CRITICAL THINKING:
An Examination of the Status and
Teaching Methods in Higher Education

Gail D. CARUTH, Ed.D.
Texas A&M University-Commerce
Eastfield College, 1876 Oak Bend Drive
Rockwall, Texas 75087, USA

ABSTRACT

Research is replete with the importance of critical thinking skills. The challenge for higher education is that the literature on how to teach critical thinking and the methods for teaching critical thinking are minimal by comparison. The purpose of the paper was to examine the current status of teaching critical thinking in colleges and universities and to identify effective methods for teaching critical thinking skills to today's students. This examination is significant if higher education is to do an adequate job in teaching critical thinking skills to prepare students for contemporary society. The review of the literature identified methods used to teaching critical thinking skills in higher education. The review also revealed that faculty may be deficient in fundamental knowledge, methods for teaching, and how to teach critical thinking in the academy.

Keywords: **Critical thinking skills, teaching critical thinking, methods for teaching critical thinking, the value of critical thinking, and the benefits of critical thinking.**

INTRUDUCTION

Why teach today's students critical thinking skills? On the one hand, Pinkney and Shaughnessy (2013) alleged that students think continously. Consequently, students do not need to be taugh how to think because they are already thinking.

On the other hand however, the authors pointed out that teaching higher order thinking skills was mandated for elementary and secondary students by the No Child Left Behind (NCLB) initiative as a result of the Elementary and Secondary Education Act (ESEA) signed by President Bush in 2002 (United States Government). Critical thinking is not a new concept in the United States (Goralski & Górniak-Kocikowska, 2013; Wilgis & McConnell, 2008). It is a concept that is difficult to explain and assess. Critical thinking can be linked to Socrates, Plato, and Aristotle.

These Greek philosophers referred to critical thinking as the ability to inquire, study, and ponder on thoughts (Wilgis & McConnell, 2008). Developing critical thinking skills became a focus of education during the latter half of the 20th century even though the concept of critical thinking has had a much longer history.

During the 17th century Sir Francis Bacon (1561-1626) wrote that: "Critical thinking is a desire to seek, patience to doubt, fondness to meditate, slowness to assert, readiness to consider, carefulness to dispose and set in order, and hatred for every kind of imposture" (The Critical Thinking Community, n.d.; Goralski & Gorniak-Kocikowska, 2013, p. 45). Bacon's quote functions as a motto for The Critical Thinking Community (The Critical Thinking Community, n.d.), a branch of The National Council for Excellence in Critical Thinking. Preceding Bacon's definition of critical thinking was the Socratic Method, which is a teaching method that practices critical thinking (Goralski & Górniak-Kocikowska, 2013).

Socrates maintained that students naturally acquire the comprehension and the skill necessary to control their own thinking through the practice of effective and repetitive questioning. The Art of Socratic Questioning outlines three types of questions that, when utilized purposefully by the questioner, can facilitate critical thinking. These questions are classified as procedure--questions with correct answers, preference--questions with no correct answers, and judgment--questions with best answers. Consequently, critical thinking according to the Socratic Method could be explained as the application and analysis of information that requires lucidity, sensibility, reliability, and self-manageability (Oyler & Romanelli, 2014).

Critical thinking skills have become essential. Acquiring the ability to collect pertinent data, examine many situations, and provide innovative resolutions to the evolving and multifaceted economic challenges are requirements for today's business professionals, as indicated by Colakoglu and Sledge (2013). Likewise, the American Assembly of Collegiate Schools of Business (AACSB) encourages business schools to include higher order thinking skills in the education of undergraduate business students to prepare them sufficiently for the real world (www.aacsb.org).

Moreover, the National League for Nursing Accrediting Commission (NLNAC) mandates that graduates of nursing programs display critical thinking skills. *The Essentials of Baccalaureate Education for Professional Nursing Practice* is an American Association of Colleges of Nursing's (AACN) curriculum guide for undergraduate nursing programs that incorporates critical thinking as a core competency for aspiring student nurses. The AACN's certifying body, the Commission on Collegiate Nursing Education (CCNE) embraces these standards. Students are required to be able to demonstrate critical thinking skills to maintain accreditation (Staib, 2003).

Furthermore, the objectives for teaching prospective undergraduate nurses have changed to the training of critical thinkers and lifelong learners because the subject matter is too extensive.

The continual advancement of health care and technology combined with the intricacies of care require higher order thinking skills. With the growing intricacies associated with the nature and the speed with which health care is growing necessitates that nurses quickly learn complicated information, use technology successfully, and competently manage a variety of care for patients.

