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# Information-Seeking Behavior in Generation Y Students: Motivation, Critical Thinking, and Learning Theory

by Angela Weiler

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**Research in information-seeking behavior, motivation, critical thinking, and learning theory was explored and compared in a search for possible motivating factors behind students' dependence on television and the Internet for their information needs. The research indicates that only a very small percentage of the general population prefer to learn by reading.**

## INTRODUCTION

Much commentary has been circulating in academe regarding the research skills, or lack thereof, in members of "Generation Y," the generation born between 1980 and 1994. The students currently on college campuses, as well as those due to arrive in the next few years, have grown up in front of electronic screens: television, movies, video games, computer monitors. It has been said that student critical thinking and other cognitive skills (as well as their physical well-being) are suffering because of the large proportion of time spent in sedentary pastimes, passively absorbing words and images, rather than in reading.

It may be that students' cognitive skills are not fully developing due to ubiquitous electronic information technologies. However, it may also be that academe, and indeed the entire world, is currently in the middle of a massive and wide-ranging shift in the way knowledge is disseminated and learned.

## THE ROOTS OF INFORMATION-SEEKING RESEARCH

Information seeking has been studied since the 1950s, but these early studies involved mostly the information-seeking activities of researchers and scientists. Information seeking has only been studied in the general population, and particularly within student groups, in the past 20 years or so.

The first model for study of information-seeking behavior in the general population was developed by James Krikelas in 1983. This model suggested that the steps of information seeking were as follows: (1) perceiving a need, (2) the search itself, (3) finding the information, and (4) using the information, which results in either satisfaction or dissatisfaction. Krikelas stated that "information seeking begins when someone perceives that the current state of knowledge is less than that needed to deal with some issue (or problem). The process ends when that perception no longer exists."<sup>1</sup> Krikelas' model is clearly a linear one, and Eisenberg and Brown have suggested that it lacks complexity and flexibility necessary to adequately address the topic.<sup>2</sup> It is interesting, however, to note that this model states that information seeking is based on "need," a concept which is closely related to motivation and consequently to many theories of learning, which will be examined later in this article.

*Angela Weiler is Public Services Librarian,  
Coulter Library, Onondaga Community College,  
4941 Onondaga Road, Syracuse,  
NY 13215, United States  
<weilera@sunyocc.edu>.*

A second model developed by Carol C. Kuhlthau of Rutgers University stresses a process approach with an emphasis placed on cognitive skills; as they increase, so does information-seeking effectiveness. This model is one of the few that was developed based on actual research and not simply on practical experience. Kuhlthau's model goes beyond the actions of seeking and looks at the thoughts, feelings, and actions of the seeker as they go through their process. It is based on a longitudinal study of a group of high school students as well as additional studies using larger, more diverse groups of students and two additional smaller longitudinal studies. The model she described is valid across the user groups studied. Kuhlthau's model includes cognitive issues and also feelings which arise during information seeking: confusion, anxiety, doubt, confidence, etc.<sup>3</sup>

While Krikelas and even Kuhlthau's models are for the most part linear processes, component-based models have also been suggested. Eisenberg and Berkowitz proposed a model based on the "Big Six Skills"—task definition, information seeking, implementation, use, synthesis, and evaluation. Their model is flexible and nonlinear in the same way that hypertext is, allowing for different areas and avenues to be explored out of sequence. In addition, seekers can go back to refine and reidentify the information need, implementing new strategies. Thus, the "Big Six Skills" may be a more appropriate way to study information seeking and are also a better fit with the more flexible of the learning theories and cognitive development theory.<sup>4</sup>

The literature of information-seeking often refers to motivation, critical thinking, and learning theory, so it is necessary to examine the core research in those areas in order to fully understand the complexity of information-seeking behavior in Generation Y students.

### MOTIVATION

The importance of motivation in information science research has been recognized by few researchers other than Kuhlthau.<sup>5</sup> However, a short overview of motivation theories clarifies the important role motivation plays in information-seeking behavior.

