

VOLUME 1: CRITICAL THINKING

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InSight: A Collection of Faculty Scholarship is published yearly as a free, refereed resource highlighting scholarly contributions to advance the practice and profession of teaching. Print journals are available to all Park University faculty; online versions are available at www.park.edu/cetl/Insight.

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"The art of teaching is the art of assisting discovery."
~Mark Van Doren

EDITORS' INTRODUCTION

In 2005, Park University created the Center for Excellence in Teaching and Learning (CETL) to support its goals for academic excellence. Organizationally housed within the Office of Academic Affairs, CETL provides University-wide resources to faculty and creates opportunities for reflection, dialogue and exchange of best practices. CETL is a faculty resource, driven by faculty-identified professional development needs, interests, and goals.

The mission of CETL is to advance the practice and profession of teaching at Park University. As a faculty resource, CETL works collaboratively across the University community to:

- Connect faculty with resources to enhance academic excellence.
- Promote a culture of reflective teaching practice to stimulate instructional innovation.
- Create opportunities for cross-disciplinary faculty collaboration and exchange.
- Recognize and reward faculty contributions to the scholarship of teaching and learning.

InSight: A Collection of Faculty Scholarship is a refereed journal published annually by CETL. The journal features theoretical and empirically-based research articles, critical reflection pieces, case studies, and classroom innovations relevant to teaching, learning and assessment. The editorial staff invites submissions of research and scholarship that support faculty in improving their teaching practices.

Unique from many discipline-based and teaching-oriented journals, *InSight* focuses each edition on a specific topic or theme, selected by Park University faculty, relevant to current trends in higher education. For the inaugural volume, a faculty interest survey revealed critical thinking as the teaching and learning topic of most interest to Park University faculty.

In this volume...

The articles in this volume each make a significant contribution to our understanding of how critical thinking can be facilitated and fostered in the classroom. The introductory editorial "Thoughts on Thinking: The Challenge of Critical Thinking," defines critical thinking; its increasing importance in today's educational climate; and the vital work of faculty at Park University in realizing the University's mission "to provide access to academic excellence which will prepare learners to *think critically*, communicate effectively, and engage in lifelong learning while serving a global community."

The volume then begins with "Instructional Support for the Teaching of Critical Thinking: Looking Beyond the Red Brick Walls," a piece that offers a concise and extremely helpful review of the resources available to faculty through professional organizations. Recognizing that non-discipline specific teaching theories and approaches are often time consuming to "translate" into disciplinary curricula, the author surveyed hundreds of professional organizations across dozens of disciplines to create a cross-disciplinary inventory of the most useful pedagogical resources.

The second scholarly article, "Using Self-Experimentation and Single-Subject Methodology to Promote Critical Thinking," recounts a specific pedagogical approach to facilitating critical thinking. Co-authored by two students in the class, the piece includes examples of student work, along with the evaluative criteria used to assess that work. Although the faculty author writes about his experiences teaching an Applied Behavior Analysis course, readers will find much to translate into their own classrooms.

Responding to the limited time and resources faculty face in the classroom, the third article in this volume, "Thinking Critically about Critical Thinking: Integrating Online Tools to Promote Critical Thinking," suggests online technologies that can aid faculty in balancing content coverage, depth of understanding, and critical analysis of course material. The article covers the theoretical foundations for critical thinking, as well as discusses specific classroom-level approaches and technologies.

The last scholarly piece, "The Impact of Academic Freedom Policies on Critical Thinking Instruction," pans outward from the classroom to the university, arguing the connection between an institution's academic freedom policies and the extent to which it is possible for critical thinking to figure prominently in the curriculum. Rooted in current events on the higher education landscape, the piece persuasively argues for faculty action to ensure that critical thinking, often promoted by the intense discussion of controversial topics, remains a hallmark of college-level teaching and learning.

Concluding the volume is an annotated bibliography of scholarly resources on critical thinking available through the Park University McAfee Memorial Library.

We wish to sincerely thank the authors who contributed to this, the inaugural volume of *InSight: A Collection of Faculty Scholarship*. We believe the pieces in this volume represent the commitment to quality and innovation that characterizes faculty at Park University, and we look forward to continued conversation in future volumes of this journal.

--B. Jean Mandernach, Emily Donnelly, and Amber Dailey

Thoughts on Thinking: The Challenge of Critical Thinking

Gary Heisserer, PhD
Associate Vice President for Academic Affairs
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Perhaps the most comprehensive definition of critical thinking comes from Halpern (1999); she writes:

Critical thinking refers to the use of cognitive skills or strategies that increase the probability of a desirable outcome. Critical thinking is purposeful, reasoned, and goal-directed. It is the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions. Critical thinkers use these skills appropriately, without prompting, and usually with conscious intent, in a variety of settings. That is, they are predisposed to think critically. When we think critically, we are evaluating the outcomes of our thought processes—how good a decision is or how well a problem is solved. (p. 70)

Central to Halpern's definition is the idea that the critical thinker must have not only the necessary analytical tools but also the inclination to use them. Implicit in this argument is the reality that as educators, we must facilitate the learning of both critical thinking skills and dispositions.

Critical thinking may also involve the dialectical confrontation between two conflicting forces. The first is what we know and believe; the second is that which is different, new, or contrary to what we know or believe. Braman (1998) uses the phrase "disorienting dilemma" to describe the situation when one critically examines a well-formulated position that is directly at odds with a long held, and perhaps cherished, belief (p. 30). It is this dynamic process of exposure, exploration, and evaluation that is central to the liberal arts educator committed to the practice and to the instruction of critical thinking. However, the evaluation of differing perspectives is a necessary but not sufficient condition of critical thinking. Hatcher and Spencer (2000) address this concern in their succinct but compelling definition. They write that critical thinking "attempts to arrive at a decision or judgment only after honestly evaluating alternatives with respect to available evidence and arguments" (p.1). This definition is particularly satisfying because it refers both to a process (the honest evaluation of alternatives) and to an advocacy-based result (a decision that is informed by the evidence and arguments).

It is this dynamic process of exposure, exploration, and evaluation that is central to the liberal arts educator committed to the practice and to the instruction of critical thinking.

In recent years much has been written about the emergence of new technologies that make previously unimaginable amounts of information immediately available. The existence of these electronic tools heightens the importance of critical thinking while also providing new challenges and opportunities for teaching and learning critical thinking skills. Halpern (1999), for example, writes that "the ability to judge the credibility of an information source has become an indispensable critical thinking skill that needs to be deliberately and repeatedly taught in college and earlier" (p. 71). Hatcher and Spencer (2000) discuss the "intellectual obligation" of critical thinking, its necessity in the workplace, its importance for problem solving at an individual and societal level, and its close relationship to effective writing (p. 9).

It is clear that with the World Wide Web in particular and technology in general, the amount of available evidence, and its ease of access, has never been

greater. Bangert-Drowns and Pyke (2001) confirm that the vast majority of students prefer the Internet to books or magazines for research purposes. From one perspective this increase in the amount of information and its ease of access should enhance our ability to think critically. Bradshaw, Bishop, Gens, Miller, and Rogers (2002) identify six particularly promising features of the Internet for helping to develop complex thinking skills: motivation, unlimited resources, global communication, collaboration, authentic problems, and hypertext environment. The very features outlined above also impose new and daunting challenges. Bradshaw et al. (2002) cite several of them: information overload, navigational disorientation, shallow thinking patterns, and the uneven quality of information. They note that the abundance of sources, coupled with the hyperlink environment, can lead to bewildered users. This abundant and interlinked environment can discourage deeper reflective study in favor of high-speed surfing. The "Googlelization" of more traditional research methodologies promotes easy-to-access, but dangerously unfiltered and non-critical examination of existing knowledge and opinion.

The "Googlelization" of more traditional research methodologies promotes easy-to-access, but dangerously unfiltered and non-critical examination of existing knowledge and opinion.

In this context a particularly daunting task facing educators becomes how to leverage technology to help develop the skills and dispositions of critical thinking. Todd (1998) advocates a sort of creative utilitarianism. He writes:

...the key challenge confronting schooling in the wake of the information technology revolution and the enormous volume of information it provides is empowering learners to be creative, critical, and constructive users of information. This has to be the central pedagogical transformation involving information technology. (Key challenges section, ¶11)

Fortunately, there is a significant body of literature documenting such "pedagogical transformations." These involve new partnerships between librarians and faculty designed to help students evaluate electronically-accessed material. Online tutorials are being developed helping Web-users to examine a site's purpose, sponsor, content, bias, and most recent revision (Lederer, 2000). Discipline-specific critical-thinking taxonomies are being developed to assist in the teaching and in the evaluation of critical thinking. Interactive media, electronic discussion forums, Weblogs, and Webquests have become commonplace in both the face-to-face and the online classrooms. The number of technology-enhanced teaching methods and programs claiming to help students think critically is itself overwhelming. These efforts reflect an explicit recognition of both the expanding importance and the increasing difficulty of developing critical thinking skills in our information age.

There also appears to be widespread recognition that critical thinking is a necessary component of authentic intellectual maturity. This sentiment is expressed by Villaume and Braham (2002) in their discussion of the ramifications of being able to read critically:

After much discussion, we concluded that we choose to actively and thoughtfully construct meaning because we experience reading as an act that empowers us. We believe that we have the right and the responsibility as readers to ask our own questions, to make our own connections, to visualize our own images, and to formulate and reformulate our own predictions. ... In short, we choose to read actively and strategically because to do otherwise means that we must relinquish our rights as readers and submit to the meanings, beliefs, and purposes advocated by others. (Why do we teach section, ¶12)

It is this empowering attribute that makes critical thinking so essential. Critical thinking and information technology have been inextricably linked. Our information age presents new challenges and new mandates for teaching critical thinking, while also presenting new and exciting opportunities.

Finally, it is with great pleasure that Park University and its Center for Excellence in Teaching and Learning explore these opportunities and address these challenges in this inaugural issue of *InSight*. Park's recognition of the importance of critical thinking is reflected by its prominence in the University's mission:

The mission of Park University, an entrepreneurial institution of learning, is to provide access to academic excellence which will prepare learners to think critically, communicate effectively, and engage in lifelong learning while serving a global community.

Park University has identified critical thinking as an essential component of the University's "literacies." These literacies (Analytical and Critical Thinking, Community and Civic Responsibility, Scientific Inquiry, Ethics and Values, and Literary and Artistic Expression) constitute those fundamental personal and professional skills and dispositions necessary in the development of women and men committed to lives of informed and engaged advocacy. These literacies are embedded in Park University's curriculum. Faculty commitment to these literacies is revealed both in their teaching methodologies and in their own personal and professional commitment to actions based on knowledge, discovery, and critical evaluation. The evidence of this commitment is reflected in the scholarship presented in the following pages.

Faculty commitment to these literacies is revealed both in their teaching methodologies and in their own personal and professional commitment to actions based on knowledge, discovery, and critical evaluation.

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Instructional Support for the Teaching of Critical Thinking: Looking Beyond the Red Brick Walls

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Many instructors appreciate the importance of developing the critical thinking skills of their students yet are unfamiliar with pedagogical approaches for teaching critical thinking. These instructors rely on instructional support from teaching and learning centers or online resources. It can be time consuming, however, for instructors to translate generic teaching strategies into actual lessons related to their course content. The purpose of this paper is to review an under-utilized source of discipline-specific instructional resources for teaching critical thinking: professional organizations. Many national organizations support education within their discipline by providing a variety of instructional materials, pedagogical approaches and a venue for sharing teaching tips and lessons by their members. Hundreds of professional organizations across dozens of disciplines were examined to determine the types of instructional support provided. Representative teaching resources from these organizations are documented from a variety of disciplinary areas.

Introduction

In our everyday lives we are faced with decisions that require reasoning, understanding, correlation, interpretation and synthesis. All college graduates are expected to be critical thinkers, enabling them to make complex decisions swiftly, act ethically, respect the ideas of others and be adaptable in the face of change. Despite the importance that society and higher education put on critical thinking, Paul et al. (1997) found that while 89% of faculty interviewed said that critical thinking was one of their primary teaching goals, only 19% could provide a definition of critical thinking. It turns out that critical thinking is a complex concept that consists of multi-dimensional constructs involving both cognitive skills and affective dispositions, so it is not surprising that many instructors are unsure about how to teach their students to think critically. Numerous definitions for critical thinking exist, but for the purpose of this paper, Huitt's (1998) definition, since it is generic enough to be useful by all disciplines, will be used: "Critical thinking is the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action".

Paul et al. (1997) found that while 89% of faculty interviewed said that critical thinking was one of their primary teaching goals, only 19% could provide a definition of critical thinking.

It might seem convenient to direct students to courses specifically designed to teach critical thinking skills, yet many studies suggest that the development of these skills is best done in association with specific content or within a domain of knowledge (Raths et al. 1967, Ennis 1990). Therefore, the teaching of critical thinking should be integrated into in all courses and in all classroom areas: lectures, discussions, homework, writing assignments, and exams. To be successful critical thinkers, students must become proficient in certain cognitive skills (e.g., interpretation, analysis, evaluation, inference, explanation, self-regulation) as well as develop dispositions towards critical thinking (e.g., inquisitiveness, open-mindedness, self-confidence, systematicity, analyticity, truth-seeking, judiciousness) (Facione 2006). Numerous instructional approaches can be used to encourage critical thinking in students, such as the development of study skills, use of creative and critical thinking skills (e.g., problem solving, exploration), meta-

cognition, inquiry training, and the asking of higher-order questions (Cotton 1991). Since many college instructors have no formal training in how to teach critical thinking, however, they will need support in developing effective learning activities to cultivate the critical thinking skills of their students.

Some colleges are fortunate to have an office or center responsible for providing pedagogical support, such as the Center for Excellence in Teaching and Learning (CETL) at Park University. There are also ample online resources that deal specifically with critical thinking (see Peirce 2004), major institutional initiatives (e.g., WSU's Critical Thinking Project) and organizations dedicated to critical thinking (e.g., The Critical Thinking Community). A number of commercial ventures (e.g., *InSight* Assessment) have developed standardized critical thinking assessment tools that many institutions use. Instructors, however, would benefit the most by having access to discipline-specific learning activities that they can seamlessly integrate into their courses. One potential source that many instructors may be unaware of is the discipline-specific professional organizations to which many may belong. A number (but not all) of these large, national organizations have made a commitment to the support of teaching within their discipline, as evidenced by a standing committee or division that specifically addresses educational issues. Instructional support may take the form of a publication specifically dedicated to education, the informal sharing of teaching materials among members, or the integration of a section within the research journal that provides educational tips and learning activities. Because of the recognized importance of critical thinking, much of these teaching materials directly or indirectly support the teaching of critical thinking skills.

Since many college instructors have no formal training in how to teach critical thinking, however, they will need support in developing effective learning activities to cultivate the critical thinking skills of their students.

This paper reports on a review of hundreds of professional organizations representative of most major branches of learning in order to evaluate the extent to which these organizations support teaching within their discipline. A number of the professional organizations reviewed either did not offer instructional support or restricted access to much of their materials. Those that did provide freely available resources often offered many types of support. It is beyond the scope of this paper to report on all of the possible resources, so for each organization, a representative instructional resource is reviewed and a specific example provided. Not all disciplines are represented nor all organizations; the purpose is to illustrate what instructors can look for in their own professional organization.

One potential source that many instructors may be unaware of is the discipline-specific professional organizations to which many may belong.

For the purpose of this paper, disciplines have been grouped into five major categories: arts and humanities (e.g., art and design, communication arts, English, history, modern languages, music, philosophy), business (e.g., accounting, economics, finance, management, marketing), education, natural and applied sciences (e.g., biology, chemistry, computer science, geology, mathematics, physics), and social sciences (e.g., criminal justice, political science, psychology, sociology, social work). Due to page constraints, professional organizations whose purpose is to support teaching within a discipline (e.g., National Science Teachers Association, National Council for History Education) were not included, nor were organizations for professional studies (e.g., medicine, dentistry, veterinary science, nursing, clinical sciences, engineering). See Appendix A for a summary of the professional organizations and their learning resources.