As a result, concentration is being given to learning how to learn. Critical thinking, as such, is thought to be vital to the specifications of protected, suitable, and pertinent care to patients in a range of conditions in a practice discipline such as nursing, as suggested by Hoffman (2008).

The body of knowledge is replete with how essential critical thinking skills are for students, employees, and citizens. The challenge for higher education is that the literature on how to teach critical thinking and the methods for teaching critical thinking are minimal by comparison (Staib, 2003). As a result, the purpose of the paper was to examine the current status of teaching critical thinking in colleges and universities and to identify effective methods for teaching critical thinking skills to today's students. This examination is significant if higher education is to do an adequate job in teaching critical thinking skills to prepare students for contemporary society.

A review of the literature presents a compilation of research, peer-reviewed journals, non-peer reviewed journals, and books on critical thinking in colleges and universities. The academic databases used were from the online library of Texas A&M University-Commerce and included, but were not limited to, Academic Search Premier, EBSCO, Education Research Complete, Eric, ProQuest, and Sage Publications. The key descriptive terms used for this research were critical thinking skills, teaching critical thinking, methods for teaching critical thinking, the value of critical thinking, and the benefits of critical thinking.

A REVIEW OF THE LITERATURE

Critical thinking skills typically include the ability to recognize problems, incorporate basic assumptions, incorporate applicable information from various sources, include a variety of viewpoints when analyzing problems, and consider the consequences of the possible solutions.

The ability to think critically is more than remembering data, it includes the ability to comprehend and infer information accurately. Therefore teachers of business, as suggested by Colakoglu and Sledge (2013), are encouraged to cultivate critical thinking skills that offer opportunities for students to progress from the fundamental knowledge and understanding of ideas to the use of higher order thinking skills of application, analysis, evaluation, and synthesis. Colakoglu and Sledge maintained that an entrepreneurial experience compels students to take real world issues and make sound decisions regarding strategies for real businesses. Ganiron (2014) revealed that student experiences with higher order thinking activities in case-based instruction demonstrated improved test scores in a project management class.

Ganiron also revealed that teaching higher order thinking skills improves thinking ability and enhances opportunities for more valued and situational learning experiences. Furthermore, brainstorming activities that utilize higher order thinking skills tend to advance students' cognitive and academic performance.

Research abounds with reasons why critical thinkings skills must be taught in the academy. Consider the following far-reaching examples: Pinkney and Shaughnessy (2013) claimed that critical thinking skills are indispensable for today's citizens. Wei-Ying, Manfen, and Hsing-Wen, (2013) maintained that developing critical thinking skills is essential for conversations that utilize, examine, and integrate newly acquired learning for thinking about contemporary problems.

Critical thinking enhances the ability to question, explore, and evaluate information and improves collaboration proficiency. Vaidya (2013) alleged that a democratic society encourages citizens to think critically about public policy concerns.

Geertsen (2013) suggested that critical thinking skills are necessary for adult self-directed learning and post-secondary education. Ganiron (2014) indicated that teaching critical thinking skills to today's students leads to more sophisticated thinking. These few examples suggest that critical thinking is requisite for whatever one's station in life from student to citizen. Critical thinking is necessary for existing in contemporary society.

Critical thinking, defined as: the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness (Scriven & Paul, 2007, p. 1).

Consequently, critical thinking is "self-directed, self-disciplined, self-monitored, and self-corrective thinking" (p. 1). According to Geertsen (2013): A good critical thinker analyzes arguments, scrutinizes claims, seeks evidence, makes inferences, and synthesizes...prior to making a judgment and taking some action if required. In addition, the critical thinking process is reinforced by a disposition to use critical thinking in a variety of different situations. This disposition includes a tendency to reserve judgment, ask questions, and consider alternative possibilities (p. 53).

Enhancing students' ability to transfer critical thinking across all domains has vital consequences for education and self-directed learning. Research has demonstrated that students have a propensity to be narrow-minded learners limiting their ability to consider all options. This tendency to be narrow-minded is applicable to a wide range of learning activities unless previously countered by lifelong learning methodologies, as maintained by Geertsen (2013).

