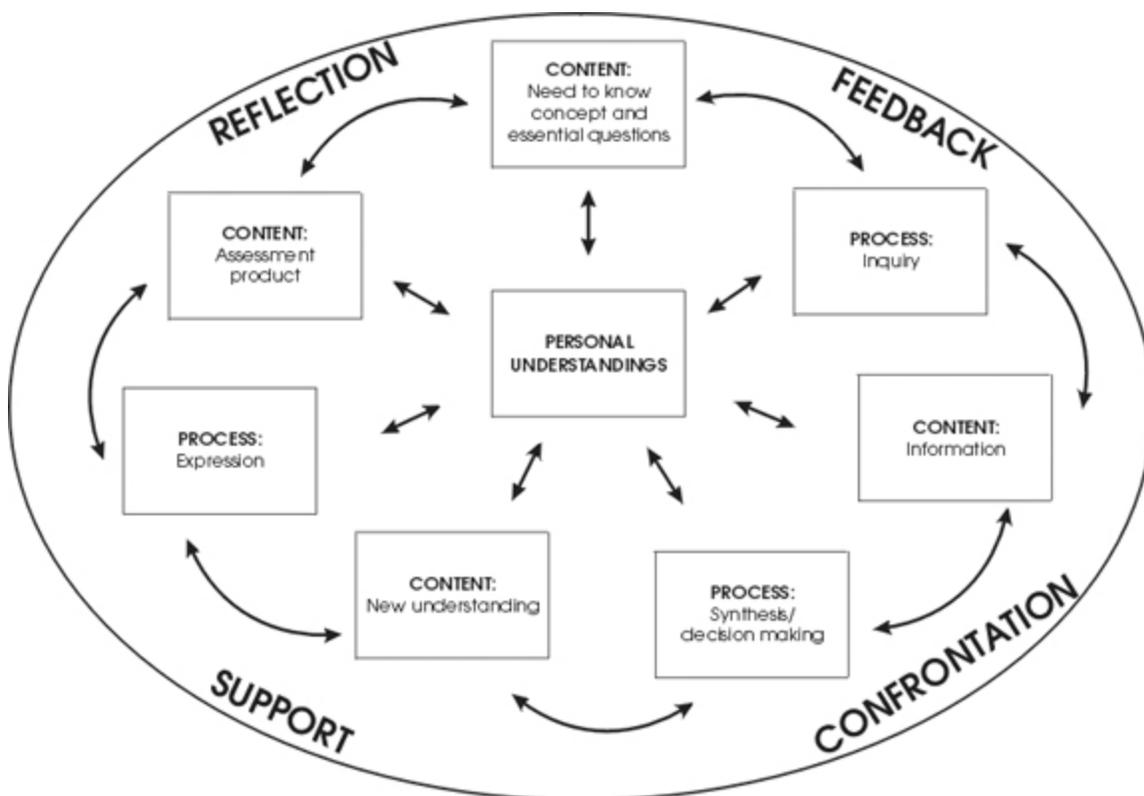
Whatever framework is used for learning (the scientific method, a problem-solving model, a research-process model, or something else), students and teachers must remember that learning is recursive. Students move backward and forward throughout the process as they encounter difficulties, reflect on their own progress, make decisions, or react to input from others.

Implications for Learning through the Library Media Center

Thoughtful Learning Cycle: Overview

If library media specialists make use of the research findings of Pitts and others in restructuring library media programs, then a model for thoughtful learning should provide a framework (see figure 1). The Thoughtful Learning Cycle model integrates research-process models that have been in the literature for several years with some new findings.

Figure 1. Thoughtful Learning Cycle



The overall structure of this model is a cycle, because real learning should always lead to more questions and further investigation. Basing investigations on a linear problem solving model in which the final step is a completely resolved solution leads to trivialization of thought. If students are pursuing real areas of concern (e.g., teenage pregnancy), they will not be able to solve the problem with their research and thinking. Their process should enable them to synthesize, draw conclusions, suggest approaches, and predict future dilemmas. They should be able to ask additional questions and suggest ideas to pursue in more depth. A cyclical model like the Thoughtful Learning Cycle should help students understand that learning is continual and

recursive, and that the main goal is not a final product or solution but the formulation of ideas, understandings, and further questions.