Review of Professional Organizations

1.0 Arts and Humanities

The five dimensions of critical thinking in the arts have been identified as perception, conception, expression, reflection, and re-vision (Eisner 1994, Siegesmund 2000). Therefore, the teaching of critical thinking in the arts and humanities should strive to address one or more of these dimensions. Many of the resources provided by the arts and humanities organizations summarized below can be directly applied to developing student's critical thinking skills.

1.1 American Historical Association (AHA)

The AHA promotes the study of history, preservation of artifacts and publication of historical research. In 1974, the Teaching Division was established to develop and promote teaching programs and resources.

1.1.1 Learning resource reviewed: *Perspectives*

(<http://www.historians.org/perspectives/>). This online journal provides articles on teaching and the use of computers and software in history. The archives are searchable and articles are available to non-members.

1.1.2 Sample article: Surfing for the past: how to separate the good from the bad (Schrum 2003). This article presents ways in which students can use critical thinking to evaluate the validity and reliability of online resources. Students are introduced to a resource called *History Matters* and are required to question and examine their sources. The author concludes that this approach "present a valuable opportunity—to teach critical thinking skills in the context of making effective use of Internet resources" (Schrum 2003).

1.2 American Philosophical Society (APA)

The APA promotes the exchange of ideas among philosophers, encourages creative and scholarly activity in philosophy and facilitates the work of teachers of philosophy.

1.2.1 Learning resource reviewed: Committee on the Teaching of Philosophy

(<http://www.apa.udel.edu/apa/governance/committees/teaching/orc/index.html>). This APA Committee emphasizes the importance of "the cultivation of students' analytical, critical, interpretive and evaluative abilities in thinking about a variety of kinds of problems, historical texts, and issues, both "philosophical" and commonplace" (Schacht and Iseminger 1995). The Committee maintains a collection of course syllabi from all areas of philosophical study; a "What Works" database (short descriptions of successful classroom practices); and discussion boards on a variety of teaching topics. They also publish a biannual *Newsletter on Teaching Philosophy*. Recent articles are only available to members, but 1995-2001 newsletters are available for free.

1.2.2 Sample article: Teaching philosophy with argumentation maps (Horn 2000). The use of argumentation maps, an instructional tool that provides a representation of how critical discussions can take place across disciplinary and geographic distances, is discussed. Argumentation maps are intended to help students learn to think critically; students must evaluate the "weight" of the arguments and evidence and then draw their own conclusions.

1.3 Modern Language Association (MLA)

The MLA of America provides opportunities for its members to share their scholarly findings and teaching experiences with colleagues and to discuss trends in the academy.

1.3.1 Learning resource reviewed: *What's the Word?*

(<http://www.mla.org/radio/>). This radio show was developed to enhance the teaching of language and literature. Each installment has discussion questions and other possible learning activities. The radio shows can provide the basis for critical thinking activities that involve dialogical/dialectical thought, which according to Paul refers to students' abilities to "enter into thoughts and feelings other than their own" (Paul 1987). The programs cover a wide range of topics and the archives are searchable.

1.3.2 Sample radio show: Famous speeches (Packer et al. 2004).

This show presents three speeches that shaped American history: Ralph Waldo Emerson's 1837 Phi Beta Kappa address; Frederick Douglass's 1852 "Fourth of July" oration about slavery; and Abraham Lincoln's Second Inaugural Address. Strategies to promote critical thinking on the issues raised are offered and students are encouraged to imagine alternative futures had these three men not been the orators that they were.

1.4 National Council for Teachers of English (NCTE)

The NCTE is devoted to improving the teaching and learning of English and the language arts at all levels of education.

1.4.1 Teaching resource reviewed: Read-Write-Think

(<http://www.readwritethink.org/>). Read-Write-Think provides instructors with pedagogically sound resources for teaching reading and language arts, many involving the use of critical thinking skills. The lessons are geared towards K-12, but many of the high school lessons can be used as is or modified for lower-level undergraduate courses.

1.4.2 Sample lesson: A biography study: using role-play to explore authors' lives (Gibson and Coffey 2004). Students read biographies and explore websites of selected American authors. They collaborate in teams to design creative projects and role-play as the authors in a panel presentation. They then synthesize their knowledge into essays about their authors to post online.

1.5 National Endowment for Humanities (NEH)

Although the NEH is not technically a professional organization, it is a large, national organization that represents the humanities. The NEH supports research, education, preservation, and public programs in the humanities. They fund programs to strengthen teaching and learning in the humanities in schools and colleges across the nation.

1.5.1 Teaching resource reviewed: EDSITEment

(<http://edsitement.neh.gov/>). Teaching resources from museums, libraries, cultural institutions, and universities are provided. The materials have been reviewed for educational impact and cover a wide range of humanities subjects. Each lesson is complete with learning objectives, suggested activities and assessment of student learning. The lessons are geared towards K-12, but many of the high school lessons can be used as is or modified for lower-level undergraduate courses.

1.5.2 Sample lesson: African-American soldiers in World War I: the 92nd and 93rd divisions (EDSITEment 2003). Students must conduct research in order to evaluate contradictory statements about the performance of the 92nd Infantry Division in World War I. Skills required include research and analysis, critical thinking, the ability to make inferences, draw conclusions and the work collaboratively.

2.0 BUSINESS

The teaching of critical thinking skills is imperative across the business curriculum, since graduates must be prepared to make rapid decisions in a constantly changing world. McEwen (1999) found the most effective methods for encouraging critical

thinking in business students were practical task completion, case studies and argumentative essays. Braun (2004) suggests that the development of critical thinking skills should be explicitly stated as a student learning outcome, instructors should model the skills they are trying to inspire and students should be presented with ample active learning activities involving the course content. Many professional organizations for business practitioners provide resources amenable with these approaches.

2.1 American Economics Association (AEA)

The AEA supports economic research, publishes on economic subjects and encourages the discussion of economic issues. A Committee on Economic Education has a mission to improve the quality of economics education at all levels.

2.1.1 Learning resource reviewed: *Journal of Economic Education* (<http://www.indiana.edu/~econed/>). This journal offers original articles on innovations and evaluations of teaching techniques, materials and programs in economics. Articles address instruction at introductory levels through graduate economics and cover content and pedagogy in a variety of media.

2.1.2 Sample article: Teaching critical thinking with electronic discussion (Greenlaw and DeLoach 2003). Based on an evaluation of critical thinking research, the authors developed a scale for assessing student critical thinking skills within the context of online discussion activities, focusing on “how students argue”. Their evaluative scale has six levels ranging from “unilateral decisions” (little or no critical thinking) to “merging values with analysis” (the highest level of critical thinking). Instructors across disciplines should find this scale useful and adaptable for evaluating their own student’s critical thinking skills in online discussions.

2.2 American Institute of Certified Public Accountants (AICPA)

The AICPA is the professional organization for Certified Public Accountants. The organization has established a Core Competency Framework that identifies a set of competencies needed by all students entering the accounting profession. These include, among other things, “strategic and critical thinking”.

2.2.1 Learning resource reviewed: Accounting Education Center (<http://ceae.aicpa.org/>). The Center provides resources to enhance accounting and business instruction, including a model tax curriculum, a collection of 100 case studies, student exercises and a teaching kit. The case studies can be searched based on Core Competencies.

2.2.2 Sample case study: A strategy-focused CPA firm (Frasier et al. 2001). Students are required to develop management strategies and decision-making skills using realistic situations faced by many CPA firms. AICPA members have direct access a solution sheet online; instructors who are non-members can contact the AICPA and request a copy.

2.3 American Marketing Association (AMA)

The AMA is one of the largest professional associations for marketers and is the leading source for information, knowledge sharing and development in the marketing profession.

2.3.1 Learning resource reviewed: Academic Resource Center (ARC) (<http://www.marketingpower.com/content4282.php>).

The ARC website provides links to case studies, course syllabi and other course materials. A regular feature on the website is Teachable News, which provides learning activities based on recent news stories. Each entry provides a link to the story, important concepts and discussion questions.

2.3.2 Sample news story: Orchard Music rides the long tail of consumer preference (AMA 2006). This teachable news was inspired by a story about the marketing of songs to be played on the Internet. Orchard Music makes money selling a small number of copies of millions of songs. Students must

use critical thinking skills to evaluate this real-world issue and to make marketing decisions based on analysis of information presented.

2.4 Council of Supply Chain Management Professionals (CSCMP)

CSCMP is the professional association of Supply Chain Management professionals. The organization has an Education Strategies Committee that acts as a liaison with students, educators and educational institutions. This committee is responsible for an annual education conference, logistic education materials, and a database of case studies.

2.4.1 Learning resource reviewed: Case studies

(<http://www.cscmp.org/Website/Resources/CaseStudy.asp>).

The use of case studies is a widely used instructional approach that exposes students to challenging logistical issues and encourages them to develop their critical thinking and decision-making skills. Each case study has associated Teaching Notes with suggested learning activities and student assessment.

2.4.2 Sample case study: Moving mountains at Marks and Spencer

(Christopher and Peck 2000). Students are placed in a retail clothing company as part of the global logistics team. The company has recently suffered a major scandal and the students must identify key areas for attention and offer suggestions as to how to implement a reorganization of the company's global logistics.

2.5 Institute of Management Accountants (IMA)

The IMA serves managers and administrators in management accounting and financial management. They are committed to the development and support of education products related to management accounting. The Academic Industry Sector is a special interest group whose mission is to promote sharing of ideas, experiences and knowledge among members in academia.

2.5.1 Teaching resource reviewed: Cases from Management Accounting Practices

(<http://www.imanet.org/ima/sec.asp?TRACKID=&CID=761&DID=965>).

The IMA publishes cases and teaching notes. Instructors can access these cases online and non-members can request teaching notes.

2.5.2 Sample case study: Bill's custom planters (Stammerjohn and Seifert 2001). Students have to analyze a company with staffing and cash flow problems using a holistic approach. They must examine production and cash flow projections, develop *pro forma* statements and conduct a sensitivity analysis.

3.0 EDUCATION

Teacher education programs must prepare teachers to model the skills they seek to inspire in their students, including higher order skills such as reasoning, complex problem solving and critical thinking. Accreditation standards and licensure requirements emphasize the importance of critical thinking in teacher education programs. Yet as recently as three years ago, Linda Elder stated in an interview that "critical thinking is not typically a significant part of teacher preparation programs" because critical thinking is not typically understood, either in schools or in the broader society (Shaughnessy and Seevers 2003). To correct this deficiency, teacher education programs have been encouraged to include the goals and their philosophy for the teaching of critical thinking, the definition of critical thinking, the preparation of college faculty to teach for critical thinking and the development of new curricula in the undergraduate program (Michelli et al. 1990). Now, in many pre-teacher courses, case-based instruction is being used to develop students' critical thinking, problem solving and reflective decision making skills. Most of the professional organizations within education deal directly with the support of teaching and learning. As stated in the Introduction, these organizations were not reviewed since it is implicit in their mission to provide instructional support.

3.1 National Education Association

The NEA is the nation's largest professional employee organization and is committed to advancing the cause of public education. The "In the Classroom" section of their website features lesson plans, approaches to dealing with classroom management, a sharing of classroom experiences and a free electronic newsletter called "Works4Me".

3.1.1 Teaching resource reviewed: Lesson Ideas

(<http://www.nea.org/lessons/index.html>). This resource provides hundreds of lesson plans that may be searched by key word or discipline. For example, a search using "critical thinking" turned up 27 lessons. Significantly more lessons could be used to promote critical thinking and the best approach would be to search by discipline. Learning objectives, activities, assessment tools and other supporting materials are provided in most of the lessons.

3.1.2 Sample lesson: Use editorial cartoons to teach about elections (McKenzie 2004). Political cartoons have a long history and can be a good tool for teaching higher-level thinking skills; students can analyze them and express how they make them feel towards a subject. This lesson suggests a number of approaches for the use of editorial cartoons in all types of disciplines. Additional resources provide background information about political cartoons and links to cartoon databases.

4.0 NATURAL AND LIFE SCIENCES

Scientific teaching demands active learning strategies to engage students in the process of science and to develop their scientific reasoning. Handelsman et al. (2004) emphasize the use of problem-based learning, case studies, group problem-solving in lectures, inquiry-based laboratory exercises and interactive computer learning as ways to prepare all students to use scientific thinking to address complex societal issues. Not surprisingly, due to the nature of science, excellence in science teaching focuses on the development of students' critical thinking skills. Bransford et al. (2002) said "one way to help students develop critical thinking skills is to focus on problems or cases where they are challenged to deal with real data and experiences". The resources that follow all address the need of using student-centered, active-learning lessons in teaching science.

4.1 American Association for the Advancement of Science (AAAS)

The AAAS is dedicated to advancing science around the world by serving as an educator, leader, spokesperson and professional association. They offer a variety of resources for science educators, many of which contain approaches to teaching and encouraging critical thinking.

4.1.1 Learning resource reviewed: BioSciEdNet

(<http://www.bioscienednet.org/portal/>). This is a searchable database that provides seamless access to a digital library collection of accurate and reliable biology science education resources. The materials represent a broad spectrum of biological science disciplines.

4.1.2 Sample article: Team-based learning enhances long-term retention and critical thinking in an undergraduate microbial physiology course (McInerney and Fink 2003). This article presents a team-based learning approach that has been shown to significantly improve student performance as measured by comprehension and retention of information, critical thinking and attitudes about the course.

4.2 American Physiological Society

The APS serves physiologists and those in related health professions. Its purpose is to support education, scientific research and dissemination of information in the physiological sciences. The Teaching of Physiology Section of the APS is responsible for matters relevant to physiology teaching in undergraduate, graduate, and

professional education. The APS offers online teaching resources, including lessons and laboratories, scientific background and review papers, tools for better teaching and learning, and technology-based resources for interactive, online teacher and student development.

4.2.1 Learning resource reviewed: Archive of Teaching Resources (http://www.the-aps.org/education/edu_teachingres.html).

This resource allows you to search for teaching materials by education level, topic, media type, and most importantly, by pedagogies (e.g., case-based/case study approach, critical analysis/critical thinking). All of the lessons have been reviewed and tested; many of them have been published in peer-reviewed journals.

4.2.2 Sample lesson: Student critical thinking is enhanced by developing exercise prescriptions using online learning modules (Brahler et al. 2002). This article describes online learning modules designed to promote higher-order critical thinking skills in students enrolled in an exercise physiology course. The modules require students to review clinical physiological details from authentic patient case data and develop exercise prescriptions.

4.3 Ecological Society of America (ESA)

The ESA is the premiere professional organization for ecologists in the US. The Education Section of the society provides resources for ecological education for students of all ages and disseminates instructional materials and pedagogic ideas.

4.3.1 Teaching resource reviewed: Pathways to Scientific Teaching (http://www.first2.org/resources/frontiers/scientific_teaching_first.html).

This is a series in the journal *Frontiers in Ecology and the Environment* in which a teaching and learning unit is presented based on a research paper (also published in the same issue). Each learning unit contains explicit learning goals, instructional strategies and a means for assessing student learning. The goal of these lessons is to ensure that students understand the key scientific principles, demonstrate basic scientific skills and are able to exercise logical thought in applying these principles and skills.

4.3.2 Sample lesson: Lyme disease: a case about ecosystem services (Richmond et al. 2005). This lesson is a case study designed to demonstrate how a number of disciplines are often necessary to inform ecological decision-making. Students use a team approach to develop a management strategy to control the spread of ticks infected with the Lyme disease vector using information from scientific sources. They must be able to recognize the relationship among ecosystem services, biodiversity, functional diversity, community disassembly and landscape ecology.

4.4 Mathematical Association of America (MAA)

The MAA is the largest professional society that focuses on mathematical science. One of their missions is to support student learning by encouraging an effective mathematics curriculum, teaching and assessment. The MAA website offers a variety of teaching resources.

4.4.1 Teaching resource reviewed: MathDL (<http://mathdl.maa.org/mathDL>). MathDL is an online resource for both teachers and students of mathematics, and provide, among other things, *Convergence* (an online magazine about teaching math using its history) and Digital Classroom Resources (DCR). Teaching materials at the DCR website include interactive web pages, web pages enhanced with animation, downloadable programs that run independently and modules developed for commercial computer algebra systems. Open Source Shareable Mathlets or Osslets are a visual tool for teaching complex mathematical concepts and a collection of Osslets is accessible on the DCR website.