STATUS OF TEACHING CRITICAL THINKING SKILLS IN HIGHER EDUCATION

Reid and Anderson (2012) recognized the need for critical thinking as indispensable for education and life, however, they indicated that little in the way of critical thinking skills is being taught or learned in the classroom (Reid & Anderson, 2012; Karabulut, 2012). Uncertainty about the teaching, learning, and transfer of critical thinking skills have been at question for some time. Reid and Anderson nevertheless, believed that critical thinking skills can be taught, learned, and transferred.

According to Butler (2012) critical thinking skills can be taught and can also be learned. The researcher conducted a study to determine if real-world outcomes of critical thinking could also be predicted. The researcher employed the Halpern Critical Thinking Assessment (HCTA) designed to predict real-world outcomes of critical thinking.

Findings showed that the HCTA can predict real-world outcomes uniformly regardless of students' background and perceptions of the importance of critical thinking. Further research on predicting real-world outcomes of critical thinking might offer higher education confirmation that teaching critical thinking can benefit students beyond the classroom.

Goralski and Górniak-Kocikowska (2013) encouraged teachers to "take their cue" (p. 57) from students and social media. Professors can no longer be the sage on the stage for the duration of the class.

Today's students are accustomed to receiving bits and pieces of information. Conceivably social media has reduced students' attention span. It is also possible students' attention span never existed and students were only acting for grades. Students have the option to listen or hear without taking in information.

Students have become, as suggested by Goralski and Górniak-Kocikowska, visual listeners. They have the option to become engaged or to take only a peek. The researchers also suggested that today's students are now accustomed to a new control they attained through social media. Today's students can now decide to listen or decide not to listen to the teacher.

Goralski and Górniak-Kocikowska (2013) examined their prior research on the significance of active productive listening as a major factor for critical thinking. They identified visual listening as a part of teaching students who are accustomed to the control provided to them through social media. Findings revealed the importance of the function of active productive listening and visual listening on critical thinking.

Teachers are confronting a long journey of critical thinking instruction in an age of technology fashioned by networks and globalization, as indicated by Goralski and Górniak-Kocikowska.Reid and Anderson (2012) alleged that some have suggested that instructors simply refuse to teach critical thinking skills or that they may lack the knowledge to teach the skills.

According to Stedman and Adams (2012) however, faculty may be deficient in an intellectual understanding of critical thinking. Hence, faculty may not have the knowledge necessary to integrate critical thinking activities and assignments into their courses. Stedman and Adams conducted a mixed-methods research study of 56 teachers. Findings revealed that not one of the 26 questions was answered accurately by all surveyed in the survey instrument. These questions were purposely developed to measure teachers' understanding of the fundamentals of critical thinking. One such question, for example, "Critical thinking enables one to think more deeply" (p. 13) was answered falsely by 9 (16.1%) of the teachers when the correct answer was true. Stedman and Adams suggested that according to the findings of their study faculty may need more training in critical thinking. If instructors do not have sufficient training in critical thinking they cannot be expected to teach critical thinking skills.

The question of whether or not teachers are knowledgeable on critically thinking is especially vital because colleges and universities have focused on the development of critical thinking skills in the classrooms. Choy and Pou (2012) have suggested that students may not be developing critical thinking skills due to instructors' inability to incorporate critical thinking satisfactorily.

Choy and Pou have further suggested that critical thinking is associated with Bloom's Taxonomy of higher order thinking skills of analysis, synthesis, and evaluation. Moreover, teachers have struggled with integrating these higher order thinking skills into their courses.

The findings of a survey (Kowalczyk, Hackworth, & Case-Smith, 2012) designed to ascertain the perceived level of ability of teaching and evaluating critical thinking skills in radiologic science programs revealed that program directors prize the significance of employing critical thinking teaching strategies.

Students are urged to develop thinking skills through understanding, examining, assessing, deducing, and clarifying radiologic science facts and information with the higher order thinking of assessing and synthesizing.

However, there are obstacles in employing critical thinking teaching methods, such as balancing time with the need to deliver a considerable amount of subject matter, student opposition to critical thinking teaching strategies, minimal student motivation, balancing teaching workloads with professional development opportunities, and insufficient teaching materials available.

Findings also revealed that program directors' confidence level in teaching critical thinking skills is impacted by the level of education of the program directors. A number of program directors, for example, communicated a need for professional development in critical thinking educational strategies.

Research has indicated that there are a minimal number of radiologic science educators ready at the doctoral and tenure levels. This is deficient in comparison to other disciplines (Kowalczyk, Hackworth, & Case-Smith, 2012).

