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Knowledge. At the end of this approach is a fundamental question: How do we help children move from merely going through the motions of learning to actually making personal meaning of their world? In the case study reported here, a team comprised of school-level and university faculty focused on journal writing as a means of deepening students' cognitive and affective awareness of the information-search process. The subjects were students in an upper elementary grade classroom in Honolulu, Hawaii. The study also explored the impact of journal writing on the school library media specialist's reflective practices. This article describes the context for this field-based research, the questions investigated, methods employed, and findings gleaned from two cycles of research assignments. A 1999 AASL/Highsmith Research Award supported the study.

Educators at all levels are involved in a paradigm shift from a view of knowledge as an "external entity" to knowledge as being internal and subjective (Hughes, Kooy, and Kanevsky 1997). This new paradigm considers knowledge as mutually constructed by teacher and student in order to make sense of human experience, and not as simply transmitted from the teacher's possession to the student's (Petrie 1990; Moore 1999). Learning only occurs when students create understanding through relevant experience rather than through the accumulation of facts received from others. This paradigm requires the creation of learning environments where the building, rather than the banking, of knowledge is encouraged and facilitated (Shor and Freire 1987).

School library media specialists are critical partners in developing such "learning to think" environments in our schools (Callison 1998, 44). Together with teachers, they design and implement learning experiences that incorporate the information-search process. The key is the "emphasis on the process of learning more than the products the student generates to display what he or she has learned" (Callison 1998, 43). This process includes a complex web of skills that involve the identification of information needs, effective access and critical evaluation of information, and creation and generation of personal knowledge based on the collected information. A crucial aspect of the process is a student's continual self-assessment of new insights gained or problems encountered.

Journal writing is a method that encourages reflection and metacognitive practice. Shor and Freire maintain that interactive journal writing "allows for the dynamic exchange of information

noted that these students demonstrated a better understanding of the problem-solving processes underlying their formal laboratory work than did students who did not journal.

Fine art teachers have incorporated journal writing into music and art education and have detailed how students expressed their personal responses to art and music texts through their journals (DeLorenzo 1990; Prisco 1990; Ameigh 1992). By sketching their ideas for drawings and scribbling their inspirations for songs, students chronicled the evolution of their own works of art.

The integration of journal writing has also been documented in foreign language classes and with second-language learners. For youngsters learning a foreign language, journals allowed out-of-class time and space for practicing written conversations in the language (Sandler 1987). Similarly, teachers of immigrant children learning English as a second language found journal writing provided an invaluable record of the students' acquisition of new vocabulary and their emerging use of English (Reyes 1991).

A study more closely related to the present investigation was Tallman's report (1998) on the use of journal writing in I-search assignments with high school students. The I-search process emphasizes the selection of research topics on a need-to-know basis and requires that students produce their results in a narrative form.Tallman, who has written extensively on use of the I-search approach as an alternative to the conventional research project, indicated that the act of recreating the research process by documenting it in a journal aided high-school students in sharpening their own critical awareness of the information search process.

In Tallman's study, students maintained double-entry journals. They used one column to record their notes and a second column to express their personal responses to these notes and raise questions provoked by the noted passages. Students were encouraged to write about research strategies that were effective as well as strategies that proved unsuccessful. Tallman also reported that the teacher and the school library media specialist, who worked as an instructional team, were able to probe for more substance as a result of reading the students'

Table 2. Cycle One: Affective Levels of Journal Entries

Affective levels	Presearch/ Exploration (N=17)	Focus formulation (N=17)	Collection/ Organization (N=17)	Presentation/ Assessment (N=17)
(A1) Optimism	14 (87%)	13 (76%)	0	0
(A2) Uncertainty, frustration	2 (13%)	43 (24%)	2 (14%)	0
(A3) Confidence	0	0	12 (86%)	0
(A4) Satisfaction, dissatisfaction	0	0	0	Satisfied 16 (94%) Dissatisfied 1 (6%)

Presearch

To launch the study, the school library media specialist created several learning stations, each focusing on a different civilization (such as, China, Greece, Rome). The stations included books, maps, encyclopedias, and computers where bookmarked links to relevant Web sites could be accessed. As part of the lesson, the school library media specialist demonstrated how students might explore the broad topic of ancient civilizations by selecting one of the civilizations and skimming through the different resources. While browsing among the stations, students were also encouraged to take notes on "things that interested them." This activity was conducted over two sessions. At the end of each session, students shared their findings with their peers while the teacher recorded and organized their comments on chart paper under headings for each of the civilizations.