4.4.2 Sample resource reviewed: Multparameter Animation Osslet (Moore and Wattenberg 2004). This Osslet can be used to investigate and

animate up to three functions involving up to four parameters. Information provided with all Ossiets includes an overview, how it can be used, how it can be integrated into a course unit and additional resources for instructors.

4.5 National Athletic Trainer's Association (NATA)

The mission of the NATA is to enhance the quality of health care provided by board certified athletic trainers and to advance the athletic training profession. Within the association, the Education Council's focus is to ensure excellence in undergraduate, graduate and continuing athletic training education.

4.5.1 Learning Resource reviewed: *Journal of Athletic Training* (<http://www.nata.org/jat/>). The mission of this journal is to enhance the exchange of ideas among professionals involved in health of physically active individuals. A section called "Educational Studies" is frequently included and contains papers that address issues of athletic training education.

4.5.2 Sample Article: Active learning strategies to promote critical thinking (Walker 2003). A number of active learning strategies for use in athletic training courses are presented, including questioning, written exercises, discussion and debates. The definition of critical thinking, the disposition to think critically and specific examples of these teaching strategies are featured.

5.0 SOCIAL SCIENCES

In the social sciences, critical thinking is typified by the ability to recognize central issues, make comparisons, differentiate relevant information from non-relevant, ask the right questions, articulate problems, distinguish fact from opinion, check consistency, ascertain assumptions, identify bias, investigate cause and effect and demonstrate reasoned judgment (Barell et al.1992). Teaching strategies to develop these skills include student engagement in reading, writing, observation, debates, role play and simulations. Individual or collaboratively, social science students should be required to use statistical data to cultivate skills in critical thinking, decision making, and problem solving.

5.1 Academy of Criminal Justice Sciences (ACJS)

The ACJS fosters professional and scholarly activities in the field of criminal justice and promotes criminal justice education, research, and policy analysis within the discipline.

5.1.1 Learning resource reviewed: *Journal of Criminal Justice Education* (http://www.acjs.org/pubs/167_669_2917.cfm).

This journal provides a forum for the examination, discussion and debate of a broad range of issues concerning education in criminal justice, criminology and related areas.

5.1.2 Sample article: Generating enthusiasm for undergraduate research by teaching futures-based problem-solving skills (Bolton 2000). Students in this activity are encouraged to think about important issues related to criminal justice and sociology and predict the impact of these issues in the future.

5.2 American Political Science Association (APSA)

The APSA is the leading professional organization for the study of political science. A component of this organization's mission is to support political science education and professional development of its members.

5.2.1 Learning resource reviewed: Annual Teaching and Learning Conference (http://www.apsanet.org/section_236.cfm). This annual conference promotes sharing of innovative teaching practices in the political science classroom and many presentations discuss instructional approaches that

encourage critical thinking. Papers presented at each of the annual meetings can be searched and downloaded for free.

5.2.2 Sample article: Effect of congressional role-playing experience on students (Chin 2006). This article presents research on the effectiveness of integrating CQ Legislative Simulation into a course that teaches students about political action committees and constituency status. The author concludes that any active learning approach must "create opportunities for students to develop problem-solving and critical analytical thinking skills" (Chin 2006).

5.3 American Psychological Association (APA)

The APA represents psychologists in the United States. The Education Directorate is tasked to advance education and training in psychology. The Society for the Teaching of Psychology (STP), a division within the directorate, supports and disseminates pedagogical strategies for teaching psychology. The STP publishes a quarterly journal (*Teaching Psychology*), presents teaching awards, sponsors conferences, maintains a website that provides materials related to the teaching of psychology and provides several E-publications.

5.3.1 Learning resource reviewed: Essays from E-xcellence in teaching (<http://teachpsych.lemoyne.edu/teachpsych/eit/>). This E-publication is an annual compendium of invited essays which were originally published in PsychTeacher, a moderated discussion list sponsored by the STP.

5.3.2 Sample article: Teaching psychology students to distinguish science from pseudoscience: pitfalls and rewards (Lilienfeld 2004). The premise of this article is that the best approach to teaching critical thinking skills in psychology is to expose students to fallacies, especially those that fall under the rubric of pseudoscience. The author outlines an approach to teach students how to differentiate between science and pseudoscience.

5.4 American Sociological Association (ASA)

The ASA is dedicated to advancing sociology as a scientific discipline. The Section on Teaching and Learning in Sociology provides a professional venue for improving the teaching of sociology from high school through the graduate level.

5.4.1 Learning resource reviewed: *Teaching Sociology* (<http://www2.asanet.org/sectionteach/>). This journal disseminates innovative and effective pedagogy in the instruction of sociology. Notes focus on specific teaching issues or techniques, many of which have been shown to improve students' critical thinking skills.

5.4.2 Sample article: Introducing methods of sociological inquiry using living-data exercises (Rohall et al. 2004). This article discusses the use of "living data exercises" to introduce students to social science methods. Students take on roles as either the investigator or the subject while collecting data in class. Afterwards, students reflect upon the process from multiple perspectives.

Conclusions

The diversity of instructional materials available from professional organizations is immense, as is the quality of these materials. But how can instructors make good use of these discipline-specific lessons and teaching resources in developing their students' critical thinking skills? Paul (1995) suggests that there are five basic components in the teaching of critical thinking. The first is the instructor, who must be able to reduce big questions or

The diversity of instructional materials available from professional organizations is immense, as is the quality of these materials.

problems into approachable tasks, contextualize learning, help students focus their thinking, require students to integrate and synthesize information, require that students teach each other difficult concepts, and teach students how to find, evaluate and access learning resources. The second component involves the use of Socratic questioning to introduce basic issues, encourage students to think deeper, focus on topics that the students struggle with, and develop skills related to sensitivity, clarity, accuracy and relevance. The third involves the use role-playing and reconstruction of opposing views. The fourth component is the requirement that students reflect and analyze their own experiences within a global context. The final component is to teach the difference between fact, opinion and reasoned judgment. Instructors should keep these components in mind when developing their own course learning activities.

Designing and integrating instructional activities to teach students critical thinking can be hard, especially when lectures, rote memorization and the use of multiple choice tests are easy. Yet there are a number of types of learning activities that can be used to encourage critical thinking, such as guided discussion, debates, role-playing, problem-solving, case studies, group projects, simulations, model building, project design, performances, presentations, experiments, research, and interviews (see Peirce 2004 for examples of these types of activities specifically designed to address critical thinking). The lessons and teaching resources reviewed in this paper are representative of these forms of activities and many of them can be directly integrated into courses without much modification. Some instructors may want to share specific activities with their institutional teaching support center for suggestions on suitability, modifications or improvements. In addition, instructors should consider explicitly informing their students on the purpose of the activity as related to critical thinking (e.g., this lesson is designed to improve your self-confidence and maturity through interpretation, inference and self-regulation). Finally, instructors must not neglect the importance of assessment. The Critical Thinking Project at Washington State University offers an excellent rubric for assessing critical thinking (WSU 2006). It addresses a student's ability to identify and summarize the problem/issue; identify and present their own hypothesis, perspective and position; identify and consider other perspectives; identify and assess key assumptions; identify and assess the quality of their supporting data/evidence; identify and consider the influence of context on the issue; and identify and assess their conclusions, implications and consequences. Peirce (2006) provides a summary of how to write rubrics for critical thinking assessment and also presents a compilation of rubrics created by others.

Teaching critical thinking skills to students should not put an undue burden on instructors; there is ample instructional support available through usual academic channels, such as campus-based teaching and learning centers, as well as the not so usual channels; discipline-specific professional organizations.

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Bowers received her PhD in Ecology from the Pennsylvania State University, where she studied the evolutionary relationships among a group of closely related cichlid fishes. She has since taught biology at Portland State University, Idaho State University and now online at Park University. In addition to her research and teaching interests, Bowers has also been involved in faculty development. She lives in northern New York and has been teaching for Park University since 2005.

Appendix A: Summary of Professional Organizations and their Learning Resources

| Organization | Discipline | Learning Resource |
|--|-------------------------|--|
| Arts and Humanities | | |
| American Historical Association | History | <i>Perspectives</i> (http://www.historians.org/perspectives/) |
| American Philosophical Society | Philosophy | Committee on the Teaching of Philosophy (http://www.apa.udel.edu/apa/governance/committees/teaching/orc/index.html) |
| Modern Language Association | Modern languages | <i>What's the Word?</i> (http://www.mla.org/radio/) |
| National Council for Teachers of English | English | Read-Write-Think (http://www.readwritethink.org/) |
| National Endowment for Humanities | Humanities | EDSITEment (http://edsitement.neh.gov/) |
| BUSINESS | | |
| American Economics Association | Economics | <i>Journal of Economic Education</i> (http://www.indiana.edu/~econed/) |
| American Institute of Certified Public Accountants | Accounting | Accounting Education Center (http://ceae.aicpa.org/) |
| American Marketing Association | Marketing | Academic Resource Center (http://www.marketingpower.com/content4282.php) |
| Council of Supply Chain Management Professionals | Supply Chain Management | Case studies (http://www.cscmp.org/Website/Resources/CaseStudy.asp) |
| Institute of Management Accountants | Management | Cases from Management Accounting Practices (http://www.imanet.org/ima/sec.asp?TRACKID=&CID=761&DID=965) |
| EDUCATION | | |
| National Education Association | Education | Lesson Ideas (http://www.nea.org/lessons/index.htmlx) |
| NATURAL AND LIFE SCIENCES | | |
| American Association for the | Science | BioSciEdNet |

| | | |
|---|-------------------|--|
| Advancement of Science | | (http://www.biosciednet.org/portal/) |
| American Physiological Society | Physiology | Archive of Teaching Resources (http://www.the-aps.org/education/edu_teachingres.html) |
| Ecological Society of America | Ecology | Pathways to Scientific Teaching (http://www.first2.org/resources/frontiers/scientific_teaching_first.html) |
| Mathematical Association of America | Mathematics | MathDL (http://mathdl.maa.org/mathDL) |
| National Athletic Trainer's Association | Athletic Training | <i>Journal of Athletic Training</i> (http://www.nata.org/jat/) |
| SOCIAL SCIENCES | | |
| Academy of Criminal Justice Sciences | Criminal Justice | <i>Journal of Criminal Justice Education</i> (http://www.acjs.org/pubs/167_669_2917.cfm) |
| American Political Science Association | Political Science | Annual Teaching and Learning Conference (http://www.apsanet.org/section_236.cfm) |
| American Psychological Association | Psychology | <i>Essays from E-xcellence in Teaching</i> (http://teachpsych.lemoyne.edu/teachpsych/eit/) |
| American Sociological Association | Sociology | <i>Teaching Sociology</i> (http://www2.asanet.org/sectionteach/) |

Using Self-Experimentation and Single-Subject Methodology to Promote Critical Thinking

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Critical thinking is often absent from classroom endeavor because it is hard to define (Gelder, 2005) or is difficult to assess (Bissell & Lemons, 2006). Critical thinking is defined as application, analysis, synthesis, and evaluation (Browne & Minnick, 2005). This paper shows how self-experimentation and single-subject methodology can be used to promote many levels of critical thinking in an Applied Behavior Analysis course. Two classroom assignment examples of this process and a grading rubric are provided.

We have all been in a classroom as the professor disseminates information to the class from the podium. Some students listen to the professor; some think about last weekend's fun and others consider future fun. While discussing the importance of the learning environment, Robinson and Kakela (2006) stated: "When students sit passively as their professor delivers information by lecturing ('drone on,' one student called it), they often do not become engaged in their learning" (p. 204). Learning is more than just hearing, rehearsing, and recalling information. There are processes and strategies that students should learn that will assist them in becoming learners over a lifetime. One important skill is critical thinking.

Gelder (2005) argued that all educators at every level should help their students learn to think critically. He indicated that critical thinking is difficult and does not come naturally to people. Bissell and Lemons (2006) indicated that teachers do not know how to define critical thinking, nor do they know how to measure it. Browne and Minnick (2005) generally defined critical thinking as application, analysis, synthesis, and evaluation of a given subject. If teachers want to have their students use critical thinking in the classroom, they must identify processes that are conducive to and design student activities that include these processes.

If teachers want to have their students use critical thinking in the classroom, they must identify processes that are conducive to and design student activities that include these processes.

Bissell and Lemons (2006) developed projects for biology students that required them to use critical thinking skills and then used individualized scoring rubrics to assess critical thinking in those projects. Fisher and Riley (2005) used an application assignment that required nursing students to read the scientific literature, critique what was read, and then apply what they read to the clinical setting. In this paper, we describe a similar process in the field of Behavior Analysis. We used self-experimentation projects (Altman, 1986; Roberts & Neuringer, 1998) and single-subject methodology (Barlow & Hersen, 1984) to guide students through a critical thinking process.

Introducing Target Behavior and Treatment

Students enrolled in an upper level psychology class (Applied Behavior Analysis) were given a self-experimentation project. Each student was required to select a behavior of his/her own that he/she wanted to change. The selected behaviors did not include those that result in danger to the student or other people.

Students were also required to avoid behaviors that were better served by professional therapy. Each targeted behavior needed to be approved by the course instructor.

Once the student identified his/her targeted behavior, he/she started to examine the scientific literature. The purpose was to gain information about their targeted behavior at many different levels, from general information to treatment applications. This review of the literature provided evidence and the student offered his/her own logic as to why they chose the particular treatment procedure. Sometimes students selected previously used methods and added their own modification to the method. This was the beginning of the process of assimilating, analyzing, evaluating, and applying information (a critical thinking process).

Methodological Strategies

Operational Definition and Behavior Observation

While students reviewed the literature and learned about their targeted behavior, they were trained to operationally define the targeted behavior so that the presence or absence of the targeted behavior could be distinguished. Once this was accomplished, the students were trained in using basic behavior observation strategies. With this information in hand, plus what had been gleaned from the literature, students were then required to design their own observation data systems. This required students to use critical thinking skills. They had acquired information on behavior observation and they had selected their target behavior. They were then required to identify the best observation procedure for measuring their targeted behavior. Often they had to test several different methods before selecting the most appropriate.

This was the beginning of the process of assimilating, analyzing, evaluating, and applying information (a critical thinking process).

Baseline

While championing the use of single-subject methodology, Barlow and Hersen (1984) argued that it was incumbent on those seeking to change human behavior to identify functional relations between environmental events and targeted behaviors that would not be confused with other available environmental and biological variables. In order to make such an analysis, each student was required to start a baseline. That means they started to observe their targeted behavior using the operational definition and data observation system they had selected. Each student would be required to observe the repeated measure of his/her targeted behavior over time without the selected intervention being in place. The purpose was to look at behavior trends (see figure 1). Students were required to identify a stable pattern of responding before they could intervene. The logic is that over time they would compare baseline levels to treatment levels. This requires the critical thinking process: If you want to increase the rate of responding, you do not intervene during an ascending pattern. Conversely, if you want to decrease the rate of responding, you do not intervene during a decreasing trend. Students were required to bring their graphs each time the class met. They were divided up into treatment teams to discuss the behavior trends that were observed. They used this information as criteria to determine when each intervention should be implemented. These decisions were made under the supervision of the instructor.

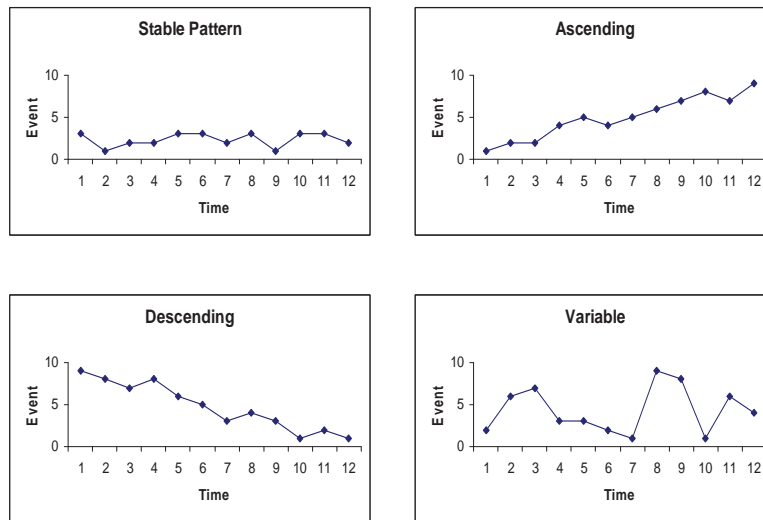


Figure 1. The four baseline trends are represented above.