Teaching critical thinking skills in the classroom is not a universal remedy or outcome of standardized instruction nor does it occur by happenstance, as maintained by Karabulut (2012). Critical thinking skills are taught as a result of deliberate and meticulous consideration and dedication. Teaching critical thinking skills in the classroom requires time, effort, and thought. Instructors who desire to teach critical-thinking skills, consequently, are encouraged to coordinate small or large group discussions, include a variety of writing activities and assignments, and continue to ask higher order questions rather than simple memorization questions.

METHODS FOR TEACHING CRITICAL THINKING SKILLS IN HIGHER EDUCATION

Numerous teachers use written or verbal assignments as evidence of students' critical thinking skills, while others consider these assignments as insufficient evidence of critical thinking ability. Staib (2003) analyzed 17 articles from 1996 to 2002 relating to teaching critical thinking. The findings revealed that reflection, creativity, contextual perspective, and open-mindedness were the most common cognitive practices. Flexibility, inquisitiveness, intellectual integrity, intuition, and perseverance were revealed as being practiced much less frequently.

In nursing for example, it is insufficient for nurses to think only critically. They must also convert thinking into action, as alleged by Staib (2003). Some may debate whether or not critical thinking is another idiom for the scientific method. Historically, scholars have employed the scientific method as a procedural process to isolate a problem, gather information, present a resolution, evaluate a theory, and describe the verified resolution. Nurses practice this procedural process in appraising, analyzing, scheduling, performing, and evaluating. This procedural process is a method for critical thinking. Nursing curricula mandate reading. These reading assignments frequently include topics that have not been specifically taught in the classroom. Consequently, prospective nurses must be competent in reading and thinking critically to comprehend the subject matter and apply appropriate care to patients. Students deficient in reading can be identified during the admission process. Reading deficiencies can then be corrected during the nursing program, as indicated by Hoffman (2008).

Directed reading assignments tend to enhance students' class preparation and involvement in class discussions of assigned readings. Reading assignments that are directed also increase critical thinking skills. Examples of such assignments include;

> - asking the student to write a paragraph about what the student thought the assigned reading was about based only on the title of the reading;
> - identifying subject matter the student did not understand from the assigned reading and outlining steps taken to understand the material;
> - writing a summation, explaining the importance of the reading assignment, and listing three questions the student had after completing the assigned readings.

The basis for these assignments is that directed guidance leads to the development of thinking critically. These activities require students to "identify assumptions, recognize relationships, evaluate evidence, make inferences, and analyze conclusions" (Hoffman, 2008, p. 228), which are features of critical thinking.

Additional strategies used to teach critical thinking skills to aspiring nurses include the use of case studies and questions that require higher order thinking. Case studies promote working through problems, creating theories, and evaluating theories against pertinent literature and personal experiences within the framework of healthcare. Case studies provide students collaboration time with colleagues regarding real-life conditions and specific nursing problems in an environment that is safe and that encourages students to think critically. Questions that require higher order thinking beyond just recalling or remembering facts are essential for facilitating students' critical thinking skills, as suggested by Hoffman (2008).

Concept maps are another strategy for teaching graduate nurses to think critically. Nurses are required to be able to identify patient problems and life-threatening conditions. Moreover, they are expected to be able to think critically and intercede correctly. Unfortunately, as suggested by Wilgis and McConnell (2008), junior nurses have limited experience with clinical decision-making and critical thinking which can have negative consequences. Concept mapping is an analytical and innovative educational strategy utilized to assist with synthesizing, organizing, and prioritizing information into reasonable sequences. Concept maps are built on an integration of concepts and connections between concepts. Concept maps are diagrams of thought progressions. Case studies of patient information can be utilized to build concept maps that may be appraised by teachers to ascertain if students are able to learn, examine, and correlate information effectively. Concept mapping is an effective teaching method to assess graduate nurses' thought processes. Improvements in concept mapping scores revealed that minimal use of this teaching strategy can be very worthwhile in developing and enhancing critical thinking skills, as alleged by Wilgis and McConnell.

According to Chabeli (2010), concept-mapping is a worthwhile approach to evaluate quickly students' understanding of complicated information. Concept mapping is an approach to teaching that facilitates innovative, insightful, and critical thinking.

Chabeli encouraged teachers to employ concept maps to assist with teaching critical and deep thinking skills. Concept maps can also be used for individual or group appraisals of complicated information comprehension. Concept maps can be used by students to summarize large amounts of information for understanding for teachers to determine grades at a glance. With the intensified attention and need for critical thinking skills in the evolving workforce, teachers have examined options for facilitating critical thinking skills in academia. The field of rehabilitation counseling, for example, is not excused from the trend of requiring critical thinking skills from its professionals.

