Cognitive Development

The Missing Link in Teaching Information Literacy Skills

Rebecca Jackson,
Guest Columnist

Correspondence concerning this column should be addressed to: **Lori Arp,** *Assistant to the University Librarian, Northwestern University Library, 1970 Campus Drive, Evanston, IL 60208; e-mail: L-arp@northwestern.edu.*

Beth S. Woodard *is Staff Development and Training Coordinator and Reference Librarian Head at the University of Illinois at Urbana-Champaign, 300 Library, 1408 West Gregory Drive, Urbana, IL 61801; e-mail: bswoodar@uiuc.edu.*

Rebecca Jackson *is Head, Social Sciences and Humanities Department, Iowa State University Library, Ames.*

They'll do a database search, and they will invariably choose the first five articles in the list. Doesn't matter if they're good or bad, relevant or not.

They use the Web for everything. They have no idea that there are better sources out there to use.

They want to find that one article that's going to write their paper for them. They don't realize that they have to read and synthesize and then put their ideas together from several sources.

Their professor suggests a particular journal and when they come into the library, that's the only journal they want. It has to be that very one.

How many librarians have said, or heard colleagues say, similar things about their students as those previous statements? How can these constant disappointments be explained? Is it that students don't know all the resources available to them? Is it that they're lazy? What can librarians and educators do to help them become more information literate?

In 2000, the Association of College and Research Libraries (ACRL) endorsed the *Information Literacy Competency Standards for Higher Education.*[1] This document specifies five standards, each with several performance indicators and outcomes, which college students should master if they are to be deemed information literate and prepared for lifelong learning. Since then, librarians have made great strides in establishing programs and practices to teach information literacy to their students. The professional literature abounds with research and best practices for promoting information literacy, much of it focusing on applications and case studies. In addition, there have been, over the years, many articles dealing with theoretical constructs such as learning styles, critical thinking, and others. However, these studies, while contributing to the dialogue, have not been able to adequately answer the questions raised above. A theoretical approach that holds promise in answering these questions is cognitive development.

The present article will examine the current research on cognitive development and its consequent implications for information literacy instruction. Differences in cognitive development levels may help to explain many of the situations librarians experience with students, both in classes and at the reference desk. Along with an examination of learning and teaching styles, it is important that librarians keep in

mind the importance of college students' levels of cognitive development as they work with them.

WILLIAM PERRY'S RESEARCH ON COGNITIVE DEVELOPMENT

The first person to systematically examine the development of intellect at the college level was William G. Perry. In the 1960s, he and his staff of the Bureau of Study Counsel at Harvard University conducted a long-term study of Harvard students, with a few female students from Radcliffe. This was a qualitative study in which students met with the staff of the Bureau throughout their college years and held open-ended discussions, reflecting on the year just past. The result of this study was the book *Forms of Intellectual and Ethical Development in the College Years.*[2]

In his writing, Perry posited nine "positions" that students go through in their college years. They have been grouped into four categories: dualism (positions one and two), multiplicity (positions three and four), relativity (positions five and six), and commitment (positions seven through nine).

In Perry's dualism, students see the world as either good or bad, right or wrong, black or white. Authorities (with a capital A) have all the answers; if they do not, either they are not legitimate Authorities, or the answers are only temporarily unknown. Students believe that there are right answers for every question. They will only look for information that agrees with their beliefs. At early stages of dualism, students simply ignore uncertainty or place it in the "others" category: us/others. According to Perry and others, teaching consists of dispensing information, and learning involves taking in as much information as possible. Grading, from students' point of view, should be based on how hard they have worked and how much information they have retained. "A characteristic phrase used by students in the Dualistic stage is: 'What is the right answer?'"[3] Students move from dualism to multiplicity as a result of all the diversity they encounter in their lives at the college level, especially among their peers.

When students reach Perry's positions of multiplicity, they acknowledge that there are some areas in which answers are not yet known. When good Authorities disagree, obviously they are dealing with an area where the answers are yet to be determined. In the later positions of multiplicity, "the not yet known . . . becomes a new certainty of 'we'll never know for sure.'"[4] Learning is seen to be more independent, centering more on process. Grading becomes less focused on how much the student learns and more focused on thinking independently. However, there is also the notion that one person's idea is as good as another's, so grading can also be thought of as arbitrary and more a matter of how things are expressed rather than what is expressed. "In this stage, the characteristic phrase is: 'Everyone has a right to his or her own opinion.'"[5]

The attaining of relativistic positions is, according to Perry, a "drastic revolution."[6] In these positions, students are aware that there are few areas in which "right" answers exist, and that most knowledge is "contextual and relativistic."[7] Students finally understand their function as learners and acquire the "self-consciousness of being an active maker of meaning."[8] What was once Authority (with a capital "A") becomes authority (with a lowercase "a"), and there may be multiple authorities who might often disagree. It is at this position, too, that students recognize the need for evidence to support their own opinions. It is important to weigh the evidence, both pro and con, to come to a reasonable opinion or answer that is "right" for the student in his or her context.

Perry characterizes the final positions as more ethical than intellectual. Within relativism, students—now adults—must make choices. But these choices are based on consideration, weighing alternatives, and coming to conclusions about areas of life such as relationships, careers, and values. In most cases these commitments are constantly reaffirmed or altered based on new evidence. It is only these positions of commitment that truly allow for fulfillment and lifelong learning.

OTHER DEVELOPMENT RESEARCH

Several other researchers have studied students' development with similar measures and results. The major studies are those by King and Kitchener, and Baxter Magolda. King and Kitchener did long-term studies of "reflective judgment," basing their measures on the solution of ill-structured problems, or problems without "right" answers. They identified seven stages of development, similar to Perry's. Students progressed through the inability to

- "understand that two people can disagree about an issue," to an understanding that
- "knowledge is assumed to be absolutely certain, or certain but not immediately available," to the
- "recognition that in some areas knowledge will never be certain," and finally to the understanding that
- "the adequacy of . . . solutions is evaluated in terms of what is more reasonable or probable on the basis of current evidence and is reevaluated when relevant new evidence, perspectives, or tools of inquiry become available."[9]

These stages are very similar to the positions described by Perry. However, King and Kitchener, by measuring reflective judgment, spoke more to the areas of critical thinking and the use of evidence. Reflective judgment is a measure of how students solve ill-structured problems—problems with no right answers; therefore, it measures how students critically assess a problem and how they do or do not use evidence to come to a solution to a problem.

Baxter Magolda studied what she calls "epistemological reflection . . . assumptions about the nature, limits, and certainty of knowledge, and how those epistemological assumptions evolve during young adulthood."[10] Her study, which grew out of her attempt to develop a simple test of Perry's developmental scheme, uncovered what she called "Absolute"

knowing, like dualistic knowing, and "Transitional" knowing, which is very similar to multiplistic positions. "Independent" knowing is also similar to multiplistic knowing in that it is "characterized by viewing most knowledge as uncertain."[11] The final stage is "Contextual" knowing, "characterized by the belief that knowledge exists in a context and is judged on evidence relevant to that context."[12]

For any of these three methods of research to have relevance to librarians, it helps to know where college students fall in these stages or positions. In Perry's study, most of the students at the end of their freshmen year fell into the third or fourth positions. Thus, many of them were still dualistic to a certain degree, but were beginning to admit to multiplicity in some areas. None of the students in his study progressed to the ninth position, and most did not get beyond position five. Other researchers, using Perry's developmental scheme, found that freshmen at other institutions were at position two or three, and may reach positions three to five by the time they graduate.[13] King and Kitchener found that, in their study, "the functional level of most undergraduate students is between Stages 3 and 4 [and] they may be able to comprehend Stage 5 concepts."[14] Baxter Magolda explained in her work:

> finding out what the authorities thought—a way of knowing I called "absolute"—absorbed most participants upon entrance to college. It wasn't long before most realized that authorities did not have all the answers. Participants became transitional knowers. . . . [and m]ost remained transitional knowers throughout college, continuing their reliance on external authority. A few participants adopted an independent way of knowing during their senior year. . . . Only two of eighty participants adopted contextual knowing, or viewing knowledge as relative to a context, and judged based on evaluation of relevant evidence.[15]

Therefore, based on these studies, it appears that upon entering higher education institutions, students are dualistic or early multiplistic, relying on Authority, believing in right/wrong, good/bad, and having difficulty recognizing differing points of view. By the time they graduate, most of them are able to deal with differing points of view, but still rely on Authority and have difficulty relating evidence to argument.

INFORMATION LITERACY AND COGNITIVE DEVELOPMENT

How can librarians relate these theories of cognitive development to information literacy? In 1981 Constance Mellon wrote two articles related to cognitive development.[16] These were, of course, before the development of the information literacy standards of 2000. In one of these articles, Mellon and her coauthor explained the "frustration of the college instructor who insists: 'College students nowadays are incapable of thinking for themselves,'" as a result of the dualistic positions of many college students.[17] Students in the multiplistic posi-

tions explain the "frustrated college professor who cannot understand why his or her students feel no need to back up their opinions with facts."[18] The authors stated that "many of the topics and concepts currently presented in undergraduate education can be understood much more readily by formal Relativistic reasoners," positions that, from the evidence in the studies discussed previously, few students reach before graduating from college.[19] In her second article, Mellon explained that at the freshman level, which for most students is dualistic, "students have little patience with alternative search strategies, with wide varieties of reference materials all designed to answer the same type of question, and with the complexities of information retrieval."[20] She discussed different types of materials that should be presented in library instruction classes to students at all levels of cognitive development. However, her main point seemed to be that most assignments teachers design are aimed at the relativistic positions, positions that most undergraduate students never reach.

The information literacy standards may include many competencies that are beyond the cognitive level of the students librarians encounter, especially from classes like freshman composition or basic communication classes. For instance, Standard One, outcome 1.f. specifies that the information literate student "recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information."[21] The discovery that the student makes his own knowledge is one that comes at the Relativistic position. Standard Two, 5.a. states that the information literate student "selects among various technologies the most appropriate one for the task of extracting the needed information. . . ."[22] This is the type of task that Mellon described as being difficult for dualistic students to understand. At that level, they are still looking for the right answer to come from the Authority.

Standard Three focuses on the information literate student's ability to evaluate information sources critically and incorporate "selected information into his or her knowledge base and value system."[23] All of the performance indicators and outcomes listed under this standard call for skills that are far beyond what the average freshman student can accomplish, and may even be difficult for multiplistic students. In fact, from the multiplistic position, "all views may have equal legitimacy, and one's own view may be as valid as that of an expert."[24] This standard can only be accomplished effectively at the relativistic stage of development. This is the beginning stage for students to be able to use evidence effectively and to analyze that information to make their own meanings.

In 2002, Michael Lorenzen studied high school students' use of the Web and their ability to evaluate sources they found there. Although this was a study of high school students, the results speak to many of the difficulties college librarians encounter in students. As might be expected, "Dualistic students will use the Web to look for the one right answer to the question. . . . They will have difficulty in determining which Web sites have valid information and which ones do

not."[25] Multiplistic students would be expected to consider all information of equal weight; one Web site is as valid as another. What Lorenzen found most troublesome was that students were using Web search engines to do the evaluation for them. Because most students think that search engines rank their results by relevancy, they think the first sites must be the most valid. "Many of the students felt that if a Web site was indexed by Yahoo! the information found on the Web site was reliable."[26]

SOLUTIONS?

So what can librarians do to help students become more information literate, given their various stages of cognitive development? Baxter Magolda cautioned:

> Awareness that students use these assumptions to guide their learning helps educators understand the basis for students' persistent efforts to find out the "right" answer, the "right" length of paper, the "right" concepts to study for a test, or the "right" major.[27]

First, no one can assume that a student of a given age or year in college is within a particular stage. To help ascertain a students' stages, librarians need to spend some time talking to them, getting to know how they perceive their assignments. It is possible to get some idea of their position or stage by the way they explain their assignments, by their confusion over the various resources they are being asked to use, by their interest in finding different opinions on an issue, or by their inability to judge resources they retrieve in a search.

No matter what their stage, Perry's suggestion was that "the learner requires the support of some elements that are recognizable and familiar."[28] Important to their development at any level is a sense of community and support. Librarians should take students with them in the search for information to answer their questions. They can also show students that they do not always have all the answers—that they, too, are learning. King and Kitchener offered several suggestions for teaching, but two are especially important: After cautioning that teachers (and librarians) should show respect for students, they say, "If students perceive disrespect or lack of emotional support, they may be less willing to . . . take the intellectual and personal risks required for development." And later, King and Kitchener also suggest that librarians should "Teach students strategies for systematically gathering data, assessing the relevancy of the data, evaluating data sources, and making interpretive judgments based on the available data."[29] It is also important to keep in mind that students in the early stages of development may not recognize librarians as authorities; thus, it is extremely important for librarians to reach out to teaching faculty to ensure that they confirm for their students the authority of librarians with whom they may interact.

At the same time, students at any stage of development, if they feel they are in a safe and supportive environment, also need a challenge. According to Kitchener et al., "data suggest that learning environments which challenge absolutistic assumptions may be particularly important for college freshmen. By contrast, older students may need help in learning to use evidence to evaluate alternative perspectives. . . ."[30]

A student may be at different levels of development in different areas of study. Social sciences and humanities courses, which offer the least amount of "right" answers, may pose more problems than more scientific courses. And students who are faced with too much confusion may regress to a more dualistic position. Certainly, using a library can cause such confusion among many students; so librarians need to recognize that just because students seem to be at a very low level of cognitive development when they are using the library, it may only be because they are faced with frustration and confusion.

Librarians who have written on cognitive development also have shared suggestions. Mellon notes that for students at the dualistic positions, only basic strategies for solving information problems should be taught, though students should be made aware of more complex information-seeking processes, and they should obviously be encouraged to ask questions of librarians. For multiplistic students, "It is useful at this stage to mention that search strategy is a very individual thing and that the aim of a library instruction program is to produce an independent library user who has developed a successful problem-solving search strategy."[31] With relativistic students, librarians are free to discuss all the complexities of information retrieval and evaluation and analysis of sources.

Fields, in a recent article on ill-structured problems, recommends scaffolding—giving prompts or asking questions that help students build from what they already know. So, for instance, asking students what resources they are already familiar with can lead to conversations on other resources similar to what they know, but which stretch their development a little more. However, Fields cautions, "learners need to be encouraged and even pushed to move beyond their present level of knowledge, but the moves must be graduated so as not to fall completely outside the learner's knowledge base and developmental stage."[32] In an earlier article, Fields simply says, "In terms of information literacy instruction, librarians should focus on 'connection,' 'collaboration,' and 'firsthand experience.'"[33]

King and Kitchener offer several pages of suggestions for identifying the stages of reflective judgment. These pages also include instructional goals for each level, sample assignments, examples of difficult tasks for each level, and types of developmental support for each level. This section of their book is very useful for spelling out specifically how to recognize the various levels and how to work with students at those levels.[34] For example, at Stage 2 reasoning, one of the characteristic assumptions of reasoning is "Evidence is not a criterion for establishing truthfulness." An instructional goal of this stage would be to "Give reasons for beliefs beyond relying on the word of an authority." A difficult task at this stage is "accept-

ing that even authorities do not have right or wrong answers for some issues." And one type of support for instructional goals at this same stage would be to "Attempt to legitimize students' feelings of anxiety when confronted with multiple perspectives on an issue."[35]

Returning to the use of the information literacy standards, it might be useful to think about which outcomes fit which positions. For instance, at the lower undergraduate levels, outcomes like Standard One, 1.a. addressing the identification of a topic and determining what types of information are needed would be a doable goal. Students at the lower developmental levels can often decide on a topic, but challenging them to determine what information they need might be just the push to further their development. For Standard One, Performance Indicator 2, several of the outcomes would be ideal for students at the lower developmental levels. This indicator focuses on concrete information, such as knowing how information is produced, knowing the scope and purpose of different information sources, and knowing the various formats of information. Librarians must remember that students at this level are ready to receive information; this is an easy task for them, but they can also be encouraged to think about how their topics are related to the types of information available. It might be a useful exercise to map all of the standards, indicators, and outcomes to the various cognitive levels of students, keeping in mind, of course, the need to keep students comfortable while at the same time offering challenges. That research is an area for future exploration, and is beyond the scope of this article.

In conclusion, the introductory quotes can each possibly be related to the developmental stages or positions of the range of students librarians encounter every day, either in classes or at the reference desk. To be armed with the best information most helpful for working with students and teaching them information literacy skills, librarians need to understand learning and teaching styles. Equally important, however, they should understand how levels of cognitive development, or reflective judgment, can have an enormous impact on students' ability to learn the skills that fulfill the goals of information literacy.

References

1. ACRL, "Information Literacy Competency Standards for Higher Education. www.ala.org/ala/acrl/acrlstandards/informationliteracy-competency.htm (accessed Dec. 30, 2006).
2. William G. Perry Jr., *Forms of Intellectual and Ethical Development in the College Years: A Scheme* (San Francisco: Jossey-Bass, 1999).
3. Constance A. Mellon and Edmund Sass, "Perry and Piaget: Theoretical Framework for Effective College Course Development," *Educational Technology* 21, no. 5 (May 1981): 29–33.
4. W. S. Moore, "Overview of Perry Scheme." www.perrynetwork. org/schemeoverview.html (accessed Dec. 30, 2006).
5. Mellon and Sass, "Perry and Piaget," 30.
6. Perry, *Forms of Intellectual and Ethical Development*, 121.
7. Patrick G. Love and Victoria L. Guthrie, "Perry's Intellectual Scheme," *New Directions for Student Services* 88 (Winter 1999): 5–15.
8. Barbara K. Hofer and Paul R. Pintrich, *Personal Epistemology: The Psychology of Beliefs about Knowledge and Knowing* (Mahwah, N.J.: Lawrence Erlbaum Associates, 2004), 21.
9. Patricia M. King and Karen Strohm Kitchener, *Developing Reflective Judgment: Understanding and Promoting Intellectual Growth and Critical Thinking in Adolescents and Adults* (San Francisco: Jossey-Bass, 1994), 53, 61, 71.
10. Marcia B. Baxter Magolda, "Evolution of a Constructivist Conceptualization of Epistemological Reflection," *Educational Psychologist* 30, no. 1 (2004): 31–42.
11. Ibid., 37.
12. Ibid.
13. Love and Guthrie, "Perry's Intellectual Scheme," 14.
14. King and Kitchener, Developing Reflective Judgment, 36.
15. Marcia B. Baxter Magolda, "Helping Students Make Their Way: Good Company for the Journey," *About Campus* 6, no. 6 (Jan./Feb. 2002): 2–9.
16. Mellon and Sass, "Perry and Piaget"; Constance A. Mellon, "Information Problem-Solving: A Developmental Approach to Library Instruction," in *Theories of Bibliographic Education: Designs for Teaching,* ed. Cerise Oberman and Katina Strauch (New York: Bowker, 1982), 75–89.
17. Mellon and Sass, "Perry and Piaget," 30.
18. Ibid.
19. Ibid., 31.
20. Mellon, "Information Problem-Solving," 80.
21. ACRL, "Information Literacy Competency Standards for Higher Education."
22. Ibid.
23. Ibid.
24. Barbara K. Hofer and Paul R. Pintrich, "The Development of Epistemological Theories: Beliefs about Knowledge and Knowing and Their Relation to Learning," *Review of Education Research* 67, no. 1 (Spring 1997): 88–140.
25. Michael Lorenzen, "The Land of Confusion? High School Students and Their Use of the World Wide Web for Research," *Research Strategies* 18, no. 2 (2001): 151–63.
26. Ibid., 161.
27. Marcia B. Baxter Magolda, "Intellectual Development in the College Years," *Change* 38, no. 3 (May/June 2006): 50–54.
28. William A. Perry, "Different Worlds in the Same Classroom: Students' Evolution in Their Vision of Knowledge and Their Expectations of Teachers." http://scholar.google.com/scholar?hl=en&lr=&q=cache:DQZfAibC17gJ:www.colorado.edu/ftep/memos/protected_memos/37.pdf+perry+%22memo+to+the+faculty%22 (accessed Dec. 30, 2006).
29. Patricia M. King, "Reflective Judgment: Educational Implications." www.umich.edu/~refjudg/edimplications.html (accessed Dec 30, 2006).
30. Karen Strohm Kitchener et al., "Sequentiality and Consistency in the Development of Reflective Judgment: A Six-Year Longitudinal Study," *Journal of Applied Developmental Psychology* 10 (1989): 73–95.
31. Mellon, "Information Problem-Solving," 81.
32. Anne M. Fields, "Ill-Structured Problems and the Reference Consultation: The Librarian's Role in Developing Student Expertise," *Reference Services Review* 34, no. 3 (2006): 405–20.
33. Anne M. Fields, "Women's Epistemological Development: Implications for Undergraduate Information Literacy Instruction," *Research Strategies* 18, no. 3 (2001): 227–38.
34. King and Kitchener, *Developing Reflective Judgment,* 250–54.
35. Ibid., 250.