In their logs, students described how they felt about exploring a topic. At this initial stage of the search process, fourteen students (87%) were enthusiastic and optimistic about the upcoming project. They enjoyed the excitement of finding new information: "I like research because you get to learn about things you have never known before." Two students mentioned the novelty of learning through hands-on activities. Still others noted that doing research in elementary school "is helping us when we have do it in middle school and college."

Reacting to the students' excitement, the school library media specialist wrote in her own log: "I found today to be exhilarating. I was really impressed by the way the students took to it. One student said, 'Boy, doing exploration has made me even more certain that I would like to do Mesopotamia.'"

"misplaced because I am not really sure of what I am supposed to do. I kind of feel like I am doing something wrong." The teacher and school library media specialist immediately conferred with the individual students to allay their concerns and offer specific help.

Collection

Prior to having students collect and record information, the school library media specialist spent a session explaining the note-taking procedure. Using several large charts, she demonstrated the following steps: review your questions, skim an article to find keywords that address your questions, jot down the keywords, and use the keywords to deChd4(s)si(y)10(our)3( )]TJ   owron(e)4(ve)-6nepsɪ

accurately identified the steps in the process and provided limited details on one or more of the stages. In examining the responses, however, the school library media specialist and teacher concluded that most of the students had simply memorized and regurgitated the steps and that the sparse details they provided did not reflect an internalization of the total process.

These student responses prompted the instructional team to reflect on the complexity of the process. Had they been too ambitious in expecting novice searchers to demonstrate a metacognitive understanding of the process at the same time they were learning the skills embedded in that process? In an interview, the teacher admitted that researching was a far more "convoluted process" than she had first envisioned. She said, "You need to teach them the skills in the process but you also want them to think about why they are doing this [process]." The school library media specialist responded, "We know that one project will not make them expert researchers." As a team, they agreed that journal responses in this first unit served as a crucial assessment measure for mediation approaches in future projects. They also reaffirmed that a continued team approach to instruction would be essential in the second unit of study.

Comparison of Cycles One and Two

Based on their examination of student products and performances in the first unit, the school library media specialist and teacher reduced the time spent on formal instruction during the second cycle of research. Instead, each session began with an informal review and discussion centering on several essential questions: How well did we do in the last session? Where are we today? What do we already know about this part of the process? Building on students' prior knowledge, the school library media specialist and teacher reinforced the understanding of specific skills and phases of the process and corrected misconceptions. The remaining time, usually thirty to forty-five minutes, was spent in guided work sessions. Thirteen meetings were conducted in the library media center.

During this second unit a critical intervention component was the increased use of individual conferences with students. Both the teacher and school library media specialist circulated during work sessions to respond to student queries. They also engaged students in conversations that focused on ideas or feelings expressed in the individual journals.

In logs written toward the end of each phase, students described the tasks involved in the respective stages of the process and shared advice and insights as well as feelings about their work. Most of them completed nine entries although actual numbers again varied because of student absences. Tables 3 and 4 summarize the cognitive and affective journal responses. The discussion below compares the statistical results from the first and second cycles and substantiates these findings with excerpts from the journals.

Table 3. Cycle Two 9 Cognitive 045 ch6 60.36 0.gina.48 P Tc 0 Tw 1136 747.84 24204 06 f*8 80T EM5Attj

Presearch

The school library media specialist and teacher paired the students and had them explain this particular phase of the process to one another. They used this informal exchange as a springboard for a review on the nature and value of exploring a broad topic. Two work sessions were devoted to the presearch phase. Students' affective responses in this initial phase were similar to those reported in the first unit. Over 87% of the students were enthusiastic about the general topic ("I think it is neat to study people that are heroes to us") and optimistic about their products ("Making trading cards for our heroes will be fun").

For many of these students, there were marked improvements in their cognitive responses (such as a move from C1 and C2 levels to C3 and C4). While ten students (59%) were unable to describe the purpose of the exploratory phase in the first cycle, only one student was still confused about this in the second cycle. Six students (38%) briefly noted that the presearch stage helped them to see the bigger picture. In addition, nine students (56%) were able to elaborate on various aspects of the exploratory phase. The examples below illustrate students' growth in understanding between the two cycles.

In the first cycle, Jayanne admitted that she did not understand what exploring a topic meant but she "guessed that it tells me when I need to pick a topic. It helps me look up things." Her entry in the second unit reflected a reasonable grasp of the concept:

> Exploring helps me know what I will be researching. I look for possible topics. I skim different resources, see if they are understandable and interesting. The more sources, the more places you will have to find answers.

Ryan, who originally stated that exploring a topic was "helpful because you get to look up stuff and find the correct information," offered the following extended advice in his second entry:

> Find a broad topic to research that has a lot of small topics in it. Find information on the topics. Look in different sources, branch out. Use more than books. Use the Internet, encyclopedias, magazines. Find what interests you.

Nicole, who wondered when the class would start their "real research" in the exploratory phase of the first unit, expressed a change of thinking in the second cycle:

> Before you can decide on what to do your project on, you have to explore. Scan different sources for topics on your research. Use different types of resources to get a feel for the general topic. Make a list of topics and resources.

Focus

Two sessions were devoted to formulating a focus and planning for the final products. Students

In the first unit, over 75% of the students remained highly optimistic as they engaged in focus selection and presentation planning. However, student responses in the second unit more closely paralleled patterns noted in Kuhlthau's studies (1993). Twelve students (71%) voiced uncertainty when they discovered they were preparing an oral presentation as well as creating the trading cards. Gabby said, "I just hate it when I get stressed like this. I hope I find time to do all these things." When the class learned that the school administrator would be invited to the presentations, Kelly expressed her fears about this prospect: "I think it will be embarrassing. Not with my parents. I already know they will love it. But with the principal, now that is a whole other story."

While many students selected their topics solely on the basis of personal interest in the first cycle, twelve students (71%) expanded on their criteria in this round of research. They indicated that availability, readability, and relevance of sources were other important criteria along with personal interest. Ryan connected his selection of a research focus with his earlier exploration of the broader topic. In the excerpt below, he also pointed out the importance of finding resources that he could comprehend:

> I looked at my results from when I explored the general topic. I decided which [subtopic] had more information and which one was interesting. I made sure the information made sense and that I could understand what I was reading. Then I selected my research topic.

During the first cycle, Hannah said she had selected her topic because it looked easy. When asked to elaborate on what she meant, she responded, "It will be easy because it will be fun." In this cycle, she pointed out the importance of considering her audience and selecting a topic that would expand learning for her peers:

> I made my final decision on my hero by finding somebody that my classmates could get excited about. I wanted to find a hero that they didn't know too much about so they could learn new things.

As reported earlier, students devised largely recall-level questions in the first unit. When asked to describe how they created their questions, the majority of the students simply said they "wrote what, when, where questions." This time, thirteen students (77%) offered remarks indicating that they had moved beyond the mechanics of writing questions to deeper levels of thinking about the value of questioning. Chelsea, for example, emphasized the significance of having an essential question: "Make one main question that is sort of the focus. Then all the other questions kind of help you answer the main one."

Ryan indicated that he wrote questions "which would lead to new questions." His own set of queries on Jonas Salk reflected an interconnected series of higher-level questions:

- x Why did Salk get interested in studying a cure for polio in the first place?
- x What steps did he have to go through?
- x What made him keep on going? Di>>BDC   /oi

Gabby's entries

Cycle 1: You search, then focus, collect information, and present it.

Cycle 2: You choose a big topic. You might ask your teacher what you should write your report on, or what she requires you to do. To get a general picture, look through different resources. See if the resources are understandable. Select the best topic. Choose the topic that you think most people won't pick because you could teach others something they may not know. Make good questions, like how did something happen or why did somebody do this or how things might be different if this didn't happen. Find resources, scan through them. Use as many different resources as possible. Take notes by writing keywords, and then long answers. Don't plagiarize out of a book. Now you are ready to put it into paragraphs. Put the information together so that it makes sense. Use correct grammar and check over your work. Finally you show others what you learned. Then you have to assess your work. Be honest or you will only be fooling yourself. Doing a project is very time consuming and it takes patience. It takes dedication. Each time you do a project it should get better and better. Never TRY to do your best; just DO your best.

It was also noted that in the first cycle, twelve students (71%) referred to assessment as the teacher's evaluation of the final product and equated it with their project grades. At the end of the second unit, 65% described this aspect of the process as a self-review rather than simply the instructor's evaluation ("Evaluate yourself so you kind of know how you feel about your work"). Students also mentioned the importance of comparing their efforts against established criteria ("You assess how well you met the standards on the rating sheet"). Several pupils indicated that self-assessment required supporting comments ("Don't just give yourself a high rating but say why"). Two students commented on the ongoing, reflective nature of assessment and the importance of an objective self-analysis. For example, Vincent wrote:

> You assess to look at what you have done so far. You check things that you had a tough time on. You look back and see the good and bad parts of the presentation. Be honest. You want to get a good feel for your work and if you aren't honest you will never know the truth.

School Library Media Specialist's Responses

The school library media specialist's written engagement in this study assumed two major forms—her responses to students' journal entries and her own weekly anecdotal logs. Both are discussed in this segment.

Journal responses

The coding team identified a total of 321 response statements from the school library media specialist, 217 and 104 responses respectively in the first and second cycles. The results are summarized in table 5. In both cycles, the school library media specialist responded with more statements that were facilitative than directive. In the first unit, 88.6% of her comments provided encouragement or requested clarification and elaboration. Similarly, 87.5% of her responses in the second cycle invited students to do deeper thinking about their initial responses. In short, the school library media specialist discovered that the power imbalance and authority role of the

instructor were minimized in the one-on-one interactions. Instead, her questions had many of the features of polite conversation in which participation is shared.

Table 5. Library Media Specialist's (LMS) Responses to Journals

Response type	Cycle 1 (N=217)	Cycle 2 (N=1047)
(S1) Elicit recall	15 (6.9%)	4 (3.8%)
(S2) Request clarification	47 (21.7%)	10 (9.6%)
(S3) Ask for summary	0	0
(S4) Request elaboration	34 (15.7%)	47 (45.2%)
(S5) Encourage expression of feeling	19 (8.8%)	8 (7.7%)
(S6) Provide positive feedback	77 (35.5%)	22 (21.2%)
(L1) LMS gives opinion		

Figure 2. Sample Journal Entries and Library Media Specialist's (LMS) Responses

Focus formulation phase	
Jayanne's entry	I kinda don't know what to do.
LMS's reflection	I spoke with J. and it seems to be the entire [information search] process that she is confused about so I have decided to spend time going over the process. Since she is not the only one who is fuzzy about the process, I am thinking of creating a wall mural that will show the phases of the process as stepping stones.

Collection and organization of information phase	
Gary's entry:	The way we take notes is we get the book with the subject we want, then we answer the question that we had. We take these notes because it helps us on the final product.

think there is a definite connection between writing freely in their journals and students asking more questions in class. The relationship has become almost collegial with some of them.

A significant insight for her was the changing nature of the questioning. Accustomed to queries

As one of the culminating activities, the school library media specialist invited students to comment on the merits of journal writing. A majority felt that the journals documented their progress as researchers. One student said, "Later on, you can look back and see what you did. You can see what you did better than before. You can also see what you thought." Another student added, "We can tell you what problems we are having so you can help us. I know from experience that a lot of questions can be answered through the journal." In her own log, the school library media specialist affirmed that journal writing provided encouragement to reflect, evaluate, deal with uncertainty, and relate personal experiences to new learning:

> Journal writing with students seems to break down some of the natural barriers that get in the way of genuine interaction. Some of the students who tend to be reticent have really come alive. All of the students say they have improved in their skills. Many are able to give details supporting their improvement. In general they appear far more confident than they were in the beginning. They are realizing that doing research is a process consisting of many interlocking steps.

Conclusion

This study focused on the information search process students engaged in rather than the content knowledge they gained through their units of study. In the initial stages of this field-based study, the students made a high proportion of nonspecific comments about various phases of the process. Their entries offered little or no supporting information and often reflected fragmented understanding. In the second cycle, however, there was a shift toward developing more specificity and depth, including descriptions of actions and identification of feelings.

According to Mueller (1992), metacognition involves at least three critical stages: an awareness of one's own cognitive ability, a proficiency in explaining tasks that improve performance, and an ability to suggest alternative strategies when existing practice proves ineffective. Although students in this study demonstrated varying levels of progress, most of them became more aware of their thinking processes through journal writing. They made strides in paraphrasing and elaborating on steps in the information search process. They also grew in their ability to identify techniques for self-improvement. If a student knew that she had a poor memory for deadlines, for example, she created a time line. As they worked on their final products, many students employed fallback strategies when technical problems arose.

Students also discovered that feelings of confusion, disagreement, and surprise were an integral part of comprehension and evaluation. Because the journal was not viewed as a tool for grading, the students felt safe to take risks and experiment with form, style, and voice. As a result, students became more confident about their abilities to create meaning through writing.

In this study, the counseling role of the instructor took on a new dimension, as journals became a

The research assignments involved a range of thinking strategies, some of which were unfamiliar or especially difficult for students. Reading the student journals made the school library media specialist and the teacher more acutely aware of the number of skills embedded in each step of the research process. They frankly admitted feeling overwhelmed by the enormity of the teaching challenge. The instructors concluded that explicit teaching of various skills had to include facilitative questioning, extensive modeling, and active demonstrations. Based on data from this study, the team agreed that visual and graphic modes of knowledge representations, work sessions that afforded guided practice and feedback, and strategies that reinforced self-assessment strategies were crucial to effective learning.

It would be inaccurate to claim that these elementary-grade students made a phenomenal leap from being novice searchers to independent learners through a few assignments. Their journal entries, however, were promising indications that they had taken the first steps in articulating new conceptions and new feelings about the information search process. For the school library media specialist, this process of reflective engagement was a chronicle of the winding journey to understand her own teaching and build interpersonal relationships with the children. For the child

Atherton, C., et al. 1992. Keeping math journals. *Instructor* 101, no. 5:46–52.

Bloom, B. 1956. *Taxonomy of educational objectives: The classification of educational goals. Handbook 1: Cognitive domain.* New York: Longman.

Callison, D. 1998. Metacognition. *School Library Media Activities Monthly* 14, no. 7:43–44.

DeLorenzo, L. C. 1990. Early field experiences in the community. *Music Educators Journal* 77, no. 3:51–53.

Fraenkel, J. R., and N. E. Wallen. 2000. *How to design and evaluate research in education.* Boston: McGraw Hill.

Freire, P. 1970. *Pedagogy of the oppressed.* New York: Seabury Press.

Gordon, C. J., and D. MacInnis. 1993. Using journals as a window on students' thinking in mathematics. *Language Arts* 70, no. 1:37–43.

Harada, V. H. 2001. Building understanding of the information search process through student journal writing. In *Proceedings of the Fifth International Forum on Research in School Librarianship, July 9–12, 2001,* ed. P. Hughes and L. Selby, 91 –105. Auckland, New Zealand: International Association of School Librarianship.

Hughes, H. W., M. Kooy, and L. Kanevsky. 1997. Dialogic reflection and journaling. *The Clearing House* 670, no. 4:187 –190.

Jewell, M. J., and M. S. Tichenor. 1994. Curriculum framework for journal writing in primary grades. Paper presented at the Annual Meeting of the International Reading Association, Toronto, Canada, May 8 –13, 1994. ERIC, ED 384061.

Johnstone, A. 1993. *Uses for journal-keeping: An ethnography of writing in a university science class.* Norwood, N.J.: Ablex.

Kuhlthau, C. C. 1993. *Seeking meaning: A process approach to library and information services.* Norwood, N.J.: Ablex.

Levitsky, R. 1991. Journal writing in the social studies. *Social Studies Review* 31, no. 1:50 –54.

Miller, D. 1991. Writing to learn mathematics. *Mathematics Teacher* 84, no. 7:516 –21.

Moore, P. 1999. Revealing thinking: Teachers working together on information literacy. In *Unleashing the power! Knowledge, Technology, Diversity. Papers presented at the Third International Forum on Research in School Librarianship,* ed. L. Lighthall and E. Howe, 133 –43. Seattle, Wash.: International Association of School Librarianship.

Mueller, R. J. 1992. *Instructional psychology: Principles and practices.* Champaign, Ill.: Stipes Publishing Co.

Petrie, H. G. 1990. Reflecting on the second wave of reform: Restructuring the teaching profession. In *Educational leadership in an age of reform,* ed. S. L. Jacobson and J. A. Conway, 14 –29. New York: Longman.

Prisco, K. 1990. The aesthetic journal: A creative tool in art education. *School Arts* 90, no. 3:24 – 26.

Reyes, M. L. 1991. A process approach to literacy using dialogue journals and literature logs with second language learners. *Research in the Teaching of English* 25, no. 3:291 –313.

Sandler, K. 1987. Letting them write when they can't even talk? Writing as discovery in the foreign language classroom. In *The Journal Book.* ed. T. Fulwiler, 312 –20. Portsmouth, N.H.: Boynton/Cook.

Segal, E. 1990. The journal: Teaching reflexive methodology on an introductory level. *Anthropology & Education Quarterly* 21, no. 2:121 –27.

Shor, I., and P. Feire. 1987. *A pedagogy for liberation: Dialogues on transforming education.* South Hadley, Mass.: Bergin & Garvey.

Staton, J. 1988. *Dialogue journal communication: Classroom, linguistic, social, and cognitive views.* Norwood, N.J.: Ablex.

Staton, J., R. W. Shuy, and J. Y. Kreeft. 1982. Analysis of dialogue journal writing as a communicative event. Final Report; Volumes 1 and 2. ERIC, ED 214196 and 214197.

Steffens, H. 1991. Using informal writing in large history classes: Helping students to find interest and meaning in history. *Social Studies* 82, no. 3:107 –09.

Stripling, B., and J. M. Pitts. 1988. *Brainstorms and blueprints: Teaching library research as a thinking process.* Englewood, Colo.: Libraries Unlimited.

Tallman, J. 1998. I-Search: An inquiry-based, student-centered, research and writing process. *Knowledge Quest* 27, no. 1: 20 –27.

Van Manen, M. 1990. *Researching lived experience: Human science for an action sensitive pedagogy.* Albany, N.Y.: Teachers College Pr.

Related Online Links

Carey, J. O. 1998. Library skills, information skills, and information literacy: Implications for teaching and learning. Accessed Sept. 13, 2001, www.ala.org/aasl/slr/vol1. The author identifies characteristics of learning outcomes, defines higher-order thinking embedded in information literacy, and discusses implications of his findings in designing optimum teaching and learning situations. The article appears in School Library Media Research.

Fitzgerald, M. A. 1999. Evaluating information: An information literacy challenge. Accessed Sept. 15, 2001, www.ala.org/aasl/slr/vol2. This is a comprehensive literature review of research

from the cognitive and behavioral sciences on factors influencing students' ability to analyze and evaluate information. The author also suggests methods to overcome these difficulties. The article appears in School Library Media Research.

Gordon, C. 1999. Students as authentic researchers. Accessed Sept. 5, 2001, www.ala.org/aasl/slr/vol4. The author reports on a study of pupils using primary research methods in a tenth grade project. She discusses how students and teachers evaluated the project and the implications of her findings for other educators. The article appears in School Library Media Research.

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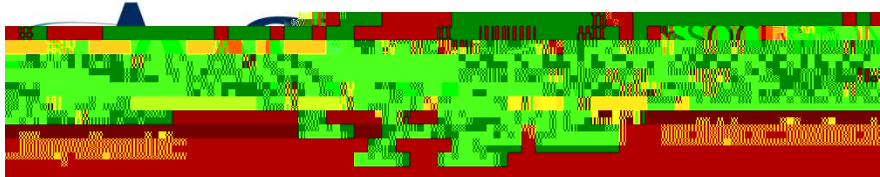
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