Class debates promote contentious conversations and have been found to increase attentiveness and understanding for a variety of perspectives. Additionally, research and planning for debates seemed to encourage improved comprehension of the subject matter by advancing active versus passive student learning. Debates compel students to be engaged with the subject matter beyond knowledge and comprehension and to progress to higher order thinking such as application, analysis, synthesis, and evaluation. Effective preparation for class debates promote the skill to present a position in fundamental terms, acquire and draw in facts to maintain a position, arrange and communicate information clearly, and reflect, assess, and invalidate opposing positions. These skills are characteristics of critical thinking skills. However findings revealed, cautioned Gervey, Drout, and Wang (2009), that if class debates are utilized to teach critical thinking skills students may initially respond pessimistically for the reason that the debate generates anxiety in students. This finding was based on student self-reports.

A 2009 survey of 317 accredited radiography and radiation therapy program directors indicated that program directors lack the skills and resources necessary to employ new educational methods to teach critical thinking skills. Therefore, a review of the literature was conducted and findings revealed that problem-based learning (PBL) is an effective approach to teaching critical thinking skills and should be used in radiologic science education. Collaborative learning, concept mapping/logic modeling, and content-dependent item sets were also reviewed in the literature. Due to the deficiencies of research and evidence evaluating the usefulness of these approaches to teaching they were not included in teaching methods to develop student critical thinking skills. Continued research is required, according to Kowalczyk (2011), to establish the usefulness of collaborative learning, concept mapping/logic modeling, and content-dependent item sets methods for teaching critical thinking.

PBL is a form of self-directed learning that starts with a question or dilemma students must resolve. The dilemma could be an event or problem relating to the subject matter where course information must be applied to explain and used to resolve the event or problem.

Often PBL involves small groups requiring collaboration. Ideally, PBL necessitates a curriculum structured around pertinent challenges for learning outcomes rather than a curriculum structured according to subject matter. This can be challenging to accomplish due to accreditation requirements. As a result, many college and university programs have implemented a mix of methods in which the curriculum is structured with both traditional and PBL methods (Kowalczyk, 2011).

The use of Socratic questions, both logical and sound, has been utilized in the legal profession. Socratic questioning is designed to engage and encourage students' critical thinking and centers on higher levels of Bloom's Taxonomy.

Socrates employed calculated, inquiring questions to assess the level of understanding of his students.

He focused on inducing uncertainty and a continuous propensity to query his students. Critical thinking and Socratic questioning are entwined. While critical thinking entails metacognition and management of one's individual thoughts, Socratic questioning can be employed to manage one's thinking in the quest for knowledge (Oyler & Romanelli, 2014).

The usefulness of Socratic questioning has not been officially assessed, as maintained by Oyler and Romanelli (2014). Socratic questioning provides academic benefits over didactic lectures and tends to be accepted by students because students become engaged in the process. The authors cautioned that learning how to employ effectively Socratic questioning has a learning curve and therefore may be more challenging for the teacher than for the students. There is the possibility for teachers to ask questions without an objective. To create simple inventories of questions is simple. Socratic questioning, however, is intentional with a beginning, middle, and end in mind. Students should sense finality at the conclusion of questioning. Additionally, Socratic questioning may be a challenge to employ without preliminary traditional lectures for students to acquire basic field knowledge. Students may not be able to answer effectively questions without this initial knowledge of the field.

Faculty at the University of Hawaii at Manoa School of Nursing introduced inquiry-based learning (IBL) as an approach that was more independent than employing specific clinical problems (Magnussen, Ishida, & Itano, 2000). IBL could include standards of theories, deduction, and collaboration discussions and interdisciplinary teamwork. IBL offered numerous learning approaches to support different learning styles.

Problem-based learning presented the subject matter through classroom tutorials while IBL consisted of class discussions that followed. Magnussen, Ishida, and Itano indicated that students who had low critical thinking skills demonstrated improvement after IBL while students with high critical thinking skills did not demonstrate the same level of improvement after IBL. The researchers concluded that IBL appeared to be more effective for developing critical thinking skills in students with initially low critical thinking ability.

