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What is the Question?

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Abstract

Asking questions is a vital part of information seeking: it begs an answer, it allows for modification in response to findings, it aids in comprehension, it fosters self-regulation, and it invites conversation. The skill of posing questions throughout the information-seeking process is often under-valued and under-taught. To ask quality, higher-level questions requires explicit instruction. Moreover, such instruction needs to take into account age-appropriate developmental processes. This paper examines the questioning behavior of youth, confronts the issue of question locus of control, and offers guidance in helping youth develop effective question strategies for comprehending information and questioning authority.

Introduction

“The important thing is not to stop questioning.” Albert Einstein

Little children ask questions spontaneously. Asking questions is a vital part of information seeking: it begs an answer, it allows for modification in response to findings, it aids in comprehension, it fosters self-regulation, and it invites conversation (Edwards and Bowman, 1996; Hord, 1995; Rosenshine, Meister, and Chapman, 1996). As youth seek information, the ability to use good questioning techniques can make or break the task. However, to ask higher-level questions requires explicit instruction (Glaubman and Glaubman, 1997). Surprisingly, the skill of posing questions *throughout the information-seeing process* is often under-valued and under-taught. This paper examines the questioning behavior of youth, and offers guidance in helping them develop effective question strategies.

Question as Communication Process

Questioning is basically a communications issue. A person is engaged with another person, be it face to face or reader to text. A question asks for information, either for clarification (What does Q.E.D. mean?) for understanding (How does the electoral college choose the President?), for evaluation (What is this author’s reputation?), or for confirmation (Is it true that Sacramento is the capitol of California?). Questioning begins as a conscious response to some outside stimulus (e.g., a book passage, a noise, a glance). A question arises because some piece of information is lacking or because the stimulus conflicts with existing information (e.g., a man biting a dog); the mind is trying to re-establish equilibrium. Ciardiello (2003) uses discrepant events (e.g., a picture that appears to be illogical) as a way to provoke conceptual conflict and encourage question-finding.

The question that thus arises needs to match the informational need: “Why is the man biting the dog” is a better match than “Does the man have canine teeth?” Existing mental schema, vocabulary, and prior experience help craft the form of the question.

If the person decides to pursue the question, and cannot figure it out internally, then the questioning process becomes “public.” The individual has to determine who or what to answer the question: what source is most likely to give me the answer I want or need? It may be a book, the Internet, or another person. Prior experience determines the source; if a young person has been successful finding answers to questions by consulting an almanac, then that reference tool may be the default choice. Likewise, the attitude that “the Wikipedia has everything” will probably result in the youngster continuing to consult that source regardless of the question. Fine-tuning the choice of information to match the question comes with repeated and differentiated efforts (i.e., trial and error) as well as explicit instruction. Typically, children go to parents, family friends, and teachers for answers first.

The information seeker has to phrase the question accurately to elicit the desired answer, be it verbal or visual. If a human is the question target, then both parties have to navigate the obstacles and contexts between them: of space, time, distractions (noise, competing messages, weather, etc.), common (or unique) language and vocabulary, as well as prior experiences and expectations. Even if the question is well understood, the receiver might not know the answer to the question nor know how to find the answer – they may choose not to get involved for a variety of reasons (e.g., close-mindedness, lack of interest, bad timing, etc.) For children, the responses they

receive may depend more upon the answerer's relationship with the child than the nature of the question itself (Shenton and Dixon, 2003). If the recipient of the question is static – say, a magazine article or Website – then the human has to do all the negotiating work. While it may be said that a document does not impede this process, being unable to twist a questioner's words around, a hypertext or other interactive document *may* impact the individual's information seeking behavior as decision points are created by the developer who has to guess how the accessor will respond to the prompt.

Even when the information is given -- or extracted, the question communication cycle has not finished. The questioner has to make meaning of the answer, usually by asking more questions. In other words, in reflective information seeking, questioning becomes a recursive and iterative process (Jolly and Radcliffe, 2000).

To this point, there has been a tacit assumption that the answer to a question is true. Part of understanding the answer involves verifying it, which can be a particularly challenging task for youngsters who have a small database of knowledge to draw upon; in general, they depend on adults to tell them the truth.

Nor is this process necessarily a one-time event. While one may get clarification or see an error as a result of questioning, the correction might not change the underlying belief system. On the other hand, when one *does* see the new information and then uses it to modify the original question and underlying assumptions, then "double-loop" learning has occurred. A third loop may be introduced as well as the basis for subsequent learning.

Because successful questioning requires clear communication and common understanding throughout the process, it requires explicit planning, instruction, and evaluation (Callison, 2003).

What is a Good Question?

No perfect question exists. A question's quality is highly contextualized. "Why are you pale?" may be a way for a student to distract the teacher or a realization that someone has said something shocking; it may also be a physician's initial question to help diagnose an illness. Timing also impacts the quality of the question; asking why a person is pale is not appreciated just before saying "I do" at the altar, for instance (although it might be the perfect time in order to avoid a bad marriage...) Each *type* of question has validity, depending on the on the objective, the content, and the context of the question (Busching, 1995).

Generally, undesirable questions are those which:

- have no discernable answer (e.g., What is reality?)
- are beyond the intellectual grasp of youth (e.g., How do you create a nuclear space station?)
- are very difficult to find with locally available resources (e.g., How many Peruvians have infected toe nails?)
- are overwhelming in the timeframe allotted (e.g., What is the chemical composition of every fast food in America?)

Ideally, questions should engage the information seeker intellectually and emotionally, cause them to think (Loertscher and Woolls, 2002).

Several question taxonomies exist. One set of categories would be considered nominal; that is, they do not posit that one is "better" than another, just more appropriate in certain circumstances than another. Elder and Paul (2004) posit three types of questions: one-system (right/wrong answers), no-system (opinion, such as flavor preferences), and multi-system (calling for critical judgment). Dahlgren and

Oberg (2003) posit five categories of questions: encyclopedic (e.g., What is the gross national product of Egypt?), meaning-oriented (e.g., What does natural law mean?), relational (e.g., What are the effects of globalization?) , value-oriented (e.g., what languages should be preserved and why?), and solution-oriented (e.g., What can we do to reduce oil pollution?).

Other question taxonomies appear more hierarchical in nature. Sunda (2003) suggests having students generate and classify questions according to Bloom's taxonomy, from knowledge (e.g., How many moons does Mars have?) to evaluation (e.g., Should marijuana be legalized?) De Jesus, Almeida, and Watts (2004) suggest a hierarchy of questions based on Kohl's learning theory model: acquisition (basic information), specialization (linked to one's own knowledge base), and integration (elaboration). Glaubman and Glaubman (1997) categorized questions types as factual, convergent comprehending, and divergent integrative. Ciardello's (2003) question types are similar: memory, convergent, divergent, and evaluative.

Vogler (2004) synthesizes question pattern research, categorizing sequences of questions into six groups: circular (asking a series of questions that finish at the starting position), extending (asking a series of questions at the same cognitive level), extending and lifting (asking extending questions and then asking higher-level questions), narrow to broad (asking specific low-level questions and then higher-level general questions), broad to narrow (asking general, low-level questions and then asking specific, higher-level questions), and backbone of questions (asking all types of questions based on their relationship to the central issue).

While much pedagogical emphasis has been placed recently on in-depth "essential questions," factual questions have their place. Sometimes youth really do need to know how much is one Japanese yen is worth in U. S. dollars. Reference librarians encounter these types of "ready reference" questions all the time. Likewise, procedural questions are also important: how to cite a source correctly, how to insert clip art into a document, how to take Cornell notes, as well as how to whistle or titrate a solution or buy a car. Traditional reference questions, which reflect traditional research papers, consist of those questions that might have a complex answer or which require several steps to answer the question: "How did the Civil War's outcome affect the status of Negroes in the South?" or "What is the reason for seasons?" Deeper-level research questions, as exemplified by Wiggins and McTighe's (1998) essential questions, require searching a variety of sources and analyzing possibly conflicting information: "How would the United States of today differ if the South had won the Civil War?" or "Do new technologies always lead to progress?" (Bopp and Smith, 2000).

Even the most sophisticated information seeking process requires some simple factual question such as how to spell a name correctly -- or procedural questions such as how to request an interlibrary loan. On the other hand, if an academic course exists merely of right/wrong factoid questions and answers, then young people will likely learn little of consequence. Sadly, teachers tend to ask lower-level cognitive questions in class, even though students tend to engage at the level of the questions asked and will rise to the occasion if higher-level critical questions are posed (Edwards and Bowman, 1996).

Developmental Issues in Questioning

Beyond the obvious issue of prior experience, librarians sometimes overlook the developmental issues that compound the difficulties students encounter when posing questions. Youngsters deal with concrete reality and so may make false

generalizations about abstract concepts such as volume conservation. Sometimes they cannot distinguish between main concepts and distracting details, and have difficulty categorizing information. Moreover, young children have a difficult time when faced with conflicting information such as maps with different keys or terms with different meanings (Moore, 1995; Leong and Jerred, 2001).

As children mature cognitively, the types of questions they generate – and the way they use those questions – change. Norris and Foxcroft (1996) noted that with cognitive growth, youth:

- ask more abstract questions
- develop more questions based on abstract categories
- build on prior questions more systematically
- use more inferential reasoning in their questions
- self-regulate their questions more.

They suggest that librarians should target adolescents in learning sophisticated questioning strategies because teenagers are most likely to have developed their formal logic and have more experiences to draw upon. Nevertheless, Glaubman and Glaubman (1997) found that even kindergartners could understand and use metacognitive methods to generate high-level questions; explicit training in questioning also improved reading comprehension and retention.

Youth also vary in the amount of information they need to ask a question. Some individuals are high risk-takers, asking questions as soon as they encounter information. Others need to know enough facts or background information before they can posit a question comfortably. Especially among this latter group, the amount of prior experience impacts their questioning behavior significantly. One might think that as children get older they would ask more questions because they gain knowledge, but the problems or assignments they face get increasingly complex as well, so the overall effect is that some continue to ask more questions than others (de Jesus, Almeida, and Watts, 2004).

Sadly, the socialization process of education can negatively impacts students' questioning behavior. Low-achieving kindergarten males asked more questions than their female counterparts or high-achieving kindergartners. However, over the years, lower-achieving students tend to ask fewer questions than higher-achieving students, becoming more passive learners; they do not want to look stupid. Likewise, adolescent girls tend to ask fewer questions than boys because they do not want to appear aggressive (Good, et al., 1997). In both cases, students change their behaviors based on peer response.

To compensate for this social “norming,” librarians should also set a positive learning atmosphere that encourages intellectual risk taking: “No question is too stupid.” This phrase is supposed to ease the questioner’s anxiety and indicate that the listener is open-minded. The type of question asked can also serve as a diagnostic tool to determine how clearly one has communicated or how well the questioner understands a concept. Nevertheless, body language or voice tonality may betray the listener’s inner feelings of frustration, defensiveness, or condescension toward the questioner. Therefore, librarians should also facilitate confidential ways to question: through writing or private conversations at the reference desk; online reference help offers an excellent way to ask questions in a non-threatening and non-competitive way.

Who Owns the Question?

One of the main difficulties in asking questions emerges when the information-seeking task does not originate with the youngster. Oftentimes, the teacher or some other adult imposes the task (Gross, 1999). So rather than focusing on an intellectually stimulating question, the students' initial questions focus on clarification of the imposer's demand: "What do you want us to do?" "What do you mean by X?" They have to make sense of the other person's question. Students realize that if they "translate" the task incorrectly, their grades will suffer. Most students really do seek the teacher's approval, but, in the process, their own intellectual curiosity may take second place. Usually, teachers do not reward students who ignore the assignment's question in favor of pursuing a self-initiated question. Thus, the basis for questions may reside in student-teacher relationships rather than on subject matter conceptualization.

In the same vein, the next questions students pose often speak to the grading ramifications of the task: "When is the project due?" "How long should it be?" "Should the paper be double-spaced?" While some teachers dismiss these questions, they reflect two intellectual tasks: managing time and framing the task itself. Experienced students realize that writing a twenty-page report entails a different set of questions and tasks than creating a five-screen PowerPoint presentation. These same students also realize that when a teacher says, "Write as long as it takes," that some students will write volumes in the hope that longer is better; students who ask about length are, in fact, trying to define the parameters to insure equity and reinforce group norms.

When the task is initiated by youngsters themselves, they feel more ownership and more control, and their questions are more apt to be personally meaningful. They know their own vocabulary and prior experience, so they can draw upon those to frame questions that can drive their information seeking more easily. On the other hand, self-initiated tasks may be difficult to actualize, such as finding the ideal date or how to make a million dollars without working. I-searches, a popular way to merge research processes and personal interests, can be very frustrating if students do not know what relevant sources of information are available. The librarian can ameliorate this situation by helping students modify their research topic to coincide with accessible information, thus enabling students to "own" the topic and the questions.

Comprehending the Information

Questioning information is an intuitive action that needs to be made explicit in order to prioritize important aspects of the document at hand in light of the pre-identified task. At the point of interacting with the information, the first question is usually: what does this mean? Librarians help students answer this query by showing them how to skim a document to get an overall sense of the content, looking at headings and images and reading the introduction and conclusion. Feldt (2001) found that once primary students learned how a text was organized (e.g., cause and effect, compare-contrast, problem-solution), they could more easily develop appropriate questions – and answer them – about the information.

Asking more specific questions as one encounters new facts or contexts needs to be a conscious action, recorded in some fashion, be it Cornell notes or iPod dictation. As with overall analysis, librarians model the process of questioning information by thinking out loud or showing commentary from sample readings. Likewise, they can examine youngsters' personal questioning practices and suggest ways to improve them.

Because individuals bring different interests and experiences to the learning process, micro-managing question techniques is probably not an effective approach. Instead, young people should be encouraged to document their question naturally – and then highlight the most important or relevant questions that they think worthy of pursuing. Several lessons are embedded in this process: that it is not enough to ask the question – one needs to answer the question if it *is* important, that some questions can be ignored, that prioritizing questions can lead to discovering the most relevant aspects of the information, and that some questions need to be answered immediately but others can wait or be answered automatically by reading further. Librarians can then look at those questions deemed *by the information seeker* to be the most significant ones, and give feedback at that level (e.g., seeing if the student recognizes the difference between main ideas and sidebar details, checking students' understanding and prior knowledge, etc.).

Another activity to reflect on questioning practices consists of having young people categorize their questions as follows: personal (e.g., When is it wrong to help?), factual (e.g., When was he born?), procedural (e.g., How was that graph made?), psychological (e.g., Why would a mother drown her own child?), convergent (e.g., Why do hurricanes move in a clockwise direction?), divergent (e.g., What would have happened if Marco Polo hadn't returned to Italy?), evaluative (e.g., Why do some countries permit capital punishment and others don't?), or author-centric (e.g., Why did the author use that quotation?). This process helps young people (and adults) become more aware of their own question patterns. It also shows how individualized each person's perceptions can be; by encouraging youngsters to generate their own questions, many more issues can surface and be examined (Busching, 1995).

Questioning Authority

In general, children trust adults so they have a predilection for trusting published information (Fitzgerald, 1999). If the answer contradicts the information seeker's existing knowledge base, s/he has to decide whether to reject the new information, reject the old information, or somehow accommodate the two. One of the main bases for rejecting conflicting information is falsehood. Thus, one subset of questions needs to deal with evaluating the information source itself. If not prompted to look for inconsistencies or falsehoods, young children will not be aware of them (Markham, 1979).

This questioning process has been widely addressed since the introduction of the Internet. In the big wide world, information seekers have always needed to cast a critical eye on sources of information. However, information seekers used to be able to depend on the professional librarian to select sources that were credible. Now the library cannot control the authority of all the information that is *accessible* from the library. Asking questions about the author's reputation, viewpoint, assumptions, objective, and communication quality are now necessary to determine the sources legitimacy. Information seekers also need to question the content's validity, currency, and citations or links (Shively and VanFossen, 1999; Browne and Keeley, 2003).

The evaluative criteria for questioning themselves reveal with quality of the information seeker's knowledge base and cognitive maturity. Young people, for instance, tend to give high marks for websites that are attractive, novel, and personally appealing (Hirsch, 1999). For that reason, librarians should provide tested criteria for young people to use as they form evaluative questions. As they become more

experienced in evaluating information, young information seekers can modify those criteria to suit their particular needs and expertise.

Teaching How to Question

As long as the teacher or librarian frames the questions, student will not learn how to ask and answer questions independently. Modeling good question strategies and demonstrating appropriate questions for different objectives only begin the process; young people need to be actively engaged in the questioning process. When librarians ask questions to help young people seek information, they need to think about the central objective and content, certainly, but they also need to consider the students' learning gap the context for learning, and the underlying assumptions about teaching and learning. (van Zee and Minstrell, 1997).

Socratic circles and Paideia seminars exemplify dialogic discussion where students pose critical questions and share understanding; the teacher acts as a guide to facilitate an effective learning environment and scaffold meaning. Socratic questioning methods are especially structured to pose questions for clarification and to test assumptions and consequences (Copeland, 2005). Part of the process consists of peer and teacher review of questioning techniques through checklists, paragraphing, restatement, or elaboration (Billings and Fitzgerald, 2002). Of course, for this interactive questioning to be successful, teachers as well as student need training since this type of classroom management is not a typical part of basic pre-service training. The process also presupposes that students have read the materials to be discussed so they can ask relevant questions. In that respect, these dialogues have a "closed universe" nature to them, seeking information *within* a text, rather than an open-ended search for *potentially* relevant information.

The concept of questioning strategies, *per se*, however, can be an open-ended experience. As with dialectic conversation, librarians can help students use prior experience and knowledge to develop questions that uncover rules and relationships. Both the process of questioning and the knowledge of when to use a particular process need to be taught (King, 1991). Librarians can provide contextual information and give timely, specific feedback that help youth redirect and recraft questions to better fit the intellectual investigation of gathering, evaluating, and using information (Grabowski, Koszalka, and McCarthy, 1998).

Rosenshine, Meister, and Chapman (1996) conducted a meta-analysis of different methods of teaching questioning strategies. They found five types of prompts: signal (key) words, generic question stems, main idea of a passage, question types (similar to types of reference questions), and story grammar categories (i.e., setting, plot, character, theme). They found that signal words and generic question stems were the most effective methods to stimulate relevant questions and facilitate learning.

King (1991) found that students who were given question "stems" (e.g., "How are _____ and _____ alike?" and "What would happen if _____?") to guide their questioning strategies performed better than students who were given no prompts or were given pre-set, closed questions. By having generic question starters, students generated higher order questions and engaged more deeply in problem solving. Self- and peer-questioning also helped student metacognitively reflect on their own information seeking strategies, even as early as fifth grade. King also found that when students pair up to ask and answer their questions, they give more elaborate answers and keep on task better.

One appropriate use of straightforward, factual questions is in helping young people use ready reference sources: tool-centric information seeking. It is important to

note that the objective is procedural knowledge: how to determine the critical features of a reference source and how to extract information from it. To give this controlled inquiry some legitimacy, librarians should contextualize the process in terms of potential academically-grounded questions to be answered. For instance, if one has questions about topography or political boundaries, then atlases would be a good source to consult. To understand information represented in maps, one needs to know how to apply legends. To help students learn how to read maps, librarians and teachers should start by developing well-structured activities to create clear, unambiguous questions that can be found in the atlases to be used by students. Other tips in question generation include:

- Determining the right/acceptable answer
- Using simple, precise vocabulary
- Avoiding “feeling” and “value” words
- Avoiding yes/no questions
- Avoiding compound and embedded questions
- Matching the question to the student’s level
- Pilot-testing the question. (Braddon, 1997)

This process mirrors the approach used in mathematics or engineering as students learn how to calculate algebraic equations or do long division for the first time; the teacher creates problems that result in whole numbers as a way for students to make reasoned guesses about the solution. The emphasis is on the process. Once students become more comfortable with the mathematical formula – or the protocols for interpreting maps, then students can pose their own questions. More complex questions can also be posed in order to help students take the next step and analyze several sources or draw conclusions from mapped representations for information; that is, they can concentrate on the content more than the format (e.g., “How did the geography of Mesopotamia impact its designation as the cradle of civilization?”) (Rosenshein, Meister, and Chapman, 1996; Jolly and Radcliffe, 2000).

On the other hand, open-ended questions and divergent-thinking questions facilitate creative thinking, encourage alternative meaning and solutions, and foster different viewpoints (Ciardiello, 2003). Problem-based learning, inquiry-based learning, and constructivist methods all call upon divergent questions (to pose alternative solutions) and convergent questions (to ultimately find a solution or arrive at a consensus). Even so, these open-ended learning activities also need to be structured to optimize successful learning (Dahlgren and Oberg, 2003). They suggest several principles:

- connect to students’ prior knowledge and experience
- provide complexity but not an overload of factors
- present relevant concepts
- be intellectually provocative and emotionally evocative
- facilitate different perspectives
- encourage self-directed learning
- enhance student interest in the subject matter.

They also found that the design of the activity, particularly scenarios, impacts the kinds of questions posed. Key words presented at the start tend to focus student attention, sometimes causing them to overlook alternative approaches. Thus, having students brainstorm numerous potential terms and connotations helps students generate more questions and modify unproductive questions more readily. Even questioning definitions can open students’ eyes to the complexities and assumptions

made about heretofore simplistic terms (e.g., ecology, freedom, culture). Having all students read the same thought-provoking article as a starting point in a learning activity, and individually generating questions, helps the class see different points of view early on in the information-seeking process. Nevertheless, a variety of question types should emerge for deep learning.

Conclusions

Questions emerge throughout the information seeking process. Taking a metacognitive look at information seeking using the Big6 research process (Eisenberg and Berkowitz, 1990) as a model, generic process questions might include:

Task Definition

- a) Frame the query or assignment. What am I supposed to do? What problem am I trying to solve?
- b) Identify the information needed. What do I need to know? What kind of information should I gather?

Information Seeking Strategies

- a) Identify possible sources. Where am I likely to find the answer?
- b) Select the sources. Which source is best for answering the question or solving the problem?

Location and Access

- a) Locate the source. Where can I find it?
- b) Locate the information within the source? What information is within the source? How do I find it?

Use of Information

- a) Comprehend the information: read, listen, view. How do I "get at" the information?
- b) Extract the useful information? What part of the source is useful? How do I document my findings?

Synthesis

- a) Organize the information. What is the logical way to put the findings together?
- b) Present the information. What is the most effective way to share the findings?

Evaluation

- a) Complete the task. Did I answer the question? Did I solve the problem? Did I do the assignment fully?
- b) Assess the process and the product. How could I improve?

While it is useful to share these questions with information-seekers, it is important to convey that these steps may be revisited and repositioned depending on the context, task, strategy, and needs of each individual. Moreover, evaluative questions arise at every point, not just at the end.

The central issue is clear communication between the information seeker and the potential source of information. This meshing of minds requires a common understanding in order to transmit the needed information. Questions help frame the information need and provide a means to assess the information received. With their

knowledge of information sources and processes, librarians can be instrumental in helping youth ask questions that will give them the answers they want and need.

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