INQUIRY TEACHING IN HIGHER EDUCATION:

A CRITICAL-THINKING CONTEXT

When, where, and how do conversations about enhancing thinking practices take place in your classroom?

Human beings alone are uniquely created to think and question, and have an amazing propensity to learn through sharing ideas, teaching one another, and looking for answers.[1] Contrast this view of learning with the historic (traditional) instructional approach, founded in Western Europe more than 900 years ago: The teacher who arrives in the classroom with a bag of books and a brain full of rehearsed, hackneyed facts, and proceeds to dispense these facts to a passive, acquiescent audience of learners.

In Genesis, we read that God created Adam and Eve in His image and likeness.[2] That likeness was not only physical but also spiritual and mental.[3] They were endowed with an intellect similar to their Creator's. God intended that the first couple and their off-spring should grow in relationship with Him and develop intellectually to attain the highest possible levels that humans can reach.[4] God, the Creator, was Adam and Eve's teacher in the Eden school, where He established the pattern for true Christian education.[5] By giving Adam the opportunity to name each of the animals,[6] He created a stimulating and challenging learning environment in which He encouraged His pupils to observe, pose questions, identify problems, conduct inquiry, and discover solutions. God freed Adam and Eve to be creative and to experience a sense of well-being and meaningfulness in the learning process.

Solomon's encounter with God[7] while still a young king exemplifies God's desire to actively involve learners. This experience prepared Solomon as a lifelong learner, problem solver, and wise king. By reflecting God's example of true education, the inquiry approach invariably results in deep engagement, which develops creative learners who are endowed with the essential skills to think scientifically and critically.

As Christian educators, God expects us to follow the example of the Master Teacher in providing learning opportunities that include inquiry-based critical thinking for the students He entrusts to our care. Questions bring clarity to problems, define issues, and engage young people in substantive learning. This approach parallels a method that Jesus used. In fact, we find that Jesus used 213 separate questions in the Gospels.[8] He used compelling questions to clarify spiritual truths, draw out responses, and combat His detractors.[9] George Knight quotes John A. Marquis, who opined, "Teaching is not telling

BY DERIL WOOD and JEANNETTE R. DULAN

because a great deal of our telling elicits no mental response."[10] In Christ's inductive, analytical approach, He incorporated questions that made His listeners think. His intent was to develop, not control minds.[11]

Generating powerful, essential questions is an integral part of critical thinking. Identifying the components of thinking can provide a framework for formulating essential questions. Using inquiry in the context of applying the elements of critical thinking is an appropriate tool in that mind development process.

The purpose of this article is to explore benefits and challenges of an inquiry-based approach within the paradigm of critical thinking in higher education. We have examined the biblical roots of an inquiry approach and will define inquiry and discuss its importance in a critical-thinking context. Further, we will cite examples of the application of the critical-thinking/inquiry approach in higher-education institutions, identify classroom delivery challenges, and finally present a framework for practical applications.

Inquiry Approach Defined

Providing a precise definition for inquiry is a challenge since teaching practices use several variations of inquiry-based learning. The most common variations include: problem-based learning, project-based learning, and case-based learning.[12] Examining the similarities and differences of each of these approaches extends beyond the confines of this article. However, each approach shares the common characteristic of a student-centered approach in contrast to a teacher-centered (traditional) approach. Inquiry-based learning, across all levels of education, is based on the philosophy of John Dewey[13] and by definition emphasizes a student-centered, active learning approach that focuses on questioning, critical thinking, and other metacognitive functions. Inquiry-based instruction provides balance to traditional instruction because it focuses more on involving students in the learning process. It gives students the opportunity to analyze their thinking and learning processes. It goes beyond *what* they know to *how they have come to know*, and helps them understand how they learned the things they know. It makes them more efficient and effective learners.

Instructors utilizing the inquiry approach

In traditional classroom settings, students are less prone to ask questions, but rather listen and repeat expected answers. While traditional, direct instruction and related teacher-centered approaches can be effective and do have a place in the learning process, they should not dominate or exclude inquiry approaches.

generally engage in more formative assessment of student learning; that is, assessing learning during instruction in order to strengthen student understanding. Thus, formative assessments occur continuously during instruction. Summative assessment, on the other hand, is usually applied at the end of an instructional cycle. One of its purposes is helping to determine grades. Inquiry-driven instructors often use rubrics (grading guides) for both formative and summative assessments because they help to clarify expectations and take the mystery out of the assessment process.

Instructors utilizing the inquiry approach are more likely to view students as:

▪ actively involved in learning and construction of knowledge rather than passive recipients;

▪ able to systematically analyze and evaluate their thinking and consider others' viewpoints rather than randomly reflecting or dismissing others' thoughts[14];

▪ able to develop the skills of critical thinking and questioning in the mastery of content, rather than being limited to mastery of content through memorization[15];

Thus, within the framework of critical thinking, inquiry is viewed as raising essential questions that lead to lifelong learning. In fact, according to Elder and Paul, "It is not possible to be a good thinker and a poor questioner."[16]

The Importance of Inquiry

In traditional classroom settings, students are less prone to ask questions, but rather listen and repeat expected answers. While traditional, direct instruction and related teacher-centered approaches can be effective and do have a place in the learning process, they should not dominate or exclude inquiry approaches. This is especially important in the 21st century, when access to huge volumes of information is practically at our fingertips. Processing volumes of information for useful and meaningful application requires a systematic approach such as inquiry-based learning within the framework of critical thinking. For example, students can easily retrieve vast quantities of data from the World Wide Web. However, they need the critical-thinking filters to sort through the information, extract the essence, and evaluate the quality. In addition to drawing from printed text, students must be equipped to read between the lines and off the page. They need to develop the ability to raise questions, identify concepts, evaluate information, make inferences and draw conclusions, and utilize inquiry skills.

Inquiry is not so much identifying the right answer but engaging in the process of seeking to understand principles that lead to appropriate resolutions to questions and issues. According to Elder and Paul, "Questions define tasks, express problems, and delineate issues. They drive thinking forward. Only when an answer generates further questions does thought continue as inquiry. A mind with no questions is a mind that is not intellectu-

ally alive."[17] This concept is especially meaningful in higher education and can be used in all disciplines. "Every field stays alive only to the extent that fresh questions are generated and taken seriously as the driving force in thinking. When a field of study is no longer pursuing significant answers to essential questions, it dies as a field. To think through or rethink anything, one must ask the questions necessary to thinking through the logic of that thing, clearly and precisely."[18]

Inquiry Approaches in Higher Education

A review of the literature reveals emergent research in inquiry-based instruction at the higher-education level. Researchers have focused primarily on K-12 classrooms, emphasizing Science, Technology, Engineering, and Mathematics (STEM). However, 21st-century educators must prepare thinkers and innovators in a variety of fields. Tertiary-level educators must assume their share of the responsibility for equipping students to: apply essential questions as tools in the learning and critical-thinking process, and to apply principles for formulating, analyzing, assessing, and settling primary questions. These inquiry skills are the essence of student-centered learning, across the subjects (e.g., science, technology, engineering, economics, psychology, history, religion, the arts, and other subjects).

A growing body of literature in higher education reports that exposure to inquiry-based teaching approaches is related to significant gains in performance on tests of critical thinking and facilitates higher levels of cognition for students, who develop a process to better understand principles and concepts.[19] Greenwald and Quitamado[20] state that inquiry-based teaching is a method that ideally reflects the application of critical-thinking skills.

The adoption of critical-thinking/inquiry approaches at several colleges and universities suggests its increasing value to the learning community. Many of the clearly delineated approaches to critical thinking/inquiry approaches are associated with a mandate of the Southern Association of Colleges and Schools Regional Accrediting Association (SACSCOC) in the United States, in its initiation of The Quality Enhancement Plan (QEP). This requires all member institutions to implement a five-year plan that addresses a well-defined topic pertaining to the enhancement of student learning outcomes.[21]

While our research suggests this particular regional accreditation initiative is currently the only one of its type and structure in the United States, we believe the value of such an initiative is not dependent on external requirements, and merits implementation as an integral part of the academic process of any higher-education institution. Within this context, Oakwood University in Huntsville, Alabama, developed a Quality Enhancement Plan approved by the Southern Association of Colleges and Schools: Commission on Colleges that addresses critical-thinking

development through writing and prepares instructors to embed critical-thinking concepts in selected general-education courses with plans for continued implementation throughout the university curriculum. The preparation was based on a metacognitive approach that utilized the Paul and Elder[22] critical-thinking framework. The framework involved an online course in critical-thinking concepts and instructional applications, and cross-disciplinary interaction in workshops and seminars. This article will briefly describe the framework, focusing on inquiry-based strategies.