In summary, the review of the literature has identified the following methods used to teach critical thinking skills in higher education:

> Written or verbal assignments provide evidence of some critical thinking skills. Students tend to demonstrate reflection, creativity, contextual perspective, and open-mindedness more frequently in these assignments as opposed to flexibility, inquisitiveness, intellectual integrity, intuition, and perseverance (Staib, 2003).
> The scientific method affords problem recognition, information gathering, resolution possibilities, evaluation of theories, and final resolution identification to convert thinking into action (Staib, 2003).
> Directed reading assignments that are designed to improve critical thinking skills also enhance participation during class discussions of required reading assignments (Hoffman, 2008).

- Case studies promote working through problems, creating theories, and evaluating theories in light of pertinent literature and personal experiences. Case studies provide students with opportunities to collaborate with colleagues on real-life conditions and problems in an environment that is safe and encouraging (Hoffman, 2008).
- Higher order questions require higher order thinking beyond just recalling or remembering facts. Higher order thinking is essential for facilitating critical thinking skills (Hoffman, 2008).
- Concept maps assist with identifying problems and challenges to proceed correctly. Concept mapping is an analytical and innovative educational strategy utilized to assist with synthesizing, organizing, and prioritizing information into reasonable sequences (Wilgis & McConnell, 2008). Concept maps provide teachers an opportunity to evaluate students quickly (Chabeli, 2010).
- Class debates promote contentious dialogue, increase attentiveness, enhance understanding of a variety of perspectives, and encourage improved comprehension of subject matter. Class debates advance active versus passive learning (Gervey, Drout, & Wang, 2009).
- Problem-based learning is a form of self-directed learning that starts with a question or dilemma students must resolve. College and university programs have implemented a mix of traditional and problem-based learning methods in the curriculum (Kowalczyk, 2011).
- The use of Socratic questions centers on higher order thinking. Critical thinking and Socratic questioning are entwined, while critical thinking involves metacognition and management of one's thinking, Socratic questioning entails management of one's thinking in the quest for knowledge (Oyler & Romanelli, 2014).
- Inquiry-based learning is more effective for developing critical thinking skills in students with low critical thinking skills initially (Magnussen, Ishida, & Itano, 2000).
- Collaborative learning, concept mapping/logic modeling, and content-dependent item sets were reviewed in the literature. However, further research is needed to establish their usefulness due to the deficiencies in evaluating the usefulness of these approaches to teaching critical thinking (Kowalczyk, 2011).

In conclusion, numerous strategies to teach critical thinking skills are emerging as summarized in Table 1 Eleven Methods for Teaching Critical Thinking Skills in Higher Education. This emergence of strategies is an indication of faculty's interest and resourcefulness in teaching critical thinking. Methods for assessing critical thinking skills are essential for internal curriculum assessments, to determine if teaching methods are effective, and for accreditation purposes.

A review of the literature has indicated that teachers may need training on critical thinking, how to teach critical thinking, and methods for teaching critical thinking. A review of the literature also indicated that methods for assessing critical thinking skills are not emerging at the same rate as teaching methods but are just as essential as teaching strategies are for higher education, as suggested by Staib (2003).

Table 1.
Eleven Methods for Teaching Critical Thinking Skills

Method	Findings	References
Written/verbl assignments	Some consider these assignments as insufficient evidence of critical thinking ability.	Staib (2003)
Scientific method	Nursing practice consider this procedure process a method for teaching critical thinking.	Staib (2003)
Directed reading assignments	Directed reading assignments increase critical thinking skills.	Hoffman (2008)
Case studies	Case studies provide students opportunities for collaboration time with colleagues regarding real-life conditions and specific problems in an environment that is safe. They encourage students to think critically and can be used to build concept maps.	Hoffman (2008), Wilgis and McConnell (2008)
Questions that require higher order thinking	Questions that require higher order thinking are essential for facilitating students' critical thinking skills.	Hoffman (2008)
Concept mapping	Concept mapping assists with synthesizing, organizing, and prioritizing information and facilitate innovative, insightful, and critical thinking.	Wilgis and McConnell (2008); Chabeli (2010)
Class debates	Class debates encourage student engagement beyond knowledge and comprehension progressing to higher order thinking of application, analysis, synthesis, and evaluation.	Gervey, Drout, and Wang (2009)
Problem-based learning	Problem-based learning is effective approach to teaching critical thinking skills.	Kowalczyk (2011)
Collaborative learning, concept mapping/logic modeling, and content-dependent item sets	Continued research is needed due to the deficiencies of research and evidence evaluating the usefulness of these approaches to teaching critical thinking skills.	Kowalczyk (2011)
Socratic questioning	Socratic questioning engages students and encourages higher levels of Bloom's Taxonomy.	Oylerand Romanelli (2014)
Inquiry-based learning	Inquiry-based learning is more effective for developing critical thinking skills in students with initially low critical thinking skills.	Magnussen, Ishida, and Itano (2000)
Questions that require higher order thinking	Questions that require higher order thinking are essential for facilitating students' critical thinking skills.	Hoffman (2008)
Concept mapping	Concept mapping assists with synthesizing, organizing, and prioritizing information and facilitate innovative, insightful, and critical thinking.	Wilgis and McConnell (2008);Chabeli (2010)
Class debates	Class debates encourage student engagement beyond knowledge and comprehension progressing to higher order thinking of application, analysis, synthesis, and evaluation.	Gervey, Drout, and Wang (2009)
Problem-based learning	Problem-based learning is effective approach to teaching critical thinking skills.	Kowalczyk (2011)
Collaborative learning, concept mapping/logic modeling, and content-dependent item sets	Continued research is needed due to the deficiencies of research and evidence evaluating the usefulness of these approaches to teaching critical thinking skills.	Kowalczyk (2011)
Socratic questioning	Socratic questioning engages students and encourages higher levels of Bloom's Taxonomy.	Oylerand Romanelli (2014)

Methods for teaching critical thinking skills must be unified across institutions. Furthermore, college and university students must be evaluated on critical thinking ability using established assessment instruments. Theses assessments for evaluating critical thinking must also demonstrate a high degree of internal consistency, as maintained by Kowalczyk, 2011.

LIMITATIONS AND DELIMITATIONS

The literature on critical thinking and teaching for critical thinking is abundant. It is an enormous task to review all the literature on teaching for critical thinking. The process of selecting the most relevant sources is a very delicate one. This study was limited to academic databases from the online library of Texas A&M University-Commerce. Furthermore, the research articles selected for this study were generally delimited to research on critical thinking skills, teaching critical thinking, methods for teaching critical thinking, the value of critical thinking, and the benefits of critical thinking published since 2010.
Implications

The implications from the findings of this research are numerous. One implication from this study is that administrators need to determine the level of faculty knowledge on critical thinking and how to teach critical thinking skills. Once this level of knowledge is determined, educators deficient in the knowledge of the fundamentals of critical thinking, the methods for teaching critical thinking, and how to teach critical thinking need to be trained. In order to be able to teach critical thinking skills effectively to today's college and university students, educators must be knowledgeable.

 Another implication from this study is that educators are encouraged to collaborate with colleagues to identify the most appropriate approaches to teaching critical thinking skills.

Through collaboration among and between college and university professors faculty will be able to determine the most effective methods for teaching critical thinking skills. Teaching methods can then become standardized across disciplines, institutions, and geographical locations.

An additional implication from this study is the need for assessing critical thinking skills. Students across disciplines, institutions, and geographical locations must be evaluated using established critical thinking assessment instruments. These instruments for assessing critical thinking ability must demonstrate a high level of internal consistency across all items on the instrument for establishing reliability.

RECOMMENDATIONS

It is recommended that additional studies be conducted on the status and teaching of critical thinking skills to verify the results of this study. It is also recommended that continual research be conducted to monitor the progress of teaching critical thinking skills in higher education.

BIODATA and CONTACT ADDRESSES of the AUTHOR

Gail D. CARUTH, Ed.D., is a member of the adjunct faculty in the Department of Educational Leadership at Texas A & M University-Commerce and is also a member of the adjunct faculty at Eastfield College. She is a former human resource manager as well as an organizational consultant specializing in training and development. She holds the professional designation of Senior Professional in Human Resources (SPHR). She is the coauthor of staffing the Contemporary Organization, 3rd ed. and her articles have appeared in a number of academic and trade journals. She serves as an editor and reviewer for a number of academic journals.

Gail D. CARUTH, Ed.D.
Texas A&M University-Commerce
Eastfield College, 1876 Oak Bend Drive
Rockwall, Texas 75087, USA
Phone: 972-771-2371
Email: gaildianna@flash.net

REFERENCES

AACSB Accreditation Standards. Retrieved from
http://www.aacsb.edu/accreditation/standards

Butler, H. A. (2012). Halpern critical thinking assessment predicts real-world outcomes of critical thinking. *Applied Cognitive Psychology*, *26*(5), 721-729. doi:10.1002/acp.2851.

Chabeli, M. (2010). Concept-mapping as a teaching method to facilitate critical thinking in nursing education: a review of the literature. *Health SA Gesondheid*, *15*(1), 70-76. doi:10.4102/hsag.v15i1.432.

Choy, S., & Pou San, O. (2012). Reflective thinking and teaching practices: A precursor of incorporating critical thinking into the classroom? *International Journal Of Instruction*, *5*(1), 167-182.

Colakoglu, S. N., & Sledge, S. A. (2013). The development of critical thinking skills through a service-learning oriented entrepreneurship course. *Journal Of Entrepreneurship Education*, *16*115-124.

Ganiron Jr., T. U. (2014). The Impact of higher level thinking on students' achievement toward project management ourse. *International Journal of U- & E-Service, Science& Technology*, *7*(3), 217-226. doi:10.14257/ijunesst.2014.7.3.19.

Geertsen, R. (2013). Barriers to critical thinking across domains. *Review of Management Innovation & Creativity*, *6*(20), 52-60.

Gervey, R., Drout, M., & Wang, C. (2009). Debate in the classroom: an evaluation of a critical thinking teaching technique within a rehabilitation counseling course. *Rehabilitation Education*, *23*(1), 61-74.

Goralski, M. A., & Górniak-Kocikowska, K. (2013). "Visual listening" – an exploration of critical thinking andhow students listen with their eyes. *Journal Of International Business Disciplines*, *8*(2), 44-60.

Hoffman, J. (2008). Chapter 12. Teaching strategies to facilitate nursing students' critical thinking. *Annual Review Of Nursing Education*, *6*225-236.

Karabulut, U. S. (2012). How to teach critical-thinking in social studies education: An examination of three NCSS journals. *Eurasian Journal Of Educational Research (EJER)*, (49), 197-212.

Kowalczyk, N. (2011). Review of teaching methods and critical thinking skills. *Radiologic Technology*, *83*(2), 120-132.

Kowalczyk, N., Hackworth, R., & Case-Smith, J. (2012). Perceptions of the use of critical thinking teaching methods. *Radiologic Technology*, *83*(3), 226-236.

Magnussen, L., Ishida, D., & Itano, J. (2000). The impact of the use of inquiry-based learning as a teaching methodology on the development of critical thinking. *Journal Of Nursing Education*, *39*(8), 360-364.

Oyler, D. R., & Romanelli, F. (2014). The fact of ignorance revisiting the Socratic Method as a tool for teaching critical thinking. *American Journal Of Pharmaceutical Education*, *78*(7), 1-9.

Pinkney, J., & Shaughnessy, M. F. (2013). Teaching critical thinking skills: A modern mandate. *International Journal Of Academic Research*, *5*(3), 346-352. doi:10.7813/2075-4124.2013/5-3/B.52

Reid, J. R., & Anderson, P. R. (2012). Critical Thinking in the Business Classroom. *Journal Of Education For Business*, *87*(1), 52-59. doi:10.1080/08832323.2011.557103.

Scriven, M., & Paul, R. (2007). Defining critical thinking. The Critical Thinking Community: Foundation for Critical Thinking. Retrieved from http://www.criticalthinking.org/pages/defining-critical-thinking/766

Staib, S. (2003). Teaching and measuring critical thinking. *Journal Of Nursing Education*, *42*(11), 498-508.

Stedman, N. R., & Adams, B. L. (2012). Identifying faculty's knowledge of critical thinking concepts and perceptions of critical thinking instruction in higher education. *NACTA Journal*, *56*(2), 9-14.

The Critical Thinking Community. (n.d.). Retrieved from http://www.criticalthinking.org

United States Government, Public Law print of PL 107-110, the No child left behind act of 2001 [1.8 MB]. (2001). Retrieved http://www2.ed.gov/policy/elsec/leg/esea02/index.html

Vaidya, A. (2013). Epistemic responsibility and critical thinking. *Metaphilosophy*, *44*(4), 533-556. doi:10.1111/meta.12047

Wei-Ying, H., Manfen, C., & Hsing-Wen, H. (2013). Assessing online discussions: Adoption of critical thinking as a grading criterion. *International Journal Of Technology, Knowledge & Society*, *9*(3), 15-25.

Wilgis, M., & McConnell, J. (2008). Concept mapping: an educational strategy to improve graduate nurses' critical thinking skills during a hospital orientation program. *Journal Of Continuing Education In Nursing*, *39*(3), 119-126. doi:10.3928/00220124-20080301-12.