At the center of the Thoughtful Learning Cycle are the personal understandings (or mental models) about both process and content that form the basis of learning. Children begin building mental models as soon as they experience the world. Any new learning starts with these mental models; real learning occurs only when these models are restructured to include new ideas in a meaningful context. The Pitts research has shown that mental models affect learning throughout the process and that teachers must take these into account as they plan, teach, and support learning.

Encircling the core of personal understandings are the integrated content and process elements that provide the structure for learning. In the content strand, a student progresses (recursively) through four stages:

Content

1. Need to Know/Concept and Essential Questions
2. Information
3. New Understanding; and
4. Assessment Product.

The information processes occurring simultaneously with the content phases include three aspects:

Process

1. Inquiry;
2. Synthesis/Decision Making; and
3. Expression.

These three aspects are labeled as one learning strand—the process strand—and incorporate the same processes that Pitts labeled three strands: information seeking and use, life skills, and production.

This whole thoughtful-learning-cycle structure is surrounded by an essential network of ongoing assessment involving both reflection and feedback. Peers, teachers, and the learners themselves should reflect on the content and process and provide feedback to the learner at all phases of the learning cycle.

Feedback takes the form of both support and confrontation. The Pitts research makes it very clear that, for significant learning to take place on any strand, students need support on all strands. Support can be offered through teaching, coaching, scaffolding, modeling, or other techniques. Research is also clear that real learning happens when a learner is confronted with a contradiction, a new idea that cannot be incorporated into an old model. That confrontation, or

provocation, may be offered most effectively by peers, teachers, or outside experts, and less effectively by easily dismissed or ignored print or audiovisual materials.

It would be helpful to examine each phase of the integrated content/process learning cycle, both to investigate its scope and to suggest practical applications for the teacher and library media specialist.

Content: Need to Know/Concept and Essential Questions. Thoughtful learning starts with a student's need to know. Fostering that need is complex; the library media specialist can be involved at several levels. An essential component is identifying each student's existing mental models: What does the student already understand about the content? What implicit knowledge is operating? This goes beyond the traditional needs assessment, which usually identifies the components of the content that are important while ignoring the mental models of students. For example, suppose a teacher team and library media specialist are planning a unit for eleventh-graders on the time of Christopher Columbus and the effect of Columbus' attitudes and actions on life today. A traditional needs assessment would list the important elements of content: problems of exploration, society and politics in Europe, society and culture in the New World, attitudes of Columbus, actions of Columbus, reactions of the native Americans, immediate effects, and long-range effects.

Perhaps the students have a mental model of Columbus as a savior (on a quest for Christianity), as someone who brought the niceties of civilization to the savages, as a brave risk-taker on a noble quest. Certainly, many American history textbooks propagate that view. Unless the students' prior understandings about Columbus are actively identified and addressed, students will define what they need to know within the framework of their already existing mental model. If they regard Columbus as a successful missionary, they might decide they simply need to investigate the extent of Christianity in the Americas today.

Once teachers have incorporated a way to identify and use student's prior understandings, they must also plan the future understandings they hope students will gain. In this phase of the collaborative planning process, classroom teachers and library media specialists focus on the content goals: What do they want students to understand about the time of Columbus? They decide on a main focus for the unit. Often the controlling idea for the unit can be stated in terms of a major concept the teachers would like for the students to understand. In terms of the Columbus unit, the teachers might choose the concept of cultural conflict.

Using the controlling concept as their guide, the teachers might pose questions to start students thinking about the major focus of the unit: What happened when Columbus brought European culture to the New World? What long-term cultural effects can be seen? The students would use these questions to focus their work throughout the unit.

The teachers, perhaps in conjunction with students, further define their study by deciding what questions must be answered in order to reach conclusions about Columbus' effects. These are called essential questions; they serve to provide a framework for the learning activities. Usually a unit will have three or four essential questions written at different levels of Bloom's taxonomy. A comprehension question for this unit might be: What were the main elements of European and

native American culture at the beginning of the sixteenth century? An analytical essential question might be: What were the effects of Columbus on the native Americans-physically, socially, economically, psychologically, and spiritually?

Process: Inquiry

Probably the first three steps of a research process would be included during this phase of the thoughtful learning cycle. Inquiry is very recursive as students “mess around” with the subject to gain insight into the overall topic and into what aspect intrigues them the most.

Identify Need/Find the Focus. Students begin a project at all different levels of prior knowledge and with highly individualized needs and interests. The teaching team can use a number of teaching strategies at this point to help students identify what they already understand about the subject, find a personal connection, and narrow to a specific focus for their own investigations. But no matter what teaching strategies are used, teachers and library media specialists must realize that inquiry takes time, it is messy, and the work must be performed by the students themselves. Teachers cannot carry out the process of inquiry for the students, although they can support and facilitate that process.

Learning-style strategies indicate that students must start their learning by figuring out why this learning would be meaningful to them. A simulated “culture clash” might provide a personal context. As an added benefit, students would be actively involved in the inquiry process from the beginning.

Students must understand the broad topic and have an overview before they are ready to narrow. Some overview information can be provided by the teacher (as long as students have the opportunity to do some of the looking themselves). Teachers and library media specialists have a rich repertoire of techniques and resources available for providing an overview, but care should be taken that the overview confronts students’ prior mental models. In other words, if students have a very traditional, one-sided, hero-like view of Columbus, a glowing filmed tribute to Columbus might not be the most appropriate overview material, because it will not cause students to reassess their own mental models. The narrow topic for each student must fit within the framework of an essential question. Based on the overview information, a student might decide to concentrate on the psychological effects of Columbus’ culture on the native Americans.

Get Organized. At this phase of inquiry, students write a tentative thesis statement or statement of purpose, formulate research questions, and develop a plan for research and production. Modeling the thinking processes involved in writing a thesis statement and research questions may be the support most needed by students at this point. Modeling is different from providing a model. During modeling the teacher thinks out loud, investigating options, identifying questions, and making decisions. The students will be able to see that there is not just one right thesis and that deciding on their personal focus is difficult and subject to later change. Based on their tentative thesis and research questions, students make preliminary decisions about the most appropriate types of sources and the access points for each.

Find Information. A real process of inquiry will get even messier at this point. Students locate sources and then choose the most appropriate and valuable. As they begin to find information, they may find themselves asking additional questions or pursuing their topics along a different route. Their questions or tentative thesis may change; they may discard all their original sources. Some students may even shoot off into unresearchable or unrelated topics unless their inquiry is constantly realigned.

The danger at this point is that teachers, while they attempt to redirect students' research, will try to establish control over the inquiry process. Requiring three sources, mandating the use of a subject encyclopedia, dictating the number of notes from each source—all of these management techniques usurp the student's responsibilities and dampen the inquiry process. Instead of using control, teachers and library media specialists must allow the overarching network of reflection and feedback to work by establishing mechanisms for student reflection, peer review, and teacher coaching and consultation.

Another danger at this step is that students will be frustrated by the messiness of research and will start grabbing facts. Students must be taught to evaluate information thoughtfully. They must be supported in finding connections among ideas, building modified personal understandings, and tolerating ambiguity. The connections between where they are in the thoughtful learning cycle and the core of learning (their mental models) must be clarified and fostered.

Content: Information

The information that students gather forms the backbone of new understandings. Students, however, tend to view information as an end in itself, losing sight of the goal of developing new understandings. Certainly textbooks, achievement tests, and many other pressures cause students to step quickly through their learning, lightly catching fragments of meaning along the way.

The information or content of learning in schools is currently undergoing massive national scrutiny. Educators have realized that, with so much information available, teachers and students can lose sight of core understandings while being drowned in facts. Much of the restructuring effort by national subject-area organizations involves writing new content standards, with high expectations for content understanding. The standards do not identify a core body of knowledge; instead they delineate key concepts and understandings that underlie different subject areas and integrate process skills that make that learning possible. If library media specialists use the standards in their programs, they can help students maintain their focus on understanding as they gather information.

Process: Synthesis/Decision Making

Make Sense Out of Information. Although synthesis and decision making may not be included in some library media specialists' mental models of information processes, they are indeed vital in the thoughtful learning cycle. In fact, they are represented in the research process step of "Make Sense Out of Information." Several techniques can be used successfully to coach students through this step.

Students can be instructed to take notes in a learning-log format (with a reactions column for their own thoughts). In the reactions column, they should react to their notes using the following questions: How does this idea fit with what I have already read? How does it fit into what I know? What doesn't make sense about this? If this is true, how does it support or deny my thesis? What do I still need to find out? Students will discover that their synthesis emerges from their reactions.

Teaching organization techniques can help students see enough order in their information and ideas that they can establish conclusions. Students should be taught visual organization (e.g., webs, time lines, branches) as well as linear organization (e.g., traditional outlines, lists, comparative columns) so that they can choose the organizational pattern that most effectively helps them juxtapose and synthesize their ideas.

Students may have difficulty reaching conclusions not because they are lacking information or cannot organize it, but because they do not know decision-making strategies. Teaching these strategies as part of the thoughtful learning cycle and research process will enable students to become active and responsible in forming new understandings.

Strategies that might be helpful to students in making decisions and reaching conclusions would include:

- *Pro vs. Con:* Students make a two-column list of pros and cons.
- *Decision-making chart:* Students create a decision-making chart and list the chief attributes of the subject across the top (e.g., if the subject is economic effects of Europeans on native Americans, then the list could include attributes of a vital economy). Down the side, the student lists aspects discovered through research (e.g., particular actions by Europeans). The student then would decide which attributes were a part of each researched item (see table 1). By analyzing their research in this manner, students can reach logical conclusions about their research questions, using the information they have gathered.
- *Rating scale or report card:* Students devise a simple report card to rate various aspects of the subject according to a standard.
- *Visual sorting of information:* Students can use columns to sort through the information (such as columns labeled “Beneficial to Native Americans,” “Beneficial to Europeans,” and “Mutually Beneficial”). Actions taken by both Europeans and native Americans at the time of Columbus could be listed down the side and the appropriate columns checked.
- *Webbing:* The center of the web is reserved for the conclusion. Radiating from the center are aspects that affect the conclusion, with further webbing to accommodate supporting data for those aspects. Once students have placed all of their important information on the web, the web will demonstrate visually where support is strongest. The conclusion or decision is based on that evidence.

Table 1. Attributes

European Actions	Independence	Necessities	Luxuries	Securities
Traded baubles for tobacco		–	+	
“Employed” natives	–	+		–
Introduced new products	+	+		

Content: New Understanding

This is an interesting phase of the thoughtful learning cycle. It is most important in terms of real learning and yet is the step most often omitted in traditional assignments. Library research projects, for example, often skip right from information to assessment product. Most textbook-based learning jumps from information displayed in the text to testing for that information.

What we have learned from the Pitts research is that students must form their new understandings in terms of their own mental models: What did they previously understand and how do their new conclusions fit? How do they need to reorganize their prior knowledge to accommodate the new understanding? What does their new mental model look like? If written records were kept at the first phase of the thoughtful learning cycle when students were identifying their own mental models, these could be used to great advantage at this point. Students themselves need to define how their learning has changed their mental model; by doing that, they are building a new model. Research indicates that this reconstruction must happen for real learning to occur.

Process: Expression

Use Information. Pitts discovered that students can become so involved in the production phase of their learning that no learning occurs (except perhaps a few isolated production skills). If learning in production is supported and confronted, just as it must be in every other phase, production will not become an end in itself, but a way to express new understanding.

Teachers and library media specialists plan for the final assessment at the beginning of their collaborative planning sessions, because support for expression processes can be built into every phase of the learning cycle. For example, if the teaching team on the Columbus unit has decided that the eleventh-grade students will create a Days of Columbus Fair for elementary students, then part of the information that students must gather is how to visualize or physically re-create what they are learning. If a group discovers that the astrolabe was used for navigation, the students have to find how it was used, why it was important, and what it looked like.

Cooperative learning techniques can be used effectively to help students with expression processes. One technique that would help, particularly with complicated production (such as

videotaping), is that of expert groups. Learning centers can be set up for each aspect of videotaping (i.e., scripting, props and set, operating the camera, and editing). One student from each group becomes an expert on a particular aspect. That student's job is to teach others in the group and to spearhead that aspect during production. The net effect is shared expertise and smoother production.

The teacher/library media specialist role during this phase must include confrontation. Students must be held to as high a standard for expressing their understanding as is demanded while they form their understanding. Poor expression reflects on the quality of their thinking just as much as poor inquiry or lack of information.

Content: Assessment Product

Research on learning offers several important ideas about assessment:

- learning must be assessed throughout the process of learning;
- both the process and the content of learning must be assessed;
- what must be assessed is the understandings that have been constructed by the learner, not the actual learning product;
- learners must be involved in the assessment of their own learning; and
- learners must be allowed to express their learning in a product that is meaningful to them.

Authentic assessment, as it has been defined in the literature, incorporates those research-based ideas about learning and assessment. Some of the underlying principles of authentic assessment are outlined in table 2.

Table 2. Authentic Assessment

What is authentic assessment?	What is authentic content?	What are types of authentic assessment?	What environment is necessary for authentic assessment?	What kinds of feedback are used for authentic assessment?
Put in a real-life context	Based on important concepts	Personal contact (observations, interviews)	Collaboration: Students help each other; they are not judged against one another	Student reflection on own work
A learning experience in itself	Consistent with curriculum guidelines	Performances	Access: Students have access to needed tools and resources	Peer review; peer reflection
Ongoing	Based on real-life	Exhibitions	Responsibility:	Ongoing

throughout the process of learning	experience		Students develop responsibility for their own learning	conversation between teacher and student about student progress
Based on authentic content	Built on prior knowledge; appropriate for developmental level	Portfolios	Flexibility: Time is flexible enough that students have time to complete the project	Teacher assessment of product based on high real-world standards
Involves reflection by student and teacher	Requires high level of thinking from students	Authentic tests	Real World: Students understand connection between what they are learning and the real world	Evaluation rubric completed by external panel

An important distinction must be made between alternative and authentic assessment, because educators must guard against thinking that assessment has been improved simply by providing alternatives to the written “report.” Unless the principles of authentic assessment provide the framework for assessment, students can easily produce visual or oral “reports” that can easily be mistaken for thoughtful learning. Producing a Days of Columbus Fair in which groups have created displays of regurgitated facts about Columbus with no thought about the essential questions may be entertaining, but it is not learning.

An important component of authentic assessment is that it is ongoing throughout the process of learning. Students reflect on their own progress in terms of both content and process, as well as receive feedback from peers and teachers. Reflection questions and techniques should be built in throughout the thoughtful learning cycle.

To help students reflect on their progress in learning, teachers and library media specialists might use any or all of the following techniques:

Encapsulation: On 3-by-5-inch cards, students briefly note the main understanding that they gathered that day. Research log: Students keep a research log during their whole process of research, noting in a brief entry at the end of each day what they learned, what questions they have, and where they need to go next. Teachers and library media specialists can use this log to establish a content- or process-based dialogue with each student, adding encouragement, confrontation, or suggestions every second or third day.

- *Conferencing/oral reflection:* Library media specialists and teachers confer with individuals, taking care to touch base with every student, or call students together near the end of a working period to share their reflections orally.

- *Reflection to a peer:* Students take advantage of peer help by sharing their progress with another student engaged in similar learning.
- *Simplified outline:* Students may be asked to create a simplified visual or verbal outline at several points during their learning cycle. This helps them organize their ideas, see gaps and overlaps, and redirect their energies to their main learning goal (if they have gotten off track).
- *Visualization:* Students design graphics or visualizations to portray the important points about their subject. For example, students might be asked to rough out a logo at the “New Understanding” phase that would portray their new idea in visual form.
- *Learning log notes:* Students organize their notes in two columns, with the left one for information and the right one for their mental and emotional reactions to those notes.
- *Reflection questions:* Teachers and library media specialists can provide questions for students to ask themselves at various points along the thoughtful learning cycle:

Inquiry-Am I really interested in the topic? Is it probable there will be enough information available? Can my thesis be supported with evidence? Do my questions go beyond simple, factual ones to interpretive or evaluative ones? Have I determined what types of information and sources I need and established a workable timetable? Have I found a balance in points of view? Have I reacted thoughtfully to my notes?