Abraham Maslow's "hierarchy of needs" identified five basic needs—physiological, safety, belongingness, esteem, and self-actualization—each one becoming a motivator after the need preceding it has been satisfied. In a campus setting, clearly physiological and safety needs are for the most part provided; the other needs are in an ongoing process of being addressed at varying levels.

McClelland's "Theory of Achievement Motivation" identifies three needs that are not hierarchical: the need for achievement, for affiliation, and for power. One of these needs is usually dominant in any given person and thus drives their actions; some people are "achievers" and function best independently; some need socialization and thrive in group projects, and others gravitate toward power and leadership positions.<sup>6</sup>

Intrinsic-extrinsic orientation is related to behaviorism and thus to motivation, but is more detailed in that it allows for varying levels of reward, both internal and external. Thus, it theorizes that some people create their own rewards, such as satisfaction of curiosity or simply interest in a given topic. The reward for these motivations then is satisfaction and feelings of accomplishment or control. External rewards are the more traditional rewards such as praise or a prize of some sort and

are usually less effective than intrinsic rewards.<sup>7</sup> In fact, there have actually been negative correlations found between the number of extrinsic motivators used and student performance.<sup>8</sup>

Some other related motivational components that are important to keep in mind when considering information seeking are level of effort, expectations, and curiosity. The ARCS model utilizes these components to finally provide a strong framework that is often used in designing instruction to enhance motivation levels. ARCS stands for attention, relevance, confidence, and satisfaction and gives the instructor responsibility for designing lessons around these areas and thus increasing student motivation.<sup>9</sup> The ARCS model can also be applied when designing lessons in information seeking.

### CRITICAL THINKING

Critical thinking is a process that is widely acknowledged in the literature to be crucial to the learning process, to cognitive development, and to effective information seeking. Most college faculty and librarians are painfully aware of how often students seem to be incapable of thinking critically about coursework in general, and about information needs or information resources in particular. Evaluation and effective use of information in any form is impossible without the use of critical thinking, and so the level and quality of critical thinking are of primary concern when speaking of information-seeking behavior in Generation Y students.

The issue of critical thinking cannot be separated from how students view their information universe, and the Grinnell College study is particularly informative in this regard.<sup>10</sup> Students were questioned over several semesters about what they perceived as good reasons for discussing certain sensitive topics such as diversity issues on campus. Those students holding strong views on such topics cited their strongly held views as their main reason for discussing these topics, as opposed to being motivated by the prospect of learning more or seeking information about the issues or the viewpoints of others. Conversely, not having a strong viewpoint (as well as the difficulty level of the subject matter or having a lack of knowledge in that area) was given by students as a reason for not wanting to discuss the topic. Here we can see that the students' efforts at discussion and information seeking, at least from peers, were limited to sharing information that they felt a familiarity with and of which they possessed prior knowledge. In discussion with peers, students rarely shared new information they had located independently, or formulated new opinions using new information, both of which methods would require extensive use of critical thinking skills. Students seemed to relate verbal interaction with peers, then, to be equivalent to advocacy and not to be information seeking at all, and indeed they appeared to prefer it that way. From their viewpoint, the main purpose of discussion was to convince others of the validity of their viewpoint, and not to collect new information. In the Grinnell study, only 5 out of 200 students, or 2.5%, viewed discussion (i.e., verbal information gathering) as a way to gather and/or explore new information.

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In addition, the study found a strong bias in favor of knowledge collected through personal experiences, or by talking with others about the others' personal experiences, rather than from disinterested information sources such as research studies or statistics. Only about 13% of students acknowledged scholarly information such as research studies to be an important source of knowledge for them.