Examples of the implementation of critical-thinking/inquiry approaches in higher education suggest purposeful integration of this approach at the university level. The University of Louisville in Louisville, Kentucky, has an active critical-thinking program that reflects the inquiry approach within its framework. It provides resource materials, workshops. and small-group sessions fostering cross-disciplinary conversations about critical thinking.[23] Surry Community College in Dobson, North Carolina, focuses on improving student learning outcomes by using critical-thinking/inquiry processes that go beyond traditional lecture and rote memorization.[24] Florida Memorial University in Miami Gardens, Florida, has embedded critical-thinking skills in five general-education courses by using a framework that includes inquiry techniques.[25]

While not exhaustive, this sampling of higher-education programs that have adopted a critical-inquiry approach to student learning does illustrate the multiple contexts in which a critical-thinking/inquiry approach is being implemented.[26]

Challenges to Implementing Inquiry in Higher Education

We have addressed inquiry as a meaningful approach to teaching and learning that seeks to promote deep understanding and active involvement in the learning process. We have identified its biblical roots and pointed out its powerful effect as a method used by Christ, the Master Teacher. However, implementing the inquiry approach as a natural part of an academic environment may present a number of challenges such as the following:

▪ Lack of understanding of the deeper nature of inquiry-based learning;

▪ Moving inquiry from the theoretical to a perspective that is basic to how instructors view their students, their discipline, and their teaching practices;

▪ Lack of a practical framework that identifies the components of critical-thinking/inquiry;

▪ Lack of a common language in analyzing and evaluating inquiry applications; and

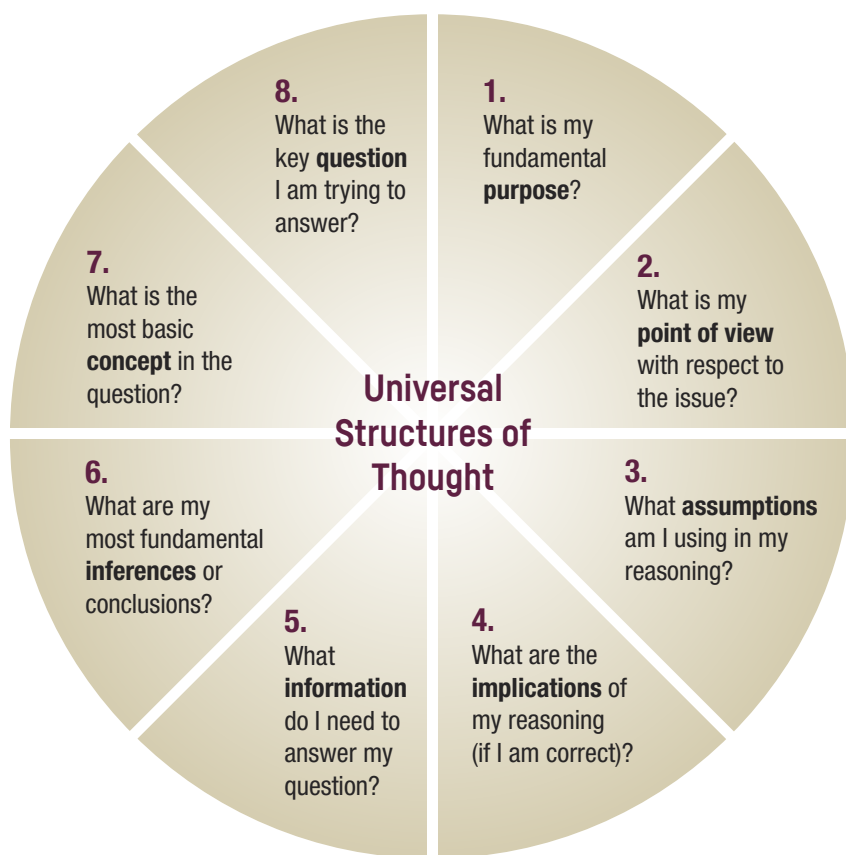▪ Insufficient preparation and learning resources.

These challenges may be overcome through deliberate planning, in a collegial manner, effortful awareness of the usefulness of the framework, buy-in by faculty, training, practice, and monitoring.

An Approach to Implementation

To help teachers master the challenges of implementing an inquiry approach, we present essential questions within the framework of elements of critical thinking, also referred to as *elements of thought*. Many possibilities exist for organizing a systematic approach to questioning. We have selected one based on the elements of thought, which are question-generating concepts. These elements are tools that represent principles for formulating, analyzing, and evaluating primary questions. Appropriately used, they promote a view of students as active learners, are applicable across subject areas and disciplines, and provide a common language for teaching and learning.

For example, in a literature, Bible, history, psychology, math, or any other class, the instructor may ask students to read a chapter of the textbook and use the eight elements to

Figure 1.
Analytic Questions Implied by the Elements of Thought

Universal Structures of Thought

8. What is the key **question** I am trying to answer?

1. What is my fundamental **purpose**?

2. What is my **point of view** with respect to the issue?

7. What is the most basic **concept** in the question?

3. What **assumptions** am I using in my reasoning?

6. What are my most fundamental **inferences** or conclusions?

4. What are the **implications** of my reasoning (if I am correct)?

5. What **information** do I need to answer my question?

do a critical analysis of the text they read. Students would then identify the author's purpose, the viewpoints considered, assumptions, implications for the reader, the information the author is using, the inferences and conclusions proposed, concepts involved in the discourse, and the questions at issue. These elements apply equally to the writing process. Furthermore, the instructor may ask students to consider some or all eight elements of thought as identified in the work of Elder and Paul[27]: purpose, point of view, assumptions, implications, information, inferences, concept, and question (see Figure 1 on page 48).

"Analyzing essential questions is vital to excellence in thought. When we analyze we break the whole into parts. Success in thinking depends, first of all, on our ability to identify the components of thinking. We can discipline our questioning by asking essential questions focused on those components."[28] This approach to inquiry teaching can be integrated into a course using steps similar to those used in instructional design for any subject. The general categories of instructional design include the following: identifying goals/objectives, developing an instructional plan, and designing assignments and assessments. Table 1 illustrates a process for inquiry in instructional design within the framework of the elements of thought.

Table 1. Elements of Thought and Inquiry in Instructional Design Across Disciplines

Instructional Design Components	Elements of Thought and Inquiry in Analyzing the Logic of Any Subject	Science (Example)	History (Example)
Goals and Objectives	What is the main **Purpose** or goal of studying this subject? What are people in this field trying to accomplish?	To figure out how the physical world operates through systematic observation and experimentation.	To create a "story" about the past that captures its dynamics and helps us make decisions about the present and plans for the future.
Instructional Plan	What kinds of **Questions** do they ask? What kinds of problems do they try to solve?	What can be figured out about how the physical world operates by observation and experimentation?	What happened during this particular time period and in this particular place in the past that can help us understand current events and make future decisions?
	What sorts of **Information** or data do they gather?	Facts that can be systematically gathered about the physical world.	Important information from the past gathered in the attempt to devise an account of the dynamics of the past.
Questions to Consider During Activities and Assignments	What are the most basic ideas, **Concepts,** or theories in this field?	The workings of the physical world as predicative and understandable through carefully designed hypotheses, predictions, and experimentation reflective of biblical accounts of Creation.	The past as understandable through careful study and interpretation.
	What do professionals in this field take for granted or **Assume**?	That there are laws at work in the physical world, some of which can be figured out through systematic observation and experimentation reflected in the biblical view of creation.	That there are important patterns and information in the past that can be figured out through systematic observation, study, and interpretation and that can help us live better in the future.

Adapted from Linda Elder and Richard Paul, *The Thinker's Guide to Analytic Thinking: How to Take Thinking Apart and What to Look for When You Do* (Tomales, Calif.: The Foundation for Critical Thinking, 2012): http://www.criticalthinking.org.

Table 2. Components of Thought and Sample Questions

Components of Thought	Sample Questions
1. *Questioning Purposes:* All thought reflects an agenda or purpose. Questions that focus purpose include the following:	• What are we trying to accomplish? • What is our central agenda? • What other goals do we need to consider?
2. *Questioning Questions:* All thought is responsive to a question. Questions that focus on questioning are:	• Is this the best question to focus on at this point, or is there a more pressing question we need to address? • What important questions are embedded in this issue? • The question in my mind is this: How do you see the question?
3. *Questioning Information*: All thought presupposes an information base. Questions that focus on information in thinking include the following:	• On what information are you basing that comment? • What experience convinced you of this? Could your experience be distorted? • How do you know this information is accurate? How could we verify it? • Have we failed to consider any information or data?
4. *Questioning Inferences and Conclusions:* All thought requires the making of inferences, the drawing of conclusions, and the creation of meaning. Questions that focus on inferences include the following:	• How did you reach that conclusion? • Could you explain your reasoning? • Is there an alternative plausible conclusion? • Given all the facts, what is the best possible conclusion?
5. *Questioning Concepts and Ideas:* All thought involves the application of concepts. Questions that focus on concepts in thinking include the following:	• What is the main idea you are using in your reasoning? Could you explain that idea? • Are you using the appropriate concept, or do you need to re-conceptualize the problem? • Is the question a legal, a theological, or an ethical one?
6. *Questioning the Assumptions:* All thought rests upon assumptions. Questions that focus on assumptions in thinking include the following:	• What exactly are you taking for granted? • Why are you assuming that? Should you rather assume something different? • What assumptions underlie your point of view? What alternative assumptions might we make?
7. *Questioning Implications and Consequences:* All thought is headed in a direction. Questions that focus on implications include the following:	• What are you implying when you say . . . ? • Are you implying that . . . ? • If we do this, what is likely to happen as a result? • Have you considered the implications of this policy (or practice)?
8. *Questioning Viewpoints and Perspectives:* All thought takes place within a point of view or frame of reference. Questions that focus on point of view in thinking include the following:	• From what point of view are you looking at this? • Is there another point of view to consider? • Which of these possible viewpoints makes the most sense, given the situation?

Table adapted from Linda Elder and Richard Paul, *The Thinker's Guide to The Art of Asking Essential Questions* (Dillon Beach, Calif.: The Foundation of Critical Thinking, 2006):5-8: http://www.criticalthinking.org.

The elements of thought can be applied to a wide range of assignments and classroom activities such as exploring a topic of study, making a presentation, writing a paper, examining an author's work, reflecting on a service-learning activity, and similar activities. In completing assignments and activities, students engage in responses to compelling questions that they generate using elements of thought as a guide.

Table 2: *Components of Thought and Sample Questions*[29] provides a brief example of how questions generated within the framework of critical-thinking elements can guide a critical-thinking approach to inquiry. The descriptions and examples provided here address the challenges to implementation of inquiry-based learning. Preparation for implementing such a program can be adapted to the institution's needs and resources.

The critical-thinking/inquiry-based framework provides a variety of powerful questions that can be communicated as a common language across disciplines, classrooms, students, and instructors.[30]

Conclusion

We have discussed an approach to inquiry in higher education within the context of critical-thinking components. Our framework provides a systematic approach to learning that is concise and reflects essential analytic questions. Examples of this approach in higher-education institutions suggest a growing appreciation for its strengths in facilitating deeper understanding that outweigh the challenges. Applications of the inquiry-based approach can be found in biblical accounts of teaching and learning from Creation to Christ's teaching and also in Ellen G. White's writings.

White declared: "Every human being, created in the image of God, is endowed with a power akin to that of the Creator—individuality, power to think and do. . . . It is the work of true education to develop this power; to train the young people to be thinkers, and not mere reflectors of other people's thought."[31] ✐

This article has been peer reviewed.

Deril Wood, Ph.D., *is an Assistant Professor in the Department of Education at Oakwood University, Huntsville, Alabama.*

Jeannette R. Dulan, Ph.D., *is a retired Professor/Chair of the Department of Education at Washington Adventist University in Takoma Park, Maryland. Dr. Dulan spent more than 40 years in education and research, including positions at the University of California, Riverside (postdoctoral researcher), La Sierra University, and Oakwood University. She has published and presented at conferences and workshops nationally and internationally. In active retirement, she directed the Quality Enhancement Plan at Oakwood University and is currently part-time Professor in the Department of Education.*

---

NOTES AND REFERENCES

1. Marge Scherer, "The Species That Asks," *Educational Leadership* 73:1 (September 2015):7.

2. Genesis 1:26-27, NIV. Scripture quotations credited to NIV are from *The Holy Bible, New International Version*. Copyright © 1973, 1978, 1984, 2011 by Biblica, Inc. Used by permission. All rights reserved worldwide.

3. Ellen G. White, *Education* (Mountain View, Calif.: Pacific Press Publ. Assn., 1952), p. 15.

4. Ibid., p. 20.

5. Ibid.

6. Genesis 2:19.

7. Ibid., 1 Kings 3:5-15.

8. John S. Bonnell, "Psychology for Pastor and People" (New York: Harper & Brothers, 1960), rev. ed., pp. 71, 72. Cited in George R. Knight, *Philosophy and Education: An Introduction in Christian Perspective* (Berrien Springs, Mich.: Andrews University Press, 2006), 4th ed., p. 251.

9. Ibid., *Philosophy and Education: An Introduction in Christian Perspective,* p. 251.

10. John A. Marquis, *Learning to Teach From the Master Teacher* (Philadelphia, Penn.: Westminster Press, 1925), p. 29.

11. Knight, *Philosophy and Education,* op. cit., p. 251.

12. John R. Savery, "Overview of Problem-based Learning: Definitions and Distinctions," *Interdisciplinary Journal of Problem-based Learning* 1:1 [Spring 2006]:9-20.

13. John Dewey, "My Pedagogical Creed," *The School Journal* 65:3 [January 1897]:77-80: http://playpen.meraka.csir.co.za/~acdc/education/Dr_Anvind_Gupa/Learners_Library_7_March_2007/Resources/books/readings/17.pdf. Accessed November 13, 2015.

14. Gerald M. Nosich, *Learning to Think Things Through: A Guide to Critical Thinking Across the Curriculum,* 4th ed. (Boston: Pearson, 2012), p. 156.

15. Savery, "Overview of Problem-based Learning," op. cit.

16. Linda Elder and Richard Paul, *The Art of Asking Essential Questions* [Dillon Beach, Calif.: The Foundation for Critical Thinking Press, 2010], p. 3.

17. Ibid.

18. Ibid.; Ralf R. Greenwald and Ian J. Quitadamo, "A Mind of Their Own: Using Inquiry-based Teaching to Build Critical Thinking Skills and Intellectual Engagement in an Undergraduate Neuroanatomy Course," *Journal of Undergraduate Neuroscience Education* 12:2 [Spring 2014]:A100-A106.

19. Ibid.

20. Ibid.

21. Southern Association of Colleges and Schools Commission on Colleges (SACSCOC): http://www.sacscoc.org/about.asp.

22. Richard Paul and Linda Elder, *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life* (Boston, Mass.: Pearson, 2012), pp. 104-111.

23. University of Louisville Ideas to Action (i2A): http://louisville.edu/ideastoaction. Accessed June 6, 2014.

24. Surry Community College Learning Initiatives: http://www.surry.edu/why-surry/learning-initiatives. Accessed July 2, 2014.

25. Florida Memorial University Quality Enhancement Plan: http://www.fmuniv.edu/administration/division-of-academic-affairs/office-of-institutional-effectiveness/quality-enhancement-plan-qep/. Accessed November 19, 2015.

26. Foundation for Critical Thinking: http://www.criticalthinking.org.

27. Paul and Elder, *Critical Thinking*, op. cit.

28. Linda Elder and Richard Paul, *The Thinker's Guide to The Art of Asking Essential Questions* [Dillon Beach, Calif.: The Foundation for Critical Thinking Press, 2010], pp. 5-7.

29. Ibid.

30. Ibid.

31. Ellen G. White, *True Education* [Nampa, Idaho: Pacific Press Publ. Assn., 2000], p. 12.

http://jae.adventist.org

The Journal of Adventist Education • February/March 2016 **51**