Synthesis/Decision Making-Do I have enough information to be able to draw conclusions? Are all of my conclusions supported by research? How can I organize my ideas to help me reach conclusions?

New Understanding-How does what I have learned fit into what I already knew? How does my new understanding relate to the essential question I was trying to answer?

Expression-Can I communicate my new understanding through the product I have chosen? Can I get the support I need to create a final product that would be judged successful according to real-world standards? Assessment Product—If I could change my final product, what would I do? What new questions can be generated from my assessment product? Where should my learning go from here?

Implications for Planning and Teaching

Although most of the implications for planning and teaching have been integrated into the previous sections on learning, a summary at this point might emphasize the major points. Because learning must occur on all strands simultaneously for any subject learning to occur, thoughtful learning must involve content and process teaching throughout. In other words, thoughtful learning demands collaborative planning and teaching between the library media specialist (the process specialist) and the classroom teacher (the content specialist).

But the collaboration must go deeper than tag-team teaching. What we have learned from the Pitts research is that the mental models of the teachers have a great impact on the learning of the students. A teacher must have correct mental models of the inquiry process, or, despite the best efforts of the library media specialist, students may be influenced to pull magazines off the shelf to find relevant articles by browsing. Likewise, a library media specialist must have accurate

mental models of the content, or students may be led astray in their information finding and use. Therefore, not only must teachers and library media specialists collaborate, but they must teach each other their own areas of expertise (or at least help each other overcome inaccurate mental models). In other words, everyone involved must function as learners-teachers, library media specialists, and students alike.

The idea of teachers providing support throughout the process of learning is not particularly new, although the idea of supporting all learning strands simultaneously is probably new. But teachers must offer confrontation as well as support for learning to occur. For service-oriented, “make-the-students-feel-good-about-learning” library media specialists, the imperative to provoke students with new questions, different opinions, conflicting facts, and expert judgments may be uncomfortable at first. Establishing an atmosphere of inquiry in which students confront themselves as well as rely on input from others may help accomplish this imperative.

Teachers and library media specialists must assume that students are logical thinkers. What may appear illogical to teachers and library media specialists makes sense to students because of their mental models. Students’ prior learning in both content and process will intermingle, and a lack of learning in one strand may affect the other. For example, what appears as procrastination in selecting a topic (the process strand) may actually be a lack of content knowledge. The student logically avoids choosing a topic because of an awareness that he or she does not understand all the ramifications and possible elaborations of the subject.

For thoughtful learning to occur, students must be able to focus on the main goal, the essential questions. Research has shown that students need a framework to help them maintain that focus. The thoughtful learning cycle can be used as such a framework. Therefore, teachers and library media specialists need to plan units so that students may follow the cycle (however recursively) in their learning. Of course, the planning does not occur in the same order as the learning (e.g., the assessment product is probably chosen early in the planning), but students should be introduced to the cycle and should be able to identify where they are on it at any point in their learning.

Finally, the Pitts research highlighted the fact that students’ prior learning (or mental models) affects and interacts with all new learning. Teachers and library media specialists must develop strategies to identify that prior learning and address it within the learning unit. Students must incorporate their new understandings into their old understandings, or they have not learned. The assessment of learning, therefore, must focus on students’ thoughtfulness throughout their learning and on their ability to make that learning their own.

Implications for Library Media Specialists

Using research to build library media programs is not only educationally sound, it is necessary for their survival. The library media specialist is in a unique position in the school to effect change in the entire instructional program. The impetus for change is certainly pressing from without and, in many schools, from within as well.

Practicing library media specialists must accept their role as catalysts in school restructuring. By taking the lead in drawing implications for practice from educational research, library media specialists can galvanize the energies of their committed teachers and accomplish substantive and effective change. The thoughtful learning cycle presented here is but one interpretation of some findings from one research study. Implications can be drawn from numerous research studies in a wide range of fields. Practicing library media specialists must accept the responsibility of reading the research, drawing implications, and implementing new ideas in the instructional programs of schools. Underlying these efforts must be the realization that all programs in a school are centered around the same goal: learning.

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