And lastly, students in the Grinnell study felt that having their own knowledge and/or opinions challenged, or even questioned, was undesirable and created discomfort, which should be avoided. They felt that the search for common ground and consensus should always take precedence over disagreement and debate, regardless of the issues or the possibility of new information to be learned. Interestingly, 25% of the women claimed the right as part of a diverse community to not have their opinions challenged at all, as opposed to only 6% of the men. In fact, other statements in the study suggested that the men fully expected that their views would be challenged by others. This ability or inability to accept dissonance will be seen in other research among students as well and is attributed by researchers to students being at various stages of cognitive development.

In direct contrast to the Grinnell study, other studies refer to the introduction of "motivational dispositions" as being essential to the employment of critical thinking, and cite such attributes as inquisitiveness, concern for being well informed, open mindedness, flexibility, understanding of opinions of others, fair mindedness, willingness to reconsider, and reasonableness as reflective of this motivation. As the students in the Grinnell study showed few of these traits, it may well be that critical thinking becomes of secondary importance when presented with emotionally charged and personally sensitive subject matter such as campus diversity issues. It may also be that face-to-face, verbal information seeking may also affect the propensity to use critical thinking skills.<sup>11</sup>

The most realistic appraisal of this apparent conflict in data would come from the research of psychologist William Perry. By surveying Harvard undergraduates, he gradually developed a scheme of ethical and intellectual development and theorized that intellectual development undergoes a series of steps, eventually reaching the stage wherein critical thinking occurs on a regular basis.

Perry's scheme begins with "dualism," which is the belief that information is either right or wrong (i.e., "You're either with me or against me"). Dualism begins early in intellectual development and often is reflected in the system of beliefs and acquired knowledge and viewpoints that a student brings with them to college from secondary school and is characterized by the need for an authority figure to transmit knowledge and beliefs. Independent or even collaborative learning is difficult for students at this stage. In this phase, students view teachers and other adults as "authorities," and on the information provided by them as either "good" or "bad," creating either "good authorities" or "bad authorities," depending on whether or not they agree or disagree with the teacher's information. Students in the dualistic phase of intellectual development are thus particularly unsuited for lessons the evils of the Internet, a source they view as "good" information. Anyone who has worked with college freshmen will most likely be familiar with this dualistic phase of

development, and indeed the results of the Grinnell study discussed above make perfect sense in the context of Perry's scheme.

A more effective lesson on Internet information then, rather than specifically dwelling on "good" and "bad" Web sites, would be to present actual examples and to raise questions rather than giving answers, opening the student up to the next level intellectual development, "multiplicity." Multiplicity is the ability to acknowledge that the world contains knowledge that the student cannot yet classify as right or wrong, knowledge which requires further study and thought (the so-called "gray area"). The student progresses from dualism to multiplicity as they encounter more and more diversity and legitimate uncertainty in the world, facts or occurrences that cannot be easily answered or explained. It is at this point that critical thinking has its roots; the student must use more complex reasoning to determine the validity or nonvalidity of any given piece of information.

The student moves from multiplicity to "contextual relativism" when the knowledge characterized as multiplicitous begins to outweigh the knowledge that is thought to be either right or wrong, or dualistic. The student begins to see the world as primarily relativistic and context-bound, rather than as a world of black-and-white facts. Slowly over these last two periods, critical thinking begins to develop and is used more and more frequently.<sup>12</sup>

Considering Perry's work, and from reading the anecdotal student comments he recorded in his study, we can see that not all college students come to college at the same levels of critical thinking ability, or even at the same level of intellectual development, regardless of academic standing.

## LEARNING THEORY

Learning Theory is an offshoot of motivational theory. As most educators are already painfully aware, students will only seek information and learn if they are motivated to do so. The difficult part is to discover the answer to the age-old question of what motivates students. Educators have often turned to motivational theory in their attempts to answer this question, and the following are a few of the more prominent theories closely related to motivation and thus to learning.

### Behavior Theory

This theory, first developed by B. F. Skinner in the 1950s, uses the concepts of "positive" and "negative" reinforcement to control behavior. This theory explains learning behavior very simply: Reward students who perform well, and punish students who do not. Behaviorist theory, although certainly observed among student populations, does not explain all learning (i.e., learning that takes place without overtly rewarding the behavior) and so has fallen increasingly out of favor in recent years. In addition, behavior learned by this method has been found to be easily changed later on when conditions change or additional information is encountered.<sup>13</sup>

### Control Theory

The "Control Theory" of behavior was developed by William Glasser. The theory states that, rather than being a

response to outside stimulus, behavior is determined by what a person wants or needs at any given time, and any given behavior is an attempt to address basic human needs such as love, freedom, power, etc. Thus, if the desired behavior addresses students needs, the students will respond. If students appear to be unmotivated to perform, it is because the rules, assignments, etc., are viewed by them as irrelevant to their “basic human needs.” Glasser has shown that a majority of students recognize when the work they are doing is irrelevant “busy work,” even if they perform well because of incentives and even when the teacher uses praise as an incentive. Many students will reject such empty work altogether.<sup>14</sup>

### Learning Styles

The concept of people having different “Learning Styles” originated in the work of psychologist Carl Jung, who first proposed the theory of different “personality types.” This theory was expanded to education by determining that these personality types have varying ways of learning. The Myers-Briggs Personality Analysis test, developed by Isabel Myers and Katherine Briggs, was developed using Jung’s theory of personality types in an effort to determine what type any given individual is. The personality type then determines the learning style of a given individual. Jung determined 16 personality types by weighing the degree in which the following four main areas of personality dominate a given person’s behavior: extraverted or introverted; learning mainly by use of the senses or by intuition; learning mainly by thinking or by feeling; and learning mainly by judging or by perceiving. To be effective, teaching styles would have to be modified to accommodate these multiple learning styles.<sup>15,16</sup>

### Multiple Intelligences

Psychologist Howard Gardner developed the theory of “Multiple Intelligences.” Although Gardner’s theory is related to Jung’s personality theory, Gardner’s theory relates more directly to intelligence rather than to personality. Gardner states that there are different skill sets that individuals use in problem solving, and that these skill sets represent distinctly different types of intelligence. Gardner states that intelligence is comprised of a group of different abilities, which originate in the stages of development each person passes through as they grow to adulthood. He identifies seven such intelligences—verbal-linguistic, logical-mathematical, visual-spatial, body-kinesthetic, musical-rhythmic, interpersonal, and intrapersonal—but he suggests that there are probably more.<sup>17</sup>

Traditional education has heavily favored only two of these areas: verbal-linguistic and logical-mathematical. The lecture, teaching by rote memorization, and other timeworn classroom methods obviously favor students who use verbal-linguistic and logical-mathematical skills most often in problem solving (e.g., the SAT test). Thus, people who solve problems visually (visual-spatial—artists, for instance) or who have to actually do an activity to learn or to solve a problem (body-kinesthetic) would be at a distinct disadvantage in the traditional classroom setting. Indeed, educators recognized years ago that only a very small percentage of the general population prefer to learn by reading, and that small percentage, not surprisingly, is comprised mainly of

people who are professionally affiliated with education and libraries.<sup>18</sup>

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An interest in active learning techniques has come to the forefront in recent years in an attempt to teach more to those students relying on other types of intelligence to learn. There have been reports of appreciable increases in posttest scores as opposed to pretest scores when the teaching methods were changed to address other types of intelligence. For instance, a change to active learning activities (kinesthetic learning) increased such posttest scores by 28.74%, and simply changing from a purely textual handout to one which used analogies and charts instead (visual learning) also increased participation and posttest scores. Adding to the argument for teaching to learning style is the fact that students for the most part retain only about 10% of what they read, but they retain 20–30% of what they see.<sup>19</sup> These figures may account for students’ strong preference for visual modes of information seeking (e.g., a television or a computer screen). Indeed, it could be argued that in heavily relying upon television, the Internet, videos/DVDs, and other primarily visual sources of information, students may simply be using the modes of information seeking that are the most efficient and the most effective ones for their particular learning styles.

### INFORMATION-SEEKING BEHAVIOR

Motivation and critical thinking, along with the learning theories above—behavior, control issues, multiple intelligences, and learning styles—become more meaningful as we begin to look at the literature on information seeking itself. Clearly, there are many intellectual and emotional factors at work when a Generation Y student is seeking information.

Although a large number of studies have been done on information-seeking behavior, the process itself is still largely a mystery. As is clear from the material just covered, learning theories, motivational factors, behavioral considerations, intellectual development, and personality types are all factors in the information-seeking process, making it a highly complex one.<sup>20</sup> Although recently researchers have been expressing the need for more qualitative research in studies of this type,<sup>21</sup> quantitative and/or longitudinal studies on generalized information seeking are also scarce, particularly in student populations.

However, to get a better feel for how students approach information seeking, we shall begin by considering a focus group study done at the University of Idaho Library. This study was exceptional in that it made an effort to examine information seeking of all types, not just in the context of academic research or the library. Although the study was done

by librarians, their purpose was to examine the broadest possible range of information-seeking behavior and attitudes. For this reason, they did not mention the word “library” in any of the questions asked, and all of the groups but one met in nonlibrary settings. A neutral moderator was used as well.<sup>22</sup>

The researchers were concerned about the “general information seeking” aspect of their study primarily because most of the research already done in this area has been done in highly specific areas. Studies have been done on students seeking information in specific subject areas such as geography<sup>23</sup> or nursing,<sup>24</sup> or on the differences among students seeking information in different disciplinary areas.<sup>25</sup> Studies have also been done on the use of specific information resources such as the Internet or online catalogs, and on specific user groups such as “mature undergraduates” (i.e., those over 21 years old),<sup>26</sup> “nontraditional undergraduates,”<sup>27</sup> multicultural students,<sup>28</sup> or the homeless.<sup>29</sup> However, the researchers at Idaho University Library wanted their study to remain as general as possible, using undergraduates seeking information of any type, in any location or resource.

This study illuminated a number of very useful points. First of all, students often cited human beings as frequently cited sources of information, both people they knew and strangers as well. Although some preferred to find information on their own, many expressed the preference to discuss information needs with a “real person” rather than find all of the needed information on their own. (This brings to mind the “authorities” that Perry discussed.) Students would appear to be initially seeking “sources of truth” (i.e., Good Authorities) rather than information per se.

The most interesting and perhaps even the most useful information coming from this focus group study is the criteria these students use when discussing their information “needs,” which as we saw from Glasser’s Control Theory are crucial in defining what students will learn. High on their lists of needs when seeking information were ease of use, reliability, accuracy, currency, availability, and cost. Other terms they mentioned as being important to them were trust, quality, credibility, validity, completeness, and comprehensiveness; but these were secondary to the first group.

Whereas obstacles to the obtaining of information in the past were simply not having physical access to the information (“the book wasn’t on the shelf,” or wasn’t available at all), “infoglut” and questionable validity were cited as the most common current obstacles to finding information. Not being able to determine where a Web site came from or whether or not it was accurate was also of primary concern to students in this study.<sup>30</sup> The fact that these students questioned the validity of Internet information at all is encouraging and seems to reveal a multiplistic view of information among these particular students. It had been previously found that Generation Y students tend to overrate their abilities a great deal when it comes to finding information on the Internet.<sup>31,32</sup>

Regarding criteria for information seeking, the concern for time spent locating information was brought up the most often across the board, among undergraduates, graduate students, and faculty. It was considered to be both of great importance and also in undersupply. Indeed, they rated most information-seeking experiences based on how much time they took, and often will accept inappropriate information or information of lower quality if finding it takes less time. They referred to information seeking as taking time away from other things that

they viewed as more important. (“More time to play” is how one student put it.) Unless there is an intrinsic or extrinsic motivation of some kind, or the research is of crucial importance to them on a personal or professional basis, students have no “need” to obtain high-quality information resources, harkening back once again to both Maslow and Glasser.

When asked to describe a “dream information machine,” the groups consistently imagined a machine that was a “mind reader,” that was “intuitive,” and could determine their information needs without them having to verbalize them. Clearly, both students and faculty realize the difficulty of verbalizing complex information needs, and although they think themselves to be clear in their minds as to what they need, they still wish there was some mechanism that could see what they envisioned their needs to be instead of having to sacrifice accuracy during verbalization.

This “dream machine” would also be a one-stop source for information needs, using voice recognition and natural language to search to return a comprehensive collection of information sources. “Portability” and ubiquitous access 24/7 were also important qualities in such a machine. It is difficult to imagine such a machine ever being developed; however, the authors remarked on the similarity between many of the criteria and a reference librarian.<sup>33</sup>

Considering all of this data and research, particularly the propensity for visual learning and the concerns over time spent exhibited by Generation Y students, it comes as no surprise to find that they will usually go to the Internet first, whether it be for personal, academic, or professional information. This has been confirmed again and again in research studies such as John Lubans’ various studies at Duke University from 1997 to the present.<sup>34</sup> D’Esposito and Gardner found in 1999 that 40–50% of the subjects in their study used the Internet on a weekly basis,<sup>35</sup> and the Pew Internet study in 2002 found that 71% of college students said they used the Internet as a major source of information.<sup>36</sup>

Looking at how faculty are dealing with this phenomenon, Susan Herring’s study of faculty acceptance of student use of the Internet in class work found that 73% of faculty accepting student use of the Internet in assignments accepted such use with no criteria or limits attached regarding the accuracy or quality of the Web sites students used.<sup>37</sup> It is assumed that this lack of discrimination or guidance among faculty regarding student information resources would remove one motivating factor students would have for seeking accurate, high-quality information. Clearly, the time factor which Young and Seggen found in their focus group study to be of paramount concern applies to faculty as well as students; checking the Web sites students are using or providing criteria or specific sites to use is time consuming. Conversely, if time is of such concern to students, it is not surprising that they would be drawn to Internet use, as it takes no time at all find information on a topic on the Internet if concern for accuracy is not a factor.<sup>38</sup>

Unfortunately, most data collected on student information seeking using the Internet has been collected by asking students how often they use the Internet, how they would rate their own skills at information seeking, etc. As has already been noted,<sup>39</sup> conflicting statements and inaccuracies show that students tend to overrate their Internet skills and experience, presumably because the Internet is regarded as a “cool” medium, which students are expected to know about in great detail. Even the OCLC white paper on the information habits of

college students found that although two thirds of students felt strongly that they know best what Internet information to use for assignments, only half agree completely that information on the Internet is acceptable for assignments.<sup>40</sup>

A number of other interesting findings in this OCLC paper include the fact that 88% of students state they are less likely to pay for information; and although 80% of students are bothered at least somewhat by advertising on Web sites, only 20% believe that ad-free Web sites have are likely to have more reliable information than sites with advertising. The Internet falls somewhat short of meeting student performance expectations in all areas (particularly currency and accuracy) except “ease of use” and “self-service,” where performance of Web resources equals the importance students place on those qualities. Also interesting is the finding yet again that four out of five students are more likely to seek face-to-face help with assignments rather than online or phone help; few students mentioned using an “Ask a librarian” service.<sup>41</sup>

There are a number of flaws apparent in some quantitative studies of students use of the Internet. First of all, they are often conducted online, skewing results in favor of students who are already heavy users of the medium. Secondly, because random samples have for the most part not been used, these studies have tended to use groups of students who are fairly homogenous either academically, ethnically, or economically, thus skewing results and missing possibly important factors such as the effects of the “digital divide” on student experiences with the Internet. The Lubans studies in particular used students from Duke University, whom we can assume come from different backgrounds both economically and academically from the average American college student.<sup>42</sup>

Studies using quantitative methods such as citation analysis to study student information seeking are few and far between.<sup>43</sup> Although many studies have been done over the past 20 or 30 years using citation analysis, only one was completed since the Internet has become so widely used by students. Malone and Videon found in that study that only 7% of students’ citations were from the Internet, although this has probably changed dramatically in recent years.<sup>44</sup>

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The OCLC white paper, although still querying students instead of measuring citations or other data and surveying only academic information seeking, nevertheless offers quantitative information gathered from a large population. The sample surveyed was taken from a global panel consisting of seven million individuals and then limited to 1050 U.S. college students aged 18–24. The sample was statistically analyzed as well and was determined to have a margin of error of  $\pm 3$  at the 95% confidence level. They also mapped the zip codes of home and school addresses to confirm that the sample was randomly distributed from across the United States.

OCLC found that although 70% of students used their library Web sites for some assignment-related information, only 20% use it for most assignments. Full-text articles are

used the most often (67%), with electronic books (21%) and online reference (6%) being used the least often. However, a full 90% of students also use their library’s print resources. While acknowledging the demographic limitations of the Duke study, the OCLC study still made several references to it.<sup>45</sup>

When studying general, across-the-board information seeking, the term used is “everyday life information seeking” or ELIS, made popular in information research by Reijo Savolainen in the framework he developed for such study in 1995. Although not specifically targeted at students, Savolainen’s framework has been acknowledged to be seminal in the field of information seeking. Two major dimensions of this framework are seeking “orienting” information and seeking “practical” information, two areas that are important to keep in mind when considering students’ information seeking.<sup>46</sup>

Perhaps the most interesting of the recent studies in information seeking are the studies done by Ethelene Whitmire on the effects of prior (epistemological) beliefs on information seeking. Her findings have indicated that students at higher levels of epistemological development (i.e., who have moved from a dualistic world view to a multiplistic or relativistic world view) are better able to handle conflicting information and to use critical thinking to determine authority and accuracy.<sup>47,48</sup>

### **CONCLUSIONS**

Information seeking is a highly subjective process, one which students approach with prior knowledge, strongly held opinions, and differing levels of cognitive development. From the research it is apparent that, aside from personal preconceptions, issues of time and levels of difficulty in obtaining information are usually of more concern to students than issues of accuracy. It is still unclear, however, whether this is because they are not concerned about the accuracy unless their instructor is, or because they are assuming most information is by nature accurate. The casual ease with which students accept information as being either true or false, particularly while they are still in the dualistic phase of cognitive development, would tend to bear out the last assumption. The source of the information (i.e., information from a “good authority”) takes precedence over the information itself, thus saving time and effort by not having to think critically to verify information.

Although the amount of available research is overwhelming, one can see clear trends emerging from both quantitative and qualitative studies, and particularly from focus group information:

- Generation Y students are primarily visual learners, a style which research has shown will almost certainly conflict with the learning style and habits of almost any instructor. Small changes in presentation, such as changing from pure lecture to incorporate hands-on activities, will help to hold student interest and increase information retention.
- Any hands-on activities should be directly related to a specific task that the student perceives as a need, i.e., to personal information needs or to a specific assignment for an instructor.
- Students arrive at college at varying levels of cognitive development and will continue to progress at varying levels through the dualistic, multiplistic, and relativistic methods of dealing with new information. It will probably be more

effective for an instructor to instruct as much as possible by raising questions, encouraging discussion, and using hands-on activities than by lecturing.

- Students, like most of us, are very concerned about saving time. They may be more open to instruction in search techniques (Boolean and other methods) or in using the library's Web site if the time-saving aspects are made clear to them.
- It cannot be expected that all students will arrive at college ready to seek information with high levels of reflective and critical thinking. Some students will develop these skills later than others, and some will still be struggling with them in graduate school.<sup>48</sup> Instructors and librarians would be well advised to keep in mind that cognitive ability is a developmental process and students must go through a series of steps over a period of time before they are able to seek information critically and reflectively.

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