Functional Assessment

While students reviewed the literature and conducted baseline observations, they also analyzed the environment where the behavior occurred. This helped them to identify stimuli that might be related to the behavior. With the information they had gathered from the literature and their own direct observation of the behavior, they would then select a treatment that they judged to have an impact upon the behavior. This process is called Functional Assessment (Barlow & Hersen, 1984).

Experimental Methodology

Each student was taught the logic of single-subject methodology. They were required to select a design from the following selections: Withdrawal, Reversal, Multiple Baseline, Changing Criterion, and Alternating Treatment Design (Cooper, Heron, & Heward, 1987). This selection required them to become familiar with each design, evaluating which would fit best for their self-experiment, and then apply that design. According to Barlow and Hersen (1984), the logic of single-subject methodology is that of repeated measure over time of a targeted behavior(s). As with the baseline logic, each student monitors the graphed trend(s) of his/her targeted behavior(s) and then intervenes when indicated by a stable trend or trends. Barlow and Hersen also indicated that this methodology allows the investigator the flexibility to administer and withdraw the treatment at any give time. This enables the investigator to observe the trends of the behavior as the intervention is put in place and then withdrawn. It also gives flexibility to the investigator when a treatment does not work. That treatment can be withdrawn and once a new baseline is established, a new treatment can be introduced. When a single-subject design is used consistently, it demonstrates internal validity. In other words, there is good evidence that the treatment change is not simply correlation, but suggests causation as well. This approach focuses only on the individual. The results cannot be generalized to anyone else, but they can demonstrate validity of treatment to the individual in question.

Examples of Student Work

Two examples of self-experiments completed in classes at Park University can be found in Appendix A and B. These examples are included as they were submitted, with few editorial changes.

Decreasing Smoking Behavior

The author of this paper completed a smoking cessation self-experiment. The entire paper was submitted for class and is included in Appendix A. She restricted her smoking to odd hours of the day; she would pay herself \$1.00 each odd hour she did not smoke. She used a Withdrawal Single-Subject Design with ABAB conditions (see graph in Appendix A). The A axis stands for Baseline and the B axis stands for the treatment condition. She ended with four weeks of follow-up probes without intervention. Her smoking rate remained at zero cigarettes per day. The logic of comparing a baseline, a treatment condition, another baseline, and a final treatment condition suggest that the change in behavior was more than correlational (Cooper, Heron, & Heward, 1987).

Fruit Intake Increase

The author completed a self-experiment in which he increased the amount of fruit he ate during the day. He developed a list of rewards that could be delivered on a weekly basis for meeting his goal for the week. The menu included such things as going out to various recreational activities, shooting pool, etc. He used a Changing Criterion Single Subject Design (Appendix B) that allowed for goal setting and then goal accomplishment. The logic of the design suggests that step or goal is controlled, that control evidences causation rather than correlation (Cooper, Heron, & Heward, 1987).

Self-Experiment Rubric

A scoring rubric is included as Appendix C. This rubric shows what was expected of the students and how many points were assigned for each item. It was developed to be specific and, where possible, quantifiable.

Discussion

The students who completed a self-experiment using single-subject design methodology will be able to use critical thinking at every level. Each student was required to apply knowledge from the class; analyze information from the literature; synthesize this information with behavior observations; and evaluate the process. These evaluations always led to further analysis, synthesis, etc. This project was also a meaningful experience because undergraduate psychology students began to gain a sense of empathy for those who are required to change their behaviors. Once a student has tried to change his/her own behavior, he/she can see how difficult change can be. This type of research also prepares those going on to graduate school to start thinking in terms of empirical study and dissemination. In fact, a similar assignment given by the first author to a student in Oklahoma is currently in press with *Clinical Case Studies* (Finley & Cowley, In Press).

Each student was required to apply knowledge from the class; analyze information from the literature; synthesize this information with behavior observations; and evaluate the process. These evaluations always led to further analysis, synthesis, etc.

There are several ways that this project as presented could better assess critical thinking. Readers will note in the rubric that there are no specific measures to evaluate the critical thinking students engage in to complete their functional assessment. This assessment requires students to assimilate information from the literature, their baseline, and their own observations of the environment. They are then required to analyze this information to identify stimuli in the environment that influence the target behavior. This leads to the selection of a treatment. The rubric needs to be further developed to include an assessment of the critical thinking that goes into functional assessment.

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Using Functional Assessment to Decrease Smoking Behavior

Ann Lindgren
Brian J. Cowley
Park University

In this self-experimentation I reduced my smoking behavior by using a Differential Reinforcement Schedule of Other Behavior with a Fixed-Interval reinforcement delivery. Smoking was only allowed during the odd hours of the day between 7:00am and 11:00pm; for every odd hour in which I did not smoke I rewarded myself with a dollar. A Single-Subject Withdrawal Design was used (ABAB) to establish treatment validity. The results confirm that limiting access to cigarettes and rewarding for abstinence from smoking can be an effective way to decrease smoking behavior.

The 2000 Surgeon General Report shows that an estimated 70% of smokers (33.2 million) want to quit, but only 2.5% (1.2 million) per year succeed in quitting smoking permanently.

According to the Centers for Disease Control (2000), 41% of smokers nationwide make an attempt to quit smoking. There are a variety of methods available to help smokers stop smoking. Effective strategies for treating tobacco use include brief advice by medical providers, counseling, and pharmacotherapy (Surgeon General, 2000) Nicotine chewing gum, nicotine patches, nicotine inhaler, nasal sprays, and some antidepressant medications like Bupropren SR, are some of the popular pharmacotherapy methods used (Krohn, Goetz, 2005).

There are also a several behavioral strategies that have shown to reduce smoking behavior, such as; selective limitation of cigarettes, increasing the interval between cigarettes (Carpenter, Hughes, Solomon, & Calla, 2004), contingency management (Roll, 2005; Stitzer, Rand, Bigelow, Mead. 1986; Stitzer, Bigelow, 1984), and operant conditioning (Azrin, Powell. 1968). Carpenter, Hughes, Solomon, and Callas (2004) found that smoking reduction procedures produced better results then stage-matched intervention, motivational interviewing, and brief advice. In John Roll's study (2005) with adolescent smokers, contingency management showed to be a successful way to reduce smoking in adolescence. Contingent monetary payment based on breath carbon monoxide level has resulted in smoking behavior change; the extent of the smoking reduction has been related to the monetary value of the reinforcement offered and to the reduction target that is reinforced (Stitzer, Rand, Bigelow, Mead. 1986). An earlier study by Stitzer and Bigelow (1984) showed that when participants were only tested for carbon monoxide at a certain time of the day, their smoking at other times of the day increased, though, overall there was still a reduction of cigarette smoking. It appears that payment and monitoring procedures can be used to promote sustained smoking abstinence.

Azrin and Powell (1968) used operant conditioning to reduce the amount of cigarettes smoked by their participants. They did this by designing a cigarette case that could be locked and had a timer on it; once a cigarette was removed from the case, the case would lock for a period of time, another cigarette could only be removed after the end of the period of time. They found that limiting access to cigarettes reduced the amount of cigarettes smoked by their participants. More recently, many businesses have been prohibiting on premises smoking. Bauer et al (2005) did a study to assess the impact of smoke-free worksite policies on smoking cessation behaviors. Smoke-free policies have been shown to discourage smoking, reduce smoking consumption, and increase people's desire to quit smoking. These studies show that when people are limited to when they can smoke they decrease the amount they will smoke. I based my treatment design on the idea that limiting access to cigarettes and rewarding for abstinence from smoking would decrease my smoking behavior.

The following study uses a single-subject design and self-experimentation, done for a college class, to change my own smoking behavior. I used a fixed interval differential reinforcement of other behavior treatment design (ABAB). I did so, by only allowing myself to smoke cigarettes during odd hours of the day between 7am and 11pm; for every odd hour that I did not smoke I rewarded myself with a dollar. I used event recording for measurement by tallying every cigarette I smoked, how much of the cigarette I smoked, and what time of the day I smoked it.

Method

Participant

I am a 23-year-old Caucasian female. I have been smoking cigarettes since the age of 15, but have made several attempts to quit in the past. For most of my past cessation attempts I used a nicotine patch for approximately one week to four weeks. Though each attempt was successful, I continued to return to smoking within a year of quitting. I had been smoking for approximately six months prior to this study.

I considered myself a light smoker, smoking less than a half a pack of cigarettes a day. Most of my smoking took place in the garage at my house; I also smoked in my vehicle while driving, and occasionally smoked in restaurants or on the college campus. When I smoked at home I mostly only smoked a half of a cigarette a time. I would smoke the cigarette half way down, then leave the other half to smoke down completely at a later time. Most of the time when I smoked in my vehicle I would smoke an entire cigarette, because it was inconvenient to put it out half way.

Material

I used event recording to record the frequency of my smoking behavior. I did this by keeping a notepad and pencil with my pack of cigarettes, every time I smoked I wrote down what the time was and how much of the cigarette I smoked. I recorded the time of day I smoked to see if any patterns emerged in my smoking behavior. At the end of each day I recorded the amount of cigarettes smoked during that day on a chart.

My reinforcement involved rewarding myself with a dollar. Since I did not have dollars readily available on hand, I used dried beans to keep track of each dollar earned. The dried beans were kept in a baggy so I could add them up at the end of treatment, and deduct that dollar amount from my savings account for spending. After the extinction of my treatment plan I will do a once a week maintenance probe to check for a relapse of behavior. I will collect data every Monday for one month.

Design and Procedure

I took baseline for eighteen days, smoking an average of 6.3 cigarettes a day, with a maximum of 8 and a minimum of 5. I found no real pattern in the times of days I would smoke, thus there were no external factors that caused my behavior. I used this information to determine what my fixed intervals for my treatment schedule.

I used a fixed interval reinforcement schedule by only allowing myself to smoke during the odd hours of the day. I typically slept from 12:00am to 7:30am, so I limited my available reinforcement hours to the odd hours of and between 7:00am and 11:00pm. During these odd hours I allowed myself to smoke as many cigarettes as I desired. The assessment was the same; I kept the notepad and pencil with the pack of cigarettes, and wrote down the time and amount smoked. I used a differential reinforcement of other behavior; for every hour I did not smoke I would reward myself with a dollar. I used an ABAB withdrawal treatment design, with an eighteen-day baseline, a seven-day treatment, a five-day return to

baseline, followed by fifteen days of treatment that ended in extinction. One variable that occurred on day 34 was a dental visit in which I had oral surgery. The dentist advised me not to smoke during the healing process.

Results

During the first treatment condition I reduced my smoking from a baseline average of 6.3 cigarettes a day, to an average of 3.5 cigarettes a day. I started treatment smoking 4.5 cigarettes, and made a steady seven-day decline ending at 2.5 cigarettes. I then returned to baseline, and my smoking increased to an average of 3.9 cigarettes per day, which was up slightly from my treatment average of 3.5, but not as high as my pretreatment average of 6.3. I returned to treatment, and my daily smoking immediately dropped back down, and after the fourth day of treatment I had quit smoking. After my smoking behavior had decreased to zero cigarettes, I continued treatment for eleven days before extinction of reinforcement. On day 34, the day before my behavior dropped to zero cigarettes, was my oral surgery, and I took my doctor's advice to refrain from smoking.

Discussion

This study showed that reduction procedures accompanied by reinforcement can lead to smoking cessation. There have been many previous studies that have shown the effectiveness of using money as reinforcement for smoking abstinence (Stitzer and Bigelow, 1984. Roll, 2005. Stitzer, Rand, Bigelow, and Mead, 1986). Azrin and Powell (1968) showed the effectiveness of restricting the amount of cigarettes smoked by using a reduction technique. Though the procedure was successful in reducing the amount of cigarettes smoked by all participants, there was no reinforcement for the smoking reduction, so the participants went back to smoking as usual as soon as the study was over (Azrin, Powell, 1968). It seemed to me that if I restricted when I allowed myself to smoke, and added reinforcement as an incentive not to smoke, that I might achieve cessation.

Something that my treatment design is missing which would greatly improve its validity is interobserver agreement percentages. When I began collecting the data I was using permanent product by collecting the cigarette butts and writing down what time I smoked the cigarette. It didn't take me long to realize I was being repetitive in my collection methods, so I switched to just tallying (event recording) the occurrence of my behavior. However, I did not find out until it was too late that tallying the occurrence of a behavior could not be considered permanent product, and therefore could not be used for interobserver agreement. Though I have every piece of paper in which I recorded the occurrence of my behavior, since it was event recording and I did not have anyone present during each occurrence of my behavior, I was unable to use the information to establish a percentage of interobserver agreement.

In setting up my design I took in consideration the amount of cigarettes I smoked, and how often I smoked. Though I was only averaging six cigarettes a day, I would mostly smoke half cigarettes, which made the frequency at which I smoked much greater than if I had smoked whole cigarettes. I decided if I were to limit myself to only smoking every other hour it would work to reduce my smoking, and wouldn't put too much pressure on me in withdrawing from the addictive nature of cigarette smoking. I chose an odd hour restriction because it fit conveniently into my weekly schedule, most often I was in my vehicle at nine in the morning, and in my vehicle was my favorite place to smoke. I also knew that at anytime during the day that I really wanted to smoke, I would never have to wait more than an hour for that chance, and most of the time this occurred, when the hour came that I could smoke, the desire had gone away. When repeating this study on other smokers it would be necessary to set up time slots that would be convenient for their schedules. Since I was a light smoker it was easy for me to restrict myself to

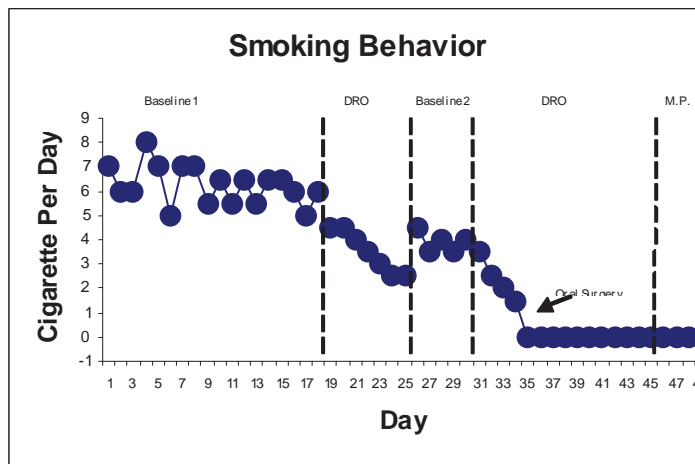
an every other hour schedule, but a heavier smoker may need a shorter limitation. Also, the hours that are chosen should be convenient for a person's schedule, for instance; if the participant gets an hour lunch break at work, don't make that one hour a restricted hour.

A variable that affected the final cessation of my smoking behavior was oral surgery during the last bit of my treatment. Because of the surgery, I was advised not to smoke, so I took the advice and quit smoking. After going several days without smoking it made it much easier to continue on with that pattern. However, prior to the surgery I was only smoking 1.5 cigarettes a day, and the likelihood that I would have reduced that to zero regardless of surgery, was very high.

For reinforcement I chose a dollar because it was a realistic amount for me to receive. It gave me incentive because there is many things I have been wanting to buy, and haven't set the money aside to do so. I chose the dollar amount, because that led to the potential of nine dollars a day, which could add up to a decent amount. When using this procedure on a smoker it would be important to set up a reinforcement that would be beneficial for them, that way they feel motivated to abstain from smoking during the allotted time.

The way I set up this procedure made it very easy on me throughout the whole process. I never felt pressured or agitated that I couldn't smoke, my withdrawal symptoms were minimum, and it caused virtually no disruption in my daily routine. I can easily say, this quitting experience was far more enjoyable and easier than my past quitting experiences with the nicotine patch or gum.

This study supports that functional assessment is effective in reducing smoking behavior. This single subject design combined reduction and reinforcement to treat smoking behavior. It showed that self-management can be an effective way to stop smoking; this can be achieved by reducing the times you allow yourself to smoke and rewarding yourself for not smoking. This study can be replicated in many numbers of ways, to fit an individual smoker's needs.



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Lindgren is currently an honor roll student at Park University, with plans to graduate in Spring 2007 with a BA in Psychology. Before coming to Park University, Lindgren earned an AA from Maple Woods Community College, where she graduated with honors. After graduating from Park University, Lindgren plans to continue her studies in a graduate program, eventually earning a PhD in Psychology with a focus on health psychology.

Increasing the Amounts of Fruit Ingested to Promote a Healthy Diet

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The increasing rate of obesity in people represents a major public health concern especially since obesity is correlated with an increased rate of morbidity and mortality. The cause of obesity results when caloric intake exceeds the burning of calories. Obesity is directly related to diet, however it is difficult for one to change and maintain their diet. These difficulties in maintaining healthy eating are not surprising because obese persons find high-fat foods more reinforcing than lower fat foods. This coupled with the fact that healthy changes in eating behavior are generally not maintained over time can make changing diet a very difficult task. (Goldfield & Epstein, 2002). Another factor contributing to the difficulty of diet is that unlike health-related habits that are optional features of one's lifestyle, food consumption is central to everyday survival. Therefore, dietary interventions have an air of ambivalence (Kumanyika, Van Horn, Bowen, & Perri 2000).

In order to counteract obesity a proper diet is in order. A major part of a healthy diet and which is lacking in many adults are fruits. Fruits are a very healthy and part of a balanced nutrition. Vegetables and fruit are important sources of several essential nutrients, including vitamin C, folate and other B vitamins, pro-vitamin A and other carotenoids, potassium, calcium, and iron (National Cancer Institute, 2006). Fruits, in addition also help in reducing calories, and have positive health benefits. Advice to increase intake of fruits and vegetables is based on epidemiologic studies indicating that an eating pattern high in fruits and vegetables is protective against cancer and CVD dietary modification for cardiopulmonary risk reduction converges around increased intake of fruits and vegetables. The evidence was most conclusive for vegetables and fruit in prevention of cancers are in cancers of the mouth and pharynx, esophagus, lung, and stomach (National Cancer Institute, 2006). The protective effect of fruit and vegetable consumption was found in 128 of 156 dietary studies in which results were expressed in terms of relative risk. In the majority of cancer sites people who consume low amounts of fruits and vegetables experience around double the risk of cancer compared with those with high intake. (Block, Patterson, & Subar, 1992). Higher fruit and vegetable consumption of between 9 and 12 servings per day have shown to reduce blood pressure by a large sum.

In order to increase the behavior of fruit consumption the goals were set on a single-subject changing criterion design schedule. These goals were reinforced with a menu of variable rewards. Changing criterion design was first described in applied behavior analysis in two papers coauthored by Hartmann and Hall (1976). This design has been used in the past on a single target behavior schedule (Cooper, Heron, & Heward 1987). The changing criterion design is a variation of a multiple baseline with treatment introduced in a series of phases. Each treatment phase is associated with a step like change in criterion rate for the target behavior. This means that each phase of the design provides the baseline for the next phase. When the target behavior changes with each step in criterion, therapeutic change is replicated and experimental change determined. (Hartmann & Hall 1976) The reason change in criterion design was used is that goals and expectations matched up perfectly with the criterion set up by Hartmann and Hall to successfully use this treatment program. The length of the baseline, number of treatment phases, and magnitude of treatment phases were all set up so as to be naturally occurring in accordance with Hartmann and Hall. The benefit of the changing criterion design is that the starting criterion is base upon the subject's own personal baseline and treatment is therefore given in small successful increments followed by reward (De Luca & Holborn, 1992). The intention of this treatment is to have the participant

consume the set goal of number of servings each week until the participant reaches the goal of 5 servings of fresh fruit in accordance to the National 5-a Day program.

Method

The participant in this experiment was I, a 21 year old senior in from Park University. I have not been consuming the daily recommended servings of fruit. In order to increase my consumption of fresh fruit I used a single subject self-change project using a changing criterion design with a menu of rewards (Cigar, Hen House Chinese Food, Argosy Casino Buffet, & Shoot Pool with Friends, Go out to a New Movie with Fiancé). I established a baseline by recording the number of fresh fruit servings I had consumed per day. My baseline for fresh fruit consumption was zero. After baseline was established a treatment of a changing criterion design was introduced in which if I consumed one serving of fresh fruit a day for a week a reward would be given from the menu. After each week of completion the number of servings increased by one until 5 servings of fresh fruit a day was reached. I measured my fresh fruit consumption using a semi-permanent product system in which the core or peel of a fruit was kept after every fresh fruit consumed and then counted that night and thrown away. The interobserver reliability for this experiment was my fiancée Heather who observed me consuming fresh fruit on a daily basis.

Results

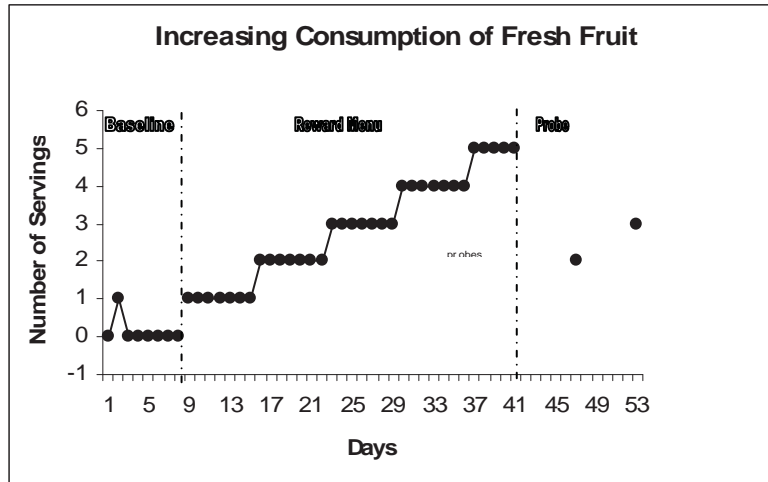
The results of this data is that the baseline of zero fresh fruit servings consumed increased to 1 serving per day for 7 days after the treatment was implemented (See Figure 1). On the eighth day of treatment the number of servings consumed was increased to 2 servings per day for 7 days and a reward was given for the completion of the prior week's goal. On the fifteenth day of treatment the number of servings was increased to 3 servings per day for 7 days and a reward was given for the completion of the prior week's goal. On the 22nd day of treatment the number of servings was increased to 4 servings per day for 7 days and a reward was given for the completion of the prior week's goal. On the 29th day of treatment the number of servings was increased to 5 servings per day for 7 days and a reward was given for the completion of the prior week's goal. After the completion of the 5th week where 5 servings of fruit were consumed per day the treatment was discontinued and probes were implemented once a week in order to determine if there was a return to baseline. The probes reflected a decrease in fruit consumption, but not a complete return to baseline was recorded.

Discussion

The Reinforcements and goal structure as described by Hartmann and Hall (1976) was successful in this study to increase fresh fruit consumption. The effectiveness of this design relies in the reward system and the variability of the rewards in order to prevent satiation. By establishing a menu of rewards in which I was to choose from at the end of each week provided adequate motivation for me to continue my goal of consuming fresh fruit. Without the reward system having variability I most likely would not have reached my goal.

The benefits of increased fresh fruit consumption are very noticeable after a relatively short time of only 4 and ½ weeks. I've noticed I feel better and more energized the more I eat fresh fruit and that I have begun to enjoy the taste of fruit much more since I have started this project. Another upside to the increase amount of fresh fruit is the downside of less healthy snack food such as cookies, cakes, and sugary snacks. In order to reach my goals in the latter weeks of this project I had to eat less of the snack food and more fruit. This experiment has shown how successful changing criterion design can be used in increasing healthy eating. If this is combined with De Luca and Holburn's (1992) study where they used changing

criterion to increase exercise in the obese it could dramatically increase the health of those who use this design for treatment.



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Langdon is a senior Psychology major at Park University.

Appendix C: Assessment Rubric

| Competency | 3 Exceeds Expectation | 2 Meets Expectation | 1 Does Not Meet Expectation | 0 No Evidence |
|------------------------------|---|---|--|---|
| Critical Thinking | Up to 100% of the points Possible | Up to 70% of the points Possible | Up to 50% of the points Possible | Up to 30% of the points Possible |
| Synthesis Outcomes 2, 3, 4 | In the introduction of the paper, the student used: <ul style="list-style-type: none"> 8 or more references from the literature. The student cited references that provide evidence from the literature on the topic being examined in the introduction and discussion. Three of the references should be empirical and refereed research articles. (35 Points) | In the introduction of the paper, the student used: <ul style="list-style-type: none"> 5-7 references from the literature. The student cited references that provide evidence from the literature on the topic being examined in the introduction and discussion. Three of the references should be empirical and refereed research articles. (24.5 Points) | In the introduction of the paper, the student used: <ul style="list-style-type: none"> 1-4 reference(s) from the literature. The student cited references that provide evidence from the literature on the topic being examined in the introduction and discussion. (17.5 Points) | In the introduction of the paper, the student did not use any references from the literature. (10.5 Points) |
| Analysis Outcomes 2, 3, 4 | In the introduction the student used the information gleaned from 8 or more references to build an argument to validate the treatment method they used in the <i>Behavior Self-Change Project</i> . (40 points) | In the introduction the student used the information gleaned from the 5-7 references to build an argument to validate the treatment method they used in the <i>Behavior Self-Change Project</i> . (28 Points) | In the introduction the student used the information gleaned from the 1-4 reference(s) to build an argument to validate the treatment method they used in the <i>Behavior Self-Change Project</i> . (20 Points) | In the introduction the student did not use any information gleaned from the literature to build an argument to validate the treatment method they used in the <i>Behavior Self-Change Project</i> . (12 Points) |
| Evaluation Outcomes 2, 3, 4, | In the introduction the student has identified what treatment they will be using. In the conclusion, the student has indicated how their research will add to the body of literature outlined in their introduction. In the conclusion, the student has indicated how their research could be improved. (40 points) | In the introduction the student has identified what treatment they will be using. In the conclusion, the student has indicated how their research will add to the body of literature outlined in their introduction. (28 Points) | In the introduction the student will identify what treatment they will be using. (20 Points) | In the introduction, the student failed to identify what treatment they will be using. (12 Points) |
| Content | | | | |
| Terminology Outcome 1 | The student will use 16 or more vocabulary words specifically used in the field of Behavior Analysis. Not only are these words used, but they are used consistently and accurately. (35 Points) | The student will use 10-15 vocabulary words specifically used in the field of Behavior Analysis. Not only are these words used, but they are used consistently and accurately. (24.5 Points) | The student will use 1-9 vocabulary words specifically used in the field of Behavior Analysis. Not only are these words used, but they are used consistently and accurately. (17.5 Points) | The student did not use vocabulary words specifically used in the field of Behavior Analysis. Not only are these words not used, but they are not used consistently and accurately. (10.5 Points) |
| Concepts Outcome 1, 2, 3, 4 | The student demonstrates a correct understanding of operant conditioning principles, functional assessment, and single-subject design as they are applied in their study. The student has identified a novel treatment concept as result of the functional assessment and search of the literature. (40 Points) | The student demonstrates a correct understanding of operant conditioning principles, functional assessment, and single-subject design as they are applied in their study. (28 Points) | The student uses operant conditioning principles, functional assessment, and single-subject design as they are applied in their study. (20 Points) | The student does not use operant conditioning principles, functional assessment, and single-subject design as they are applied in their study. (12 Points) |

| Competency | 3 Exceeds Expectation | 2 Meets Expectation | 1 Does Not Meet Expectation | 0 No Evidence |
|---------------------------------|--|--|---|--|
| Content (Cont'd) | | | | |
| Application Outcomes 3, 4, 6 | While using the principles of operant conditioning, functional assessment, and single-subject design, the student manipulates the targeted behavior. The student is able to show experimental control. (35 Points) | While using the principles of operant conditioning, functional assessment, and single-subject design, the student manipulates the targeted behavior. (24.5 Points) | While using the principles of operant conditioning, functional assessment, and single-subject design, the student attempts to manipulate the targeted behavior. (17.5 Points) | The student does not use the principles of operant conditioning, functional assessment, and single-subject design, to manipulate the targeted behavior. (10.5 Points) |
| Technical Skills | | | | |
| Whole Artifact Outcome 4 | The <i>Behavior Self-Change Project</i> shows a consistent use of APA format with there being no more than 0-4 errors. (35 Points) | The <i>Behavior Self-Change Project</i> shows a consistent use of APA format with there being no more than 5-7 errors. (24.5 Points) | The <i>Behavior Self-Change Project</i> shows a consistent use of APA format with there being no more than 8-10 errors. (17.5 Points) | The <i>Behavior Self-Change Project</i> does not show a consistent use of APA format with there being no more than 10 errors. (10.5 Points) |
| Component Outcome 4 | Same as Meets Expectation category, except student has used the computer for all graphics. (20 Points) | The <i>Behavior Self-Change Project</i> contains the following sections: <ul style="list-style-type: none"> • Cover page • Abstract – summary of Project • Introduction – contains a review of the literature, rationale for treatment, and statement of intention. • Method – contains participant, procedure, materials, research design, and interobserver-reliability. • Results – summary of the data • Discussion – statement of outcome, analysis of how the treatment and results add to the literature, and a statement of how their project could be improved. • References Page – all the references in the body of the text match up with those in the references list and all references in the references list match up with those in the body of the text. • Graph(s) – single-subject design format graph with all labels, etc. (14 Points) | The <i>Behavior Self-Change Project</i> contains only the following sections: <ul style="list-style-type: none"> • Cover page • Introduction • Method • Results • Discussion • References Page • Graph(s) (10 Points) | The <i>Behavior Self-Change Project</i> does not contain all of the following sections: <ul style="list-style-type: none"> • Cover page • Introduction • Method • Results • Discussion • References Page • Graph(s) (6 Points) |
| | Exceeds Expectation | Meets Expectation | Does Not Meet Expectation | No Evidence |
| Relationship Outcome 4 | Each section (cover page, introduction, method, results, discussion, references page, and graph) contain sufficient information that this research could be submitted to a conference or journal as is. (20 Points) | Each section (cover page, introduction, method, results, discussion, references page, and graph) contain sufficient information that this research could be replicated by reading the <i>Behavior Self-Change Project</i> . (14 Points) | Each section (cover page, introduction, method, results, discussion, references page, and graph) contain sufficient information that you have a general idea of what was attempted in the <i>Behavior Self-Change Project</i> . (10 Points) | Each section (cover page, introduction, method, results, discussion, references page, and graph) do not contain sufficient information that you have a general idea of what was attempted in the <i>Behavior Self-Change Project</i> . (6 Points) |

Thinking Critically about Critical Thinking: Integrating Online Tools to Promote Critical Thinking

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The value and importance of critical thinking is clearly established; the challenge for instructors lies in successfully promoting students' critical thinking skills within the confines of a traditional classroom experience. Since instructors are faced with limited student contact time to meet their instructional objectives and facilitate learning, they are often forced to make instructional decisions between content coverage, depth of understanding, and critical analysis of course material. To address this dilemma, it is essential to integrate instructional strategies and techniques that can efficiently and effectively maximize student learning and critical thinking. Modern advances in educational technology have produced a range of online tools to assist instructors in meeting this instructional goal. This review will examine the theoretical foundations of critical thinking in higher education, discuss empirically-based strategies for integrating online instructional supplements to enhance critical thinking, offer techniques for expanding instructional opportunities outside the limitations of traditional class time, and provide practical suggestions for the innovative use of critical thinking strategies via online resources.

As discussed by McKeachie, "everyone agrees that students *learn* in college, but whether they learn to *think* is more controversial" (Joscelyn, 1988). The discrepancy highlighted by McKeachie is at the center of ongoing debate between content coverage and critical thinking. Instructors try to cover more material, in more depth, with more critical analysis while simultaneously struggling with growing class sizes, limited funds, and restricted contact time. This instructional catch-22 creates an educational dilemma in which many instructors must make difficult decisions between focusing limited class time to the comprehensive coverage of course material or encouragement of critical thinking about a narrow range of course concepts.

This dilemma is compounded even more by the passive learning stance adopted by many postsecondary students and the vast amount of readily available information provided by the media. As described by MacKnight (2000, pg. 38), "we fall prey to modern communication media, which present a world where the prepackaging of intellectual positions and views is so ingenious that *thinking* seems unnecessary." Thus, as our society becomes more advanced with an endless supply of information readily available via television, radio and the Internet, it is essential that postsecondary institutions prepare students to be critical thinkers and cautious consumers of information.

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Defining Critical Thinking

Research (Paul, Elder & Bartell, 1997) indicates that an overwhelming majority (89%) of university faculty claim that the promotion of critical thinking is a primary objective of their instruction. Yet, only 19% could define critical thinking and 77% had little, limited or no conception of how to reconcile content coverage with the fostering of critical thinking. This ambiguity only adds to frustrating challenge of structuring classroom activities to clearly and effectively meet an undefined goal. Thus, the first step of ensuring the promotion of this abstract intellectual ability is to operationalize critical thinking:

Critical thinking is the intellectually disciplines 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. (Center for Critical Thinking, 2004, ¶12)

This definition of critical thinking provides a framework, or a process goal, that leads to achievement of the specific course learning objectives. When balancing course coverage with critical thinking, it is important to clearly differentiate between the *content* of a course and the *process* by which the content is mastered. The course learning outcomes provide guidance on the content goals, while critical thinking guidelines provide instructional strategies for approaching and learning the specific course content. As such, "instruction in critical thinking is to be designed to achieve an understanding of the relationship of language to logic, which should lead to the ability to analyze, criticize, and advocate ideas, to reason inductively and deductively and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief" (Dumke, 1980, pg. 3).

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Barriers in Teaching Critical Thinking

Barriers in teaching critical thinking are often the result of practical constraints of a traditional classroom. Specifically, instructors have only a limited amount of contact time with students, and the face-to-face classroom environment mandates that instruction be somewhat generalized to be applicable, understandable, and paced to simultaneously meet the needs of a large number of diverse students. This type of time-limited, group setting often dictates a more didactic teaching strategy in which the instructor leads students through a pre-arranged set of content material with minimal time spent on individual interaction or critical analysis of the information presented.

The challenges of the traditional classroom are compounded further by the habitual nature of teaching and learning. Most teachers tend to teach the way they were taught with an emphasis on instructor-based strategies that value content acquisition over the learning process. This tendency is again reinforced by the standardized assessment movement and readily available assessment resources which emphasize knowledge over the thought process (i.e., most published assessment supplements provide questions designed primarily around ease of grading, factual textbook information, the time-constraints of testing, etc.). As a result, students tend to gear their time and attention on concrete, factual learning that is likely to be assessed to determine their overall course grade. This habitual cycle impedes the integration of critical thinking instructional techniques as instructors may be uncomfortable or unfamiliar with alternative classroom strategies, assessments may not be in place to measure students' mastery of critical thinking skills, and students may be resistant to altering their focus toward nonfactual learning (Paul & Elder, 2004).

Embracing Alternative Teaching Philosophies

In contrast to traditional didactic instructional strategies, constructivist learning philosophies tend to shift the emphasis from the instructor to the student. As described by Thanasoulas (n.d., ¶12),

It is the learner who interacts with his or her environment and thus gains an understanding of its features and characteristics. The learner constructs

his own conceptualisations and finds his own solutions to problems, mastering autonomy and independence. According to constructivism, learning is the result of individual mental construction, whereby the learner learns by dint of matching new against given information and establishing meaningful connections, rather than by internalising mere factoids to be regurgitated later on. In constructivist thinking, learning is inescapably affected by the context and the beliefs and attitudes of the learner. Here, learners are given more latitude in becoming effective problem solvers, identifying and evaluating problems, as well as deciphering ways in which to transfer their learning to these problems.

As such, instructional principles based on a constructivist framework require instructors to anchor learning activities within a larger context while supporting students in developing ownership of the task. To encourage active engagement with course material, the instructor must design authentic tasks that reflect the complexity of the environment students will face, then support and challenge students' thinking while encouraging them to test their ideas against alternative views and alternative contexts. Throughout this process, instruction not only facilitates content review, but provides the opportunity for reflection on the learning process (Savery & Duffy, 1995).

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While constructivist or student-centered instructional philosophies are not unique to any one teaching mode, there are several advantages to the use of online tools for promotion of critical thinking using this type of philosophical approach (Astleitner, 2002; Bruning, Zygeilbaum, Horn & Glider, n.d.). Central to student-centered learning and the development of critical thinking is allowing students the individualized time necessary for mastering the learning process; and, unlike the constraints of scheduled class period, online resources allow students to complete learning activities at their own pace. The increased time available also ensures that students have the time necessary to prepare for learning tasks (Pyle, 1997). Because learning is facilitated in an individualized environment, online resources remove peer-pressure and self-consciousness that can hinder classroom interactions (Hanna, Glowacki-Dudka & Conceicao-Runlee, 2000; Horton, 2000). The equal-opportunity environment of self-paced, online interaction encourages inclusion of all students and allows each student the prospect of learning by the means that best fit their preferred learning style (MacKnight, 2000; Muirhead, 2002; Murchu & Muirhead, 2005).

Integrating Online Instructional Strategies

The use of online instructional technology provides two distinct benefits for instructors wishing to enhance students' critical thinking about course material: 1) it provides a means of moving lower-level learning tasks out side of class time so that limited student contact time can be devoted to higher-order critical thinking activities; and 2) it fosters the use of constructivist teaching philosophies by supplementing traditional face-to-face activities with opportunities for individualized, in-depth interactions with course material.

Expanding Available Class Time

Educators generally agree that there is not enough classroom contact time available to cover all relevant course material effectively; as a result, class activities are often geared toward ensuring that students understand basic course concepts

with little time left to promote a more in-depth, critical analysis of course information (Kulik & Kulik, 1979). One of the most effective ways of meeting instructional goals concerning content coverage and critical thinking skills is to utilize online instructional strategies to actively engage students with instructional material outside of the classroom (Driscoll, 2005). By encouraging students' structured, targeted interaction with course material outside the scheduled class period via online instructional resources, instructors can enhance students' preparation for class and dedicate limited contact time to higher-order learning goals.

Research clearly supports the benefits of active learning strategies to promote enhanced understanding, retention and critical thinking over the shallow, passive learning that results from conventional lectures (Kulik & Kulik, 1979; McKeachie, Pintrich, Lin, Smith & Sharman, 1990). As such, interactive class discussions, projects and debates are often promoted for their ability to increase students' critical thinking abilities (i.e., ability to evaluate empirical positions, apply relevant principles, and formulate logical arguments). But, the educational benefits of interactive class activities rely on students' participation and preparation (Driscoll, 2005). The main reason that students cite for not participating in discussions or activities is a lack of knowledge or preparation; thus the essential problem facing instructors is ensuring that students have completed the prerequisite learning activities and are adequately prepared to interact with course material. While reading alone can be a very effective means of preparing students for class, instructors continuously struggle to ensure students complete readings *prior* to class time. As a consequence, instructors spend large amounts of valuable classroom time reviewing basic concepts and are not left with adequate time to conduct interactive discussions or activities. To maximize the educational impact of class activities, it is vital that students possess a basic understanding of key concepts prior to class time.

To maximize the educational impact of class activities, it is vital that students possess a basic understanding of key concepts prior to class time.

Online tools provide an efficient means by which instructors can shift the instruction of basic concepts outside of class so that students are prepared to fully engage in class activities. The expansion of students' time-on-task with course material prior to scheduled class meetings ensures that students are more prepared to benefit from interactive instructional strategies (Driscoll, 2005). This shift in focus allows instructors to dedicate their face-to-face interactions to instructional strategies that foster critical thinking about the content of a given course. Key online tools that facilitate students' preparation for class include online preparation quizzes and online lectures or supplements.

Online Preparation Quizzes - Online preparation quizzes can be used prior to class to assess students' understanding of readings, provide feedback to correct basic conceptual errors, and, most importantly, provide an external motivation for students to complete assignments prior to class. The integration of online quizzes enables instructors to engage students with course material prior to class without spending valuable classroom time on quizzing and grading. In addition, online quizzes create an automated means of directing students' attention to key course concepts and correcting basic conceptual errors (Peirce, 2003).

Online tools provide an efficient means by which instructors can shift the instruction of basic concepts outside of class so that students are prepared to fully engage in class activities.

Online Lectures or Supplements - Many students lack the metacognitive ability to accurately judge the importance and significance of concepts embedded within written text. Thus, students become overloaded with the daunting task of "learning everything" and they fail to focus on key information. Online lectures

provide an efficient means by which instructors can guide students' focus and attention to ensure that students devote their preparation and study time to the key concepts within course material. Online lectures might include key term lists, examples, drill-and-practice activities and other basic components that allow students to obtain a basic level of knowledge outside of class time so that instructors can gear class activities to higher-order, critical thinking activities.

Embracing the principles of constructivist theory, self-paced online lectures allow a student-centered approach to individualize the learning experience. As such, the instructor provides the learning objectives and each student selects his or her own path of inquiry. The instructor facilitates the learning process by introducing necessary tools and resources in small increments as they are needed (Bruning, 2005). This hands-on engagement demands frequent student interaction and a high level cognitive involvement. As such, equal emphasis is given to the evaluation of the learning process as well as the knowledge gained (Jones, 1996). Because students are given the resources and support to master material according to their own schedule, valuable class time is freed to devote to more interactive critical thinking activities.

Asynchronous Learning Tools

A key feature of online education is the asynchronous learning environment that it creates. Online activities provide educators with the means to offer instructional assistance and learning activities that meet the demands, pace and interest of individual students. As described by Pyle (1997, ¶11) "At present, asynchronous learning may be the ONLY path to critical thinking for most undergraduates. . . .much of academic online teaching is done backwards. Instead of borrowing from classroom teaching, online education should be revolutionizing it." Central to this position is the notion that an asynchronous environment allows for prepared, individualized, thoughtful interactions that are free from the constraints of time, self-consciousness, learning style and other student learning variables. There are a wide range of asynchronous teaching strategies available and advances in educational technology continue to contribute to the growing body and diversity of options; the most effective asynchronous tools for the promotion of critical thinking are treaded discussions and alternative assignments based on emergent technologies.

Online activities provide educators with the means to offer instructional assistance and learning activities that meet the demands, pace and interest of individual students.

Online Asynchronous Threaded Discussions – Threaded discussion boards provide an opportunity to take advantage of the benefits of student-teacher and student-student interaction in an environment that encourages planned, meaningful, prepared discussion (MacKnight, 2000; Muirhead, 2002; Murchu & Muirhead, 2002; Peirce, 2003; Walker, 2005). Supplementing the time-based, spontaneous interaction that occurs in a face-to-face classroom, threaded discussions create an outlet for in-depth interactions that may require additional thought, investigation or research. While threaded discussions are not necessarily better than classroom discussions, they provide an alternate avenue for facilitating a different type of critical thinking than can be promoted through spontaneous interactions.

For online discussions to be meaningful and engaging, it is vital that they are structured in a manner that effectively facilitates critical thinking (Hanna, Glowacki-Dudka & Conceicao-Runlee, 2000; Horton, 2000). As such, it is essential that threaded discussions are based upon *discussable* questions, problems, debates or situations (i.e., you do not want to utilize discussion questions that have a definite answer or require little investigation). To encourage on-going thought and in-depth analysis of an issue, it is recommended that instructors facilitate threaded discussions utilizing a range of convergent, divergent and evaluative questions. As

recommended by Collision, Elbaum, Havvind and Tinker (2000), effective threaded discussions integrate full-spectrum questions that encourage critical thinking by 1) probing the “so what!” response targeting relevance, interest level, urgency and context; 2) clarifying meaning or conceptual vocabulary as they challenge ambiguity, vagueness and common misconceptions; 3) exploring assumptions, sources and rationale; 4) seeking to identify causes and effects/outcomes including primary or secondary sources, and internal or external factors; and 5) considering the appropriateness of various courses of action

The educational value of a threaded discussion depends upon the thoughtful interaction of both students and instructor. As such, it is important that instructors teach students how to participate in an online discussion (i.e., you will want to make recommendations concerning the number and frequency of interactions as well as the expected content of initial responses and peer replies) and that instructors contribute to ongoing discussions via the use of discussion scaffolding to maintain the focus of the discussion and guide interactions toward a more critical analysis of a given course concept (MacKnight, 2000). Within the threaded discussion environment, instructors may create a variety of different discussion formats to facilitate critical thinking; Appendix A provides a sample of various formats for promoting in-depth analysis of course topics. While the potential uses of threaded discussions for the promotion of critical thinking are limited only by an instructor’s creativity; the key is to design learning strategies that take advantage of the unique asynchronous environment to engage students in critical thinking activities that are not possible within the confines of a traditional classroom.

Alternative Assignments Based on Emergent Technologies – As the available educational technologies continue to grow, the challenge for instructors is to identify tools that facilitate existing learning objectives (as opposed to creating assignments simply for the sake of using novel technologies). Several emerging technologies (including blogs, wikis, and podcasting) offer distinct instructional advantages in the promotion of students’ critical thinking skills. The following narratives describe the basic tools; examples of how to use each emergent technology to enhance critical thinking can be found in Appendix B.

- *Blogs* – Blogs (shortened form of weblog or web log) are websites in which journal entries are posted on a regular basis and displayed in reverse chronological order. Blogs may be used within a course management system (usually private) or on a number of free, public, blog sites available throughout the Internet (typically organized by common theme, topic or point of interest).
- *Wikis* – A wiki is a piece of server software that allows users to freely create and edit Web page content using any Web browser; they support hyperlinks and have simple text syntax for creating new pages and crosslinks between internal pages. The advantage of a wiki is that it allows users to easily add and edit content; as such, it is especially suited for collaborative writing or group projects.
- *Podcasting* – Podcasting is a method of publishing audio and video programs via the Internet that lets users subscribe to a feed of new files. Generally, podcasts are audio recordings (made via cell phones, digital voice recorders, computer microphones, etc) made into downloadable MP3 or RSS files.

As the available educational technologies continue to grow, the challenge for instructors is to identify tools that facilitate existing learning objectives (as opposed to creating assignments simply for the sake of using novel technologies).

Conclusions and Recommendations

As highlighted by this review, there are a variety of ways to utilize online technologies to supplement traditional classroom activities and promote critical thinking in the virtual classroom. With the primary goal of promoting students' critical understanding and analysis of course information, the focus should not be on the technology itself; rather the emphasis must be on the careful selection of appropriate online instructional strategies to meet course content and process goals. By expanding students' time-on-task outside of the limitations of a scheduled class period, instructors can shift many low-level learning activities outside of the classroom to free valuable contact time for critical thinking endeavors. Through this shift, instructors are able to enhance individual participation in large classes by providing outlets for academic expression of ideas, and engage students both in and out of the confines of a typical class period. In addition, the thoughtful integration of asynchronous instructional strategies encourages students to go beyond the spontaneous interactions of a face-to-face class to delve deeper into the intricacies, details, exceptions and circumstances of the learning experience that are at the core of critical thinking. The effective integration of online technology is more than a delivery medium; it is a *way of learning* that challenges current views of teaching, thinking and instruction by blurring the line between teacher and student by shifting the focus from knowledge acquisition to critical application of information.

With the primary goal of promoting students' critical understanding and analysis of course information, the focus should not be on the technology itself; rather the emphasis must be on the careful selection of appropriate online instructional strategies to meet course content and process goals.

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Appendix A: Online Threaded Discussion Formats to Enhance Critical Thinking

Alternative formats for online threaded discussions (MacKnight, 2000):

- Create specific learning communities or workgroups based on interests or experiences;
- Introduce guest “speakers” who have invited access to a specific discussion topic;
- Utilize role playing by assigning specific positions or roles to defend within the discussion;
- Incorporate audio or video as the “spark” for a discussion;
- Structure small group activities led by student discussion leader;
- Create buzz groups that focus on a specific topic for a designated, short period of time;
- Engage in-depth analysis of a case study or simulation;
- Assign debate teams to formulate ideas, defend assigned positions and refute opposing viewpoints;
- Create jigsaw groups to divide learning tasks then re-engage to develop a comprehensive understanding of a given topic;
- Structure mock trials to investigate and debate assigned issues.

Appendix B: Using Emergent Technologies to Enhance Critical Thinking

Blogs encourage critical thinking through the encouragement of self-reflection, sharing of the learning process and peer-review. Blogs may be used to promote critical thinking by supporting:

- Dissemination of news, current events or experience
- Outreach activities
- Opinion forming
- Archives of human thought
- Reflection or learning logs
- Electronic scrapbooks
- Dialogue for groupwork
- Networking and personal knowledge sharing
- Reflective or writing journals
- Annotated links
- E-portfolios

Wikis break down the barrier between content creator and content consumer by promoting genuine interactivity and collaboration. Through the reciprocal nature of learning, knowledge and investigation, wikis support critical thinking activities such as:

- Brainstorming
- Planning of learning activities
- Document editing
- Perpetually updated lists
- Bulletin boards
- Collaborative experiments
- Informational debates
- Teaching network literacy
- Ongoing revisions, changes and modifications

Podcasts facilitate on-demand education that allows students access information when they need it that allows educational resources to be tailored to various learning styles, pace and interests. Podcasting can be used to facilitate critical thinking via:

- Instructional explanations
- Lecture supplements
- Student presentations
- Guest speakers
- Commentaries on current issues
- Project soundtracks
- Integration of news media
- Music enhancements
- Creative assessments such as relevant playlists

The Impact of Academic Freedom Policies on Critical Thinking Instruction

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Critical thinking enjoys almost universal support, except when applied to controversial topics. Yet it is these topics that are often the most effective initiators of critical thinking exercises that improve students' rational approaches to challenging problems. The use of controversial issues to promote critical thinking requires an institutional commitment to academic freedom in order to survive. In some institutional contexts, the most crucial need for critical thinking is the very condition under which it is least likely to be applied. Instead, avoidance of controversy seems to be the predominant policy of institutions fearful of expensive lawsuits or damaging public relations. Several trends are decreasing the likelihood that critical thinking is applied in the classroom to challenging topics: demands for increased accountability from legislatures; scrutiny of adopted content standards; oversight of Internet and other intellectual work of professors affiliated with the universities; student challenges to faculty instruction; and attempts to curtail ideological diversity. This paper describes these current dynamics which erode academic freedom and thus the ability to apply critical thinking to controversial topics. The paper also recommends that institutions and faculty adopt clearly delineated policies related to academic freedom in order to ensure faculty freedom to promote critical thinking. Awareness of how these trends impact the instructional climate enables teachers to design instruction and be more proactive in guaranteeing that critical thinking about controversial topics is able to flourish under academic freedom.

Critical thinking is defined as making judgments about the truthfulness and worth of the statement. Academic freedom refers to the freedom of teachers to study and teach content-related ideas that may lead to controversy without the fear of threats or sanctions. [There is] a fundamental positive relationship between controversy and student mastery of related subject matter. (Stancato 1-2)

Critical thinking and academic freedom are together essential both to a deliberative democracy and to an economy dependent on innovation. ("Focus" par. 6)

Abandoning the commitment to critical thinking and academic freedom would imperil the future of our nation. (Stancato 379)

Threats to Academic Freedom and Critical Thinking

The history of educators' contributions to promoting critical thinking is lengthy and significant¹, as academic freedom is central to the very idea of a university. Recently, however, new threats to divergent thinking have surfaced through attacks on academic freedom, the essential foundation of critical thinking—not only resistance to differences in ideology but also to the right to any discussion of differing views on controversial topics.

A trend toward verifying and sanctioning content in the name of accountability has emerged. This emphasis has direct implications for questions of academic freedom and critical thinking.

Academic freedom continues to be debated, even though critical thinking, the outgrowth of this freedom, is the premier hallmark of an advanced education. A trend toward verifying and sanctioning content in the name of accountability has emerged. This emphasis has direct implications for questions of academic freedom and critical thinking. Recently, opposition to the legitimacy of academic freedom combined with increasing accountability for educational results has curtailed the application of critical thinking to “safe” topics. In the social science, for instance, Richard Evans and Valarie Pang assert that the National Standards for United States History instruction are “pedagogically conservative” and recommend an approach which emphasizes critical thinking, which some leap to translate as “liberal” (270). In science, arguments about required dissections are one sample of the debate. Another is the turmoil over evolution, intelligent design and creationism. In English, a first-year student at a Midwest college protested an instructor who “teaches differently than any teacher I have ever had” (Box). The introduction of an “academic bill of rights” in the Pennsylvania legislature has been challenged as threatening at every level. The legislation is backed by Students for Academic Freedom, with 150 chapters on campuses nationally. However, the name seems a misnomer, since the group seeks to proscribe instruction to certain approved viewpoints (Berube par. 11). Opponents of the bill include the American Association of University Teachers, who believes that “academic freedom” is being used inappropriately to actually limit critical thinking (Bradley par. 2, “Academic Freedom” pars. 2, 9).

In today’s accountability climate, 14 states are involved in debates over content (Swanger 4). In 2005, Tom Auxter and David Horowitz debated the need for states to require colleges to promote ideological diversity. Those arguing against such action say that states have no purview in defining or shaping educational-related issues. The trend toward a “politically correct” college curriculum contradicts academic freedom (Kimura 20) and limits critical thinking. Charges of “bias” miss the point. The liberal arts tradition of inquiry demands that positions, whether controversial or not, be stated and defended as subjects for critical thinking (Hickey and Brecher 302-3). However, some believe that liberal learning has become increasingly expensive because of lawsuits challenging content and faculty.

Fostering a Hostile Instructional Climate

Many reports of the use of controversial topics to promote critical thinking highlight the hostility that often develops from students offended by professors whose statements they disagreed with or which they felt were fundamentally opposed to their belief systems. Students at Washington University challenged Jonathan Katz faculty’s web page content. Indiana University professor Eric Rasmussen and Northwestern University’s engineering professor Arthur Butz have had their web content challenged (Kumar pars. 3-5). Discussion is not inappropriate. These examples point to the emergent trend of sanctioning and prohibiting the freedom of professors to teach their views if those views are controversial.

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Donald French, president of the Philadelphia-based Foundation for Individual Rights in Education, writing in the *Journal of College Science Teaching*, underscores that the academic freedom dispute runs the gamut of institutional life, therefore posing an opportunity for contention to arise at every juncture (46-47). Classroom disruptions, academic integrity, intellectual property, ideological discrimination, research topics and rights, the rights of graduate students to unionize, and both faculty and student web sites have all come under the charge of

threats to academic freedom (Kumar pars. 23-34, Glaister par. 4, Mauer par. 5, Dudley pars. 15, 22, 26, 28).

This climate, which can impede faculty ability to teach critical thinking, does not only result in unrest but also generates concrete challenges for administrators, faculties and students. For example, smaller or private institutions in particular, which have often historically been established to promote a particular ideological emphasis on critical thinking, cannot sustain expensive lawsuits. These institutions are more totally dependent on private donations and are therefore more likely to discourage professors from promoting discussion of controversial ideas.

Challenging Faculty Instruction

Hardly any campus has been left untouched by this trend toward suppressing the very controversial issues that can promote critical thinking. Whenever some students are presented with divergent ideas, they now tend to misinterpret the shock as an assault on their beliefs. They wrestle with new concepts and may experience cognitive dissonance. Without being prepared for this normal development, students may be encouraged to sue if this climate continues to grow ("Academic Freedom" par. 6, Swanger par. 10). Most institutions have done a thorough job of addressing privacy, free speech and other freedom issues in library and Internet policies. But other aspects of university operations, such as student challenges to faculty and professor's freedom of speech, may have been left unaddressed, creating vulnerable areas for colleges, both in reputation and finances, as well as discouraging faculty from promoting critical thinking.

More than one administrator or faculty member has fallen under the sword of charges inimical to an approved interpretation of what academic freedom means because they attempted to promote critical thinking using controversial subjects. The Harvard presidency was affected (Summers 11).

Columbia and other small and large schools have been in the news, with the New York Civil Liberties Union becoming involved (Mirengoff par.1, Eisenberg par. 1). The recent scandal in California over hiring students to secretly record professors on a "hit list" at UCLA is only one such attack on the purview of education. These students were paid to secretly record professors who were seen as too radical in their teachings and "worthy of scrutiny" (Glaister par. 7). These professors were then labeled the "Dirty 30" by a UCLA alumnus on his web page (Dudley par. 4). The debate reached FrontPagemag.org and prwatch.org, both Internet-based magazines, as well as other public venues, creating negative publicity for UCLA. Alumni and boards are always nervous about such publicity, fearing donations will decrease.

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Misusing Faculty Evaluations to Threaten Academic Freedom

Critical thinking examines the value of an idea and is therefore open to discussion and contradiction. In an increasingly complex world, the temptation to seek simplistic answers is antithetical to the idea of a college education. However, increasing pressures are being brought to limit critical examination of complex ideas. One of these pressures is the use of student evaluations of faculty to remove those who promote discussions of controversial ideas.

Faculty are increasingly reluctant to facilitate critical thinking by discussing controversial subjects (Stancato 3). Most teachers are "reluctant to facilitate critical thinking by providing a fair presentation on a controversial topic...[because it might lead to] teacher sanctions and possible dismissal" (379). Moreover student evaluations of faculty, while researched for reliability and validity, have not been viewed as an "infringement on academic freedom, promotion, reappointment, and

tenure rights" (Haskell par. 1). Robert Haskell's lengthy examination of 78 legal actions concluded that "the courts have not been kind to faculty" (Haskell par. 2). Haskell quotes J.C. Damron as criticizing the courts for "hav[ing] little sense in how to proceed in hearing(s) affecting academics" (par. 20). The use of student evaluations has become a primary factor in dismissals and has risen from 29% of cases in the 1960s to 86% of the cases as an important determining factor in promotion, reappointment, and tenure, second only to publication (par. 2).

Student evaluations represent an important intersection of the academic freedom/critical thinking debate. If students feel their imbedded beliefs are being challenged, they may reflect this discomfort in evaluations or even seek to have faculty removed who present views with which they are uncomfortable. Openness to new ideas is never easy, and students increasingly reveal they do not know how to cope with being challenged. Some students show impatience with examining different sides of an issue and reflect their frustration with the process in evaluations.

Student evaluations represent an important intersection of the academic freedom/critical thinking debate.

Haskell found that the burden of proof to secure tenure or fight dismissal was on the faculty member in these cases. Popularity as measured by student evaluations can be legitimately included in the decision on faculty disposition. Faculty contracts must specify whether student evaluations can be required for decisions. In some cases the average of the numerical scale of student evaluations was extended to fine decimal distinctions to make decisions on tenure or dismissal. Student bias is "not taken into account when assessing" the evaluations (par. 13). The student bias variables include "being a demanding teacher" and "grading" (par. 14). Teacher method is not covered under free speech or academic freedom, unless it is covered in the faculty contract (par. 16). Haskell's conclusion is that "academic freedom is an area in which the law provides no firm guidelines for administrators. This is particularly true for private institutions" (par. 17).

W.E. Cashin (as quoted in Haskell) at the Kansas State University Center for Faculty Evaluation and Development notes:

The higher education rhetoric is almost universal in stating that the primary purpose of faculty evaluation is to help faculty improve their performance. However, an examination of the systems – as used – indicates that the primary purpose is almost always to make personnel decisions. That is, to make decisions for retention, promotion, tenures, and salary increases. (par. 4)

Haskell adds, "Herein lies a nest of problems" (par. 4). Another witness to this trend was reported by Damron in a personal communication to Haskell. He believes that "untenured and/or politically incorrect faculty are often considered to be 'fair game' by administrators...and are often regarded as ...disposable... there is a very serious ethical issue here, and a hugely hostile attitude toward academic freedom in general" (Haskell par. 20). Haskell further urges that, quoting W. A. Kaplin and B. Lee, "It is especially crucial for institutions to develop their own guidelines on academic freedom and to have internal systems for protecting academic freedom in accordance with institutional policy" (par. 17).

Faculties Respond to the Challenges

Marcia Clemmitt reported on the growing movement among professors for the right to make educational and research decisions based on professional expertise (835). The Association of American Colleges and Universities Board of Directors issued a statement on "Academic Freedom and Educational Responsibility," which calls for shift to focus on quality of education rather than faculty political views. In their view, students should not expect to remain

unconfronted by unconventional ideas, nor should they have a sense of entitlement because they pay tuition that they should be able to control course ideologies. They believe that political oversight of teaching is “inappropriate” and the “crisis” is largely a contrived event. The heritage of educators and colleges is the tradition of discovery and free inquiry.

Protections for Critical Thinking Instruction

What colleges have historically not had to address are mechanisms for student classroom disruptions that deal with academic freedoms. Ideas are, after all, key to people’s identities. It is a short walk from ideology to social groups to political action.

Institutions that have not examined the impact of these movements across the campus spectrum or developed clear policy statements to deal with them are leaving themselves more open than necessary to challenges to self-governance and legal controversies. Michael Berube believes that “Academic freedom is under attack for pretty much the same reasons that liberalism itself is under attack” (2), yet professors at conservatively affiliated institutions have their own conflicts and have raised their own concerns about academic freedom (Krebs 2). Paula Krebs reported that he and others were disturbed that there were attempts to proscribe the content of their teachings, even within approved content. However, resorting to labeling discussion as liberal or conservative misses the point. Discussion of different points of view is to be encouraged in a democracy, not labeled or sanctioned as one extreme or the other.

In this climate, a small but rare light has emerged through the Ford Foundation’s “Difficult Dialogues” initiative. The foundation is issuing grants to colleges that promote campus environments so that sensitive subjects can be discussed in open inquiry (Martinez 3). Portland Community College in Oregon, LaGuardia Community College in Queens, New York, and the University of Missouri at Columbia are three of the colleges implementing this initiative to encourage diversity of views.

This initiative recognizes the triangular foundation of institutional policy, academic freedom and critical thinking that institutions must overtly adopt. Academic freedom is the bulwark of instructional security. Faculty cannot be expected to promote critical thinking of controversial topics without institutional support of this freedom. They can, however, be in the forefront of creating and promoting the adoption of such policies. The Ford Foundation is evidence that support for divergent thinking has not died.

Faculty should urge and join administrators, board members, and student representatives at their institutions to form a study group to research best practices and develop recommendations to preserve academic freedom, critical inquiry and faculty security. They should be knowledgeable about statements in their contracts regarding teacher method, use of student evaluations, and academic freedom or lobby for such statements. They should openly discuss their commitment to academic freedom to examine controversial ideas critically when applying for positions, being aware that private institutions can restrict speech more so than public institutions which must comply with First Amendment rights. If educators are serious about promoting critical thinking, they must demonstrate a commitment to clear standards and expectations regarding academic freedom as a basis and a sense of security for faculty and students to pursue challenging inquiry. Instructors are encouraged to make clear in their syllabi their promotion of critical thinking and its application to controversial ideas. Frank Stancato recommends using reverse role plays, journaling, examining opposing sources, and practice with specifying assumptions (pars. 16, 18, 22, 23). Course policy should emphasize that students will not be penalized because they disagree with a professor, but that a climate of

Faculty cannot be expected to promote critical thinking of controversial topics without institutional support of this freedom.

mutual respect and tolerance for divergent thinking will be the norm. Course learning outcomes should make clear that students should be able to support whatever position they take and to demonstrate their mastery of the course objectives. It should be clear that the value of inquiry is central to course mastery and that they will analyze, evaluate and create, as Bloom states, as evidence of their critical thinking mastery, even if the ideas are personally challenging.

Higher education institutions, whether public or private, would do well to develop comprehensive and thorough statements and policies on academic freedom across the spectrum. From the Board to the Student Senate, academic freedom as a necessary foundation for critical thinking and therefore excellence in outcomes must be affirmed.

Serious institutions should adopt clear policies supporting academic freedom and steps to deal with challenges to academic freedom in order to support higher order thinking across the campus. Faculties should initiate and join in this effort in order to gain the academic freedom and protection to promote critical thinking about controversial ideas. Without these initiatives, our higher educational system will be weakened because our strength has been in the discoveries that evolved from free inquiry through critical thinking.

Notes

¹ Part of educators' continuing emphasis on critical thinking has been the release of a revised Bloom's Taxonomy. By combining both the cognitive process and knowledge dimensions, the creation of learning objectives has been revised as well (Emily Cruz par. 1). Instructional designers can more easily match assessment measures with learning outcomes. Cognitive dimensions have been reframed as verbs to emphasis process:

| | | |
|----------------|---|------------|
| Knowledge | = | Remember |
| Comprehension | = | Understand |
| Interpretation | = | Apply |
| Analysis | = | Analyze |
| Evaluation | = | Evaluate |
| Synthesis | = | Create |

The introduction of this revised approach to Bloom's taxonomy reveals that the discourse on critical thinking is diverse, broad, essential, and ongoing. The Army has conducted its own investigations into the importance of critical thinking. They found that promoting critical thinking affects student satisfaction, overall training, and the usefulness or relevance of training for management education, both for commissioned officers and civilian programs (Schumm 39). Professional military educators' perceptions of critical thinking were surveyed by Dike. Four themes emerged as important to development of this outcome: developmental process activities, dispositions or attitudes, reasons for critical thinking, and contextual elaboration (45). Nor does distance education research abandon the challenge to increase critical thinking in online students. Yang studied Socratic questioning in the online environment and found it successfully impacts critical thinking (163).

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Fessel has taught communication competency at Park University, Wichita State University, and various community colleges as well as in other settings. Besides leading seminars and training workshops for faculties, small business owners, and professional organizations on a variety of communication competency issues, Fessel has created and published a variety of training and educational materials. Her experiential background covers an unusually broad spectrum from basic skills to post-secondary education in rural, urban, suburban and corporate settings. She teaches at the Parkville campus and was instrumental in forming the original writing competency program. Fessel holds a BA in English from Spalding College; her MA in Speech Communication and a MEd in Counseling were earned at Wichita State University.

Critical Thinking in Higher Education: An Annotated Bibliography

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An overwhelming number of books and full-text articles on various databases are available that suggest ways to teach critical thinking. Most educators agree that this skill is becoming increasingly important as classes become more diversified and the curriculum becomes more global. An institution's library is an often-overlooked faculty development resource; this article offers relevant articles on critical thinking from the many databases available through Park University's McAfee Memorial Library, such as:

- EbscoHost: searches a wide range of magazines, many full-text, peer reviewed;
- Infotrac One File: master file of academic, general, and business periodicals;
- Lexis-Nexis: searches news, business, legal, medical, and general reference;
- ProQuest: includes many professional business and general reference periodicals and newspapers;
- Sage: 1. Full-text Communication Studies 2. Full-text Criminology 3. Full-text Political Science and 4. Full-text Sociology;
- Wilson Web: Full-text, abstract, and index databases for education and social sciences.

Most databases allow for full-text searching by subject, title, author, or keyword. Some databases, such as Sage, will even create a bibliography of selected articles using APA, MLA, or other recognized styles. These databases can be searched in the library or computer labs in addition to the faculty member's home, making it easy for faculty to review scholarly resources at their leisure.

Following are annotations for a number of scholarly articles related to the promotion of critical thinking in the higher education classroom.

Acker, J.R. (2003, Autumn). Class acts: Outstanding college teachers and the difference they make. *Criminal Justice Review*, 28 (2), 215-231. Retrieved April 12, 2006, from Criminology: A SAGE Full-Text Collection database.

Acker's research about outstanding college teachers includes reflections of instructors deemed outstanding by their students. These students agreed that their favorite, most memorable teachers were demanding—insisting on high standards. Acker states there are no set rules for being an effective educator; however, most "good" teachers:

- possess a passion for teaching,
- relate to what the students already know,

- are challenging, but caring,
- inspire students,
- are organized and knowledgeable,
- ask important questions that encourage critical thinking and problem solving,
- desire that students learn by discovery, not recall.

The research review also revealed that excellent teachers use humor effectively in the classroom, in addition to reaching out to students outside the classroom by inviting them to their homes. As busy as these educators were, all instructors deemed effective were also scholars taking time for research and writing, which they felt enhanced their teaching. No matter what subject was taught, the instructors encouraged the students to question, think critically, and solve problems. Excellent teachers promote critical thinking by their questions; by encouraging students to think and ask questions; and by allowing students to discover information and make decisions to solve problems.

Braun, N. M. (2004, March/April). Critical thinking in the business curriculum. *Journal of Education for Business*, 79 (4), 232-236.

Critical thinking is important in all classes, but researcher Nora Braun of Augsburg College in Minneapolis, Minnesota, points out that in the business world making decisions is a daily occurrence. How can we teach students to sort through information and make important decisions? Many scandals in the news today, such as the Enron fiasco, provide much fodder for discussions on business ethics and decision making. Discussions, debates, and guided questioning are some of the techniques used in business courses to classify and evaluate the enormous amounts of information available. Instructors need to provide active learning activities to help students practice critical thinking. Transferring these skills from one class or discipline to another is a worthwhile goal. Students can be taught to identify problems and classify the information to make intelligent decisions. The business curriculum needs to clearly state the critical thinking skills that are being taught and assess the improvement of these skills. This is not an easy task, but the fast-paced environment of the business world demands executives and workers who can handle vast amounts of information and make thoughtful decisions quickly.

Burbach, M., Matkin, G., & Fritz, S. (2004). Teaching critical thinking in an introductory leadership course utilizing active learning strategies: A confirmatory study. *College Student Journal*, 38(3), 482-493. Retrieved Thursday, April 20, 2006 from the Academic Search Elite database.

Educators across time have disagreed on the definition of critical thinking. Socrates, Plato, and Aristotle encouraged students to realize that things were often not what they seemed to be. Dewey proposed that "critical thinking involved the suspension of judgment and healthy skepticism." Ennis argued that students need assistance to be reflective, reasonable and should be directed on what to believe or do. A panel of experts, the Delphi Project, determined this definition (in part): "We understand critical thinking to be a purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference as well as explanation of the evidential conceptual methodological, criteriological, or contextual considerations upon which that judgment was based."

Despite these differences of opinion, however, educators agree about the value of critical thinking enough to teach courses that feature it as the

main goal and content matter. This study was conducted to answer the question, "Are critical thinking skills increased in an introductory level college leadership course that encourages active learning?" The Watson-Glaser Critical Thinking Appraisal (WGCTA form B) was used to collect data from 80 students at a Midwestern university. Pre- and post-assessment tests revealed that active learning techniques appear to increase critical thinking. Researchers found that college students have higher critical thinking skills than non-college students and their abilities increase with their education level. Increasingly, potential employers place a high priority on this skill set in discipline-based courses.

Burbach's review of the literature includes various research findings on some of the following learning methods: service-learning projects, journal writing, small groups, scenarios, case studies, and questioning.

Elder, L. (2004, Winter). Diversity: Making sense of it through critical thinking. *Journal for Quality and Participation*, 27(4). 9-13.

Dr. Linda Elder, an educational psychologist and president of the Foundation for Critical Thinking, has led many seminars on critical thinking for administrators and professionals. Her experience as a seminar leader suggests that many prospective teachers are neither taught to think critically nor taught how to get their students to think critically. She concludes that:

- All content must be "reasoned through" to be learned.
- All reasoning involves predictable parts or elements.
- All elements of high quality reasoning presuppose universal intellectual standards.

The primary barrier to good reasoning is native egocentrism. Problems arise because individuals are often conditioned to value certain people or groups differently. Critical thinking helps students learn that the ideologies of all groups, even our "own," must be analyzed and assessed. By questioning different viewpoints, students can develop the intellectual integrity needed to evaluate the reasoning of others.

Since no teacher can take into account all aspects of diversity or possibly teach "everything," what does one include and what does one omit? Elder states that the solution to this dilemma is critical thinking. Faculty should concentrate on teaching students the basic critical thinking skills to reason through myriad issues if lifelong learning is to be promoted.

Halpern, D. F. (1999, Winter). Teaching for critical thinking: Helping college students develop the skills and dispositions of a critical thinker. *New Directions for Teaching and Learning*, No.80, 69-74.

In her review of the literature Diane Halpern, a professor of psychology at California State University, refers to many educators and their opinions of critical thinking. Most agree that critical thinking is a purposeful, reasoned, and a goal directed method of solving problems and making decisions. Halpern states that the vast amount of material available on the Internet increases the need to teach critical thinking skills to evaluate information. Students need (1) *instruction*, as well as the (2) *disposition* to use these skills. Halpern proposes a four-part model to teach critical thinking—which includes the two parts mentioned as well as (3) *structure training* to help students recognize when a certain thinking skill is needed and (4) *metacognitive monitoring* or the ability to reflect on thinking processes.

The concept of student disposition is particularly interesting. A student not only needs to know skills but be willing to use those skills. Instructors need to employ a variety of methods to engage students in applying critical thinking skills. As one pedagogical suggestions, Halpern recommends utilizing the professional Web sites associated with individual disciplines, many of which offer free activities that promote critical thinking skills.

Lauer, T. (2005, May-June). Teaching critical-thinking skills using course materials: A reversal of roles. *Journal of College Science Teaching*, 34(6), 34-37. Retrieved full-text from Wilson Web Education Full-Text April 21, 2006.

Thomas Lauer, an associate professor in the Department of Biology at Ball State University, taught a class of 94 freshman biology majors. His introductory activity during the first day of class laid the foundation for the course's focus on critical thinking concepts. His activity was simple: He held up an index card and asked,

1. "What color is this?"
2. "Why is it white?"
3. "How would you change the color to blue?"

Each question required increasing levels of comprehension and application to arrive at an answer. Lauer followed this method daily with similar critical thinking questions. Although this was a large lecture group, he accomplished this by having a question of the day and dividing the large group into four smaller groups to discuss. Students wrote their answers on an index card, which he collected to assess progress in critical thinking. Lauer found that it is possible to teach *thinking* at a higher lever in the classroom using course content material. On one of the semester course evaluation questions, "What was the most important thing you learned in this class?," all students thought that the thinking skills learned were as important as the course content material.

Ortiz, A.M. (2000, Summer). Expressing cultural identity in the learning community: Opportunities and challenges. *New Directions for Teaching and Learning*, No.82, 67-79.

Anna Ortiz is an assistant professor in the Department of Educational Administration at Michigan State University. In her research, she confronted the dilemmas of dealing with a wide variety of differences in the classroom. As a Mexican-American she has a different background than many faculty members. She concludes that the interaction of different cultures of students and instructors produces a cultural identity. Clashes may arise when people do not understand the importance of the values of those whose background is different from theirs. Students who feel free to express themselves in the classroom examine not only their own culture but the culture and values of those around them.

Ortiz builds "classroom communities" by engaging the students in classroom discussions that involve personal information about themselves and their values and cultures. These assignments ask for their perspectives and experiences in relation to course content. Grouping students with different backgrounds adds to cultural awareness. Ortiz advises instructors to be patient and allow students to express their opinions freely. By learning more about each other and their values and cultures, students learn to accept or question those of others. The trust built in the diversified classroom allows students and instructors to discuss differences

productively; to see another point of view; and to make decisions based on information gained from honest discussions.

Paul, R. and Elder, L. (2003, Spring). Critical thinking: Teaching students how to study and learn. (Part III). *Journal of Developmental Education*, 26 (3). 36-37.

Richard Paul, director of research and professional development at the Center for Critical Thinking at Sonoma State University, Rohnert Park, California, has written extensively in the field of critical thinking. He and Linda Elder have co-authored many articles on critical thinking which “prove” by polls and surveys taken that educators generally do not know what critical thinking is, or how to teach it. Three templates provided in this article are well written and would be beneficial in most classes. They help students analyze the logic of articles, essays, or chapters. Each template consists of eight questions asking the main purpose, the key question, the most important information, the main references or conclusions, the key idea, the main assumptions of the material, the implications, and the main point of view. By using these templates when reading an article or chapter, students will better understand critical thinking as a process that enables them to identify and evaluate information. Specifically, a critical thinking approach to reading equips students to know:

- how to analyze the logic of an article, essay, or chapter
- how to figure out the logic of a textbook
- how to evaluate an author’s reasoning.

The authors focus on critical thinking as a process and encourage readers to work through the templates so they can help students learn to analyze and assess information in written materials. These techniques could easily be transferred to other topics or disciplines.

Robinson, C.F. and Kakela, P.J. (2006, Winter). Creating a space to learn: A classroom of fun, interaction, and trust. *College Teaching*, 54(1) 202-206. Retrieved full-text from Wilson Web Education Full-Text, April 10, 2006.

The authors, team-teaching an introductory core course in environmental studies at Michigan State University, were pleased at the end of the year to have this response from an undergraduate student: “Thanks for a great class. Few courses evoke sadness for me when they end. Yours did.” How did they achieve this? They designed the class so that students would have fun by learning from each other and the instructors in a trusting environment. From the beginning, the students were encouraged to share experiences and get to know one another. Newspaper articles about environmental issues sparked discussions. One picture of a child on the beach resulted in many descriptions—some students felt joy, some sadness that the child was alone, some wondered if the water were too polluted for swimming. The class paired off and shared their thoughts about the pictures. By the end of the first class, students had “given a brief oral report, written a short paper, reflected on why they chose the class, thought about who they were and what they valued, and made new friends.”

The instructors used various techniques to keep the class interesting. One day they showed a video about design and had pizza and soft drinks. Then the question, “Can you design an environmentally-friendly pizza box?” (On the Michigan State University Campus discarded pizza boxes are the number one cause of solid waste.) Students were made aware of global

warming and other national environmental issues but by visiting the football stadium and the electric power generation station on campus as well as nearby wetlands they learned of problems close to home. Learning outside the classroom can be incorporated into most classes: psychology classes could go to a mental institution and education students could visit nearby schools, for example.

St. Clair, R. (2004, Summer). Teaching with the enemy: Critical adult education in the academy. *New Directions for Adult and Continuing Education*, No.102, 35-43.

Author Ralf St. Clair, scholar in residence with the Canadian National Literacy Secretariat, makes a distinction between critical thinking and critical pedagogy. He feels strongly that critical pedagogy is associated with education of children rather than adults. He refers to his research in the context of academic life as *critical teaching*, where the role of education is a change process that challenges common sense and makes one aware of oppression. In theory, educators can put forth radical ideas, but publishing and acquiring grant funds are more apt to secure one's job. St Clair's advice: "the trick to academic survival is to be critical—but not too—critical and never to critique the academy itself." The act of critical teaching is challenged by the increasing demands of accountability. However, by allowing students to rationally analyze factors that affect their lives. St. Clair sees this as a jigsaw puzzle: The different experiences show the big picture—which will be different each time you have different students with different beliefs. Do instructors have the right to try to make students think as they do? Professors must be aware of the power inherent in their positions and recognize oppression from both sides.

St. Clair questions grading and thinks that most critical educators do also, but he deems it necessary to account for the differences in quality of work. How does one access work that expresses views that are different from our own? What if the instructor assigns too many A's? (Can't everybody earn an A?) Critical teachers need to keep up the spirit of critique by pushing for change and challenging the power structures between teachers and students, even if that means that we, the instructors, are sometimes the enemy.

Tremblay, K.R., Jr., Downey, E. P. (2004, Summer). Identifying and evaluating research-based publications: Enhancing undergraduate student critical thinking skills. *Education*, 124 (4), 734-740.

Researcher Kenneth Tremblay from the Department of Design and Merchandising and School of Social Work, Colorado State University, reports on 80 undergraduate students who took a research methods course in spring 2003. A series of questions were provided to students who started with an idea, gathered research based publications, read the literature and evaluated the literature. Critical thinking skills were developed while evaluating the research literature, as well as inductive and deductive logic reasoning skills. Students were encouraged to print only relevant information so as to conserve paper. They were also taught correct citing of an Internet source using APA guidelines. Various sets of questions were provided for Internet sources, popular sources, trade magazines, proceedings of meