

I-LEARN: A Model for Creating Knowledge in the Information Age

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*The **I-LEARN** Model—Identify, Locate, Evaluate, Apply, Reflect, kNow—both describes the process of learning with information and provides a learning sequence that children and youth can be taught. Grounded in research and theory from information science and instructional systems design, it is also based on the author's own research and writing. This theoretical model reflects an inquiry approach to learning and builds on the three-part information-literacy paradigm that underlies many instructional activities conducted in library media centers: accessing, evaluating, and using information. It expands that paradigm to focus specifically on the use of information as a tool for learning.*

Keywords: information and learning, inquiry learning, information literacy

The I-LEARN Model

To be efficient and effective learners in the information age, students and others must be able to access, evaluate, and use various kinds of information, presented in a variety of formats, for a variety of purposes. Living in a world in which information flows freely and defies the boundaries of traditional disciplines and subject areas, young learners in particular must develop strategies for engaging with ideas that transcend the curriculum and its usual topics and structures. Simply put, to flourish in information environments that are rich and complex, students must learn how to use all kinds of information as tools for learning.

This paper describes a model for learning in today's (and tomorrow's) information-rich environments, outlines the model's theoretical and research background, and suggests its implications and importance for both theory and practice. Based on research and theory from the broad fields of information science and instructional systems design, the model also reflects the realities of practice through its grounding in the author's series of observational studies of the information behavior of children and youth.

Categories and Elements

The I-LEARN model includes six major activities that describe the overall process of learning with information. It also includes eighteen elements, three related to each category, that flesh out those major activities with suggested ways to implement them. It is anticipated that, in practice, the number of these elements might increase or decrease according to the needs of students and teachers and the demands of particular learning tasks.

Definitions for the categories and explanations of the elements follow:

<i>Identify</i>	<i>Choose a problem or question that can be addressed through information</i>
Activate	A sense of curiosity about the world
Scan	The environment for a suitable topic within that world to investigate
Formulate	A problem or question about that topic that can be addressed with information

<i>Locate</i>	<i>Access information, either recorded or in the environment</i>
Focus	On what is to be learned
Identify	The information needed for that learning
Extract	The most relevant and salient information for that learning

<i>Evaluate</i>	<i>Judge the quality and relevance of the information found</i>
Authenticity	Credibility of source and/or author; internal logic; accuracy
Relevance	Topic at hand, level of learning/depth required, appropriateness
Timeliness	Currency, accessibility

<i>Apply</i>	<i>Use the information for a learning task</i>
Generate	Construct new understanding, personal meaning
Organize	Determine appropriate cognitive structure (e.g., chronological, hierarchical, etc.)
Communicate	Create appropriate product to convey that structure

<i>Reflect</i>	<i>Examine product and process</i>
Analyze	Adequacy of both form and content
Revise	Improve as necessary
Finalize	Polish as appropriate

<i>kNow</i>	<i>Instantiate knowledge gained</i>
Personalize	Recognize meaning as personal construct
Internalize	Integrate with previous knowledge
Activate	Draw upon as necessary and/or appropriate

It is significant that the “I” in the initial category suggests several concepts in addition to “Identify”: the dependence on Information as the building block for learning is clearly implied, as is the personal responsibility for one’s own learning assumed by constructivism: “I” create my own understanding of the world. Further, it is important to note that the “kNow” category ends with the element entitled “activate”—the same element that begins the learning process under “Identify.” The implication is that greater knowledge about the world is likely to stimulate even more curiosity about its nature, structures, and processes.

The model is clearly related to the three basic components of information literacy—access, evaluate, and use. “Access” is obviously related to “Locate,” although the model encompasses locating information inherent in the environment as well as accessing information in databases and other library resources. “Evaluate” is the same concept in the model as it is in the usual conception of information literacy. The model’s chief contribution lies in its expansion of the dimension of “Use”: its three culminating categories greatly extend the information-literacy idea of “use” by tying it directly to “learning.” In typical models of information behavior, “use” is generally a vague term describing something beyond the information-seeking process itself. In the I-LEARN model, however, “use” is central: “Apply” describes the process of using information to generate knowledge—that is, to learn; “Reflect” is seen as a key factor in ensuring that learning is personally meaningful; and “kNow” describes how individuals employ and expand their knowledge once learning has been accomplished.

The model also links information behavior directly to learning—specifically, to the four types of knowledge and six levels of learning described in Anderson & Krathwohl’s (2001) revision of Bloom’s *Taxonomy of Educational Objectives*. While the delineation of these relationships is tentative at this point in the model’s development, early conceptions of the links are intriguing: “Locating” information involves finding *factual and conceptual knowledge* that will be the building blocks of learning; “Evaluating” information involves using *metacognitive knowledge* to judge the appropriateness of information; and “Applying,” “Reflecting,” and “kNowing” all involve both *procedural and metacognitive knowledge*. Even more intriguing is the relationship of the model to the taxonomy’s levels of learning: “Locate” is clearly tied to the levels of *remembering* and *understanding*; “Evaluate” encompasses those levels and

also suggests the levels of *analyzing* and *evaluating*; and “Applying,” “Reflecting,” and “kNowing” involve those four levels and add the final two—*apply* and *create*. Further work is necessary to establish (or reject) the relationships of the model to Anderson & Krathwohl’s (2001) work, particularly in terms of their dynamism within the context of information seeking and use.

Theoretical Framework

The I-LEARN model builds on the three-part information literacy paradigm that underlies many of the instructional activities in college and university libraries and in K-12 library media centers: *accessing* information, *evaluating* it, and *using* it to answer a particular question or to complete a particular assignment. Its closest ancestor is *Information Power: Building Partnerships for Learning* (1998)—the current national guidelines for the school library media field, jointly developed by the American Association of School Librarians and the Association for Educational Communications and Technology. The guidelines themselves are grounded in previous research, beginning with Doyle’s (1992) early work to identify the components of information literacy, and assume the American Library Association’s definition of information literacy:

To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. . . . Ultimately, information literate people are those who have learned how to learn. . . . They are people prepared for lifelong learning because they can always find the information needed for any task or decision at hand. (*ALA Presidential Committee Report*, p. 1, quoted in Behrens, 1994, p. 315).

This definition is significant because it makes explicit the link between learning and information use. It suggests going beyond the general notion of information seeking—that is, accessing and evaluating information—to encompass the ultimate reason for students’ information seeking—that is, learning. The key assumption underlying the model is that “developing expertise in accessing, evaluating, and using information is in fact the authentic learning that modern education seeks to promote” (AASL & AECT, 1998, p. 2).

Theoretically, the I-LEARN model draws upon conceptions of the nature of information presented both in the information science literature (e.g., Buckland, 1991; Marchionini, 1995; Wilson, 1981, 1999) and in the literature of instructional design (e.g., Gagne, 1965, 1977, 1985; Hill & Hannafin, 2001; Mayer, 1999; Merrill, 1983, 1999). It assumes that information is itself a dynamic phenomenon consisting of entities and relationships that can be mixed and matched according to their nature and the uses to which they are put. As noted earlier, I-LEARN also incorporates the types of knowledge and the levels of learning outlined in Anderson and Krathwohl’s 2001 revision of Bloom’s *Taxonomy of Educational Objectives*. Finally, it is grounded in the

understanding of learning summarized in Bransford *et al.* (2000). These authors' constructivist view of learning as an active, dynamic process that involves stages and levels meshes well with the dynamism of information itself. The I-LEARN model—itsself a dynamic construct—encompasses all these dimensions.

The research base for the model stems primarily from its creator's research and writing for almost two decades (Neuman, 1993, 1995, 1997, 2003, 2004; Chung & Neuman, 2007). A consistent theme throughout these publications involves the ways in which information can be organized and presented to enhance students' opportunities for deep engagement with content that will enable them to construct higher-level knowledge. Ideas from many other researchers—Bilal, 2000, 2001; Crane & Markowitz, 1994; Eisenberg & Small, 1995; Fidel *et al.*, 1999; Kafai & Bates, 1997; Kuhlthau, 1997; Large *et al.*, 1994, 1995, 1996; McGregor, 1994; and Pitts, 1994; to name a few—have also informed the development of the model.

Implications

The model supports higher-level learning in the information age, both theoretically and practically. Theoretically, I-LEARN is grounded in contemporary notions of both learning theory and information theory and builds on both bases to suggest a new theory—a way to conceptualize learning in an age that requires learners to take personal responsibility for defining their own questions; accepting and (more often) rejecting information in order to answer those questions; and using that information in both critical and creative ways to engender personal, actualizable knowledge. Its emphasis on *evaluating* information and *applying* it in order to *generate* this new knowledge places its focus directly on the higher levels in Anderson and Krathwohl's (2001) revision of Bloom's *Taxonomy*

In practical terms, I-LEARN provides both a description of the process of learning with information and a strategy that can be taught and used to invoke that process successfully. Although the model has not yet been validated in practice, its potential as a learning tool seems strong. By “operationalizing” learning with information in six categories and a few elements within each, the model not only offers a clear and succinct way to explain what happens when we use information as the basis for our learning but also suggests a straightforward process that teachers and library media specialists can use to help students master the task of learning in the information age.

Plans are currently underway to develop and test the model in school library media centers in the mid-Atlantic region of the United States. Experienced library media specialists will be involved in designing and implementing learning activities built on the model that can be integrated into ongoing instruction. These activities will involve students in identifying authentic topics both within and beyond the curriculum, Locating information

about them in a wide range of information sources, Evaluating the information to assess its utility, Applying the “best” information to develop a deep understanding of the topics and to solve related problems about them, Reflecting on their work, and summarizing their kNowledge gained as a result of their efforts.

Figure 1 on the following page provides an example of the kind of activities envisioned for this application of the model to practice. It is important to note that the scenario is simplified and described in a linear fashion for the purposes of efficient presentation. In fact, any I-LEARN activity is by its nature iterative, offering possibilities for looping at each category and element. While the scenario suggests some of the ways various components might lead to additional exploration, it is impossible to provide a comprehensive picture of the ways in which any activity might be developed by teachers (including library media specialists) and learners.

Conclusion

The I-LEARN model bridges the fields of information science and instructional/learning science by drawing on components of each to create a way to think about learning that responds directly to the actualities of a world brimming with information. While this blending of information seeking and learning has been in the literature for over a decade, the I-LEARN model is the first to combine them in a construct that is grounded in both theory and research and that has practical implications as well. Providing this bridge is the most significant contribution of the model.

LIFE IN THE CITY
A Seventh-Grade Social Studies Activity

Identify:

- Activate: What makes city living special?
- Scan: Skyscrapers are uniquely found in cities.
- Formulate: What do skyscrapers tell me about life in the city?

Locate:

- Focus: How do height limitations affect a city's construction of skyscrapers?
- Select: Books, databases, city records, newspaper archives, conversations with planning and other city officials, etc.
- Extract: Specific information about cities of interest (e.g., Washington, DC, which has limitations; Chicago, IL, which does not; Philadelphia, PA, which once had limitations but now does not)

Evaluate:

- Authority: Creator of information, opinion vs. fact, internal logic, etc.
- Relevance: U.S. vs. European cities, new cities in Dubai, etc.
- Timeliness: Accessibility, historical vs. contemporary perspective, etc.

Apply:

- Generate: Height limitations have both advantages and disadvantages.
- Organize: List advantages/disadvantages; sort photos of skyscrapers and of cities with/without height limitations, etc.
- Communicate: Podcast (audio and video)

Reflect:

- Review: Is the information accurate, complete, balanced, etc.? Are the photos clear, illustrative of key concepts, etc.?
- Revise: Find more information, add/delete pictures/narrative, etc.
- Finalize: Crop photos, re-record segments of narrative, etc.

kNow:

- Personalize: Acknowledge individuality of viewpoint, conclusions
- Integrate: With what is known about own city, state capital, other cities, etc.
- Activate: Explain in conversations with friends, use as basis for projects, ask related questions, etc.:
 - What happens in a city when height limitations are dropped?
 - What does zoning have to do with buildings in cities?
 - What do other kinds of buildings tell me about life—e.g., shopping malls, libraries, cathedrals?
 - What makes rural (or suburban) living special?

Figure 1

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Biographical Notes

Delia Neuman holds bachelor's and master's degrees in English literature and a Ph.D. in Education/Instructional Systems Design. She has published and presented widely in both information science and educational technology. The writer of *Information Power: Building Partnerships for Learning*, she is working on a book entitled *Learning in Information-Rich Environments*.

Statement of Originality

This paper is based upon original scholarship undertaken by the author and was conceived and written by the author alone. It has not been published elsewhere. All information and ideas from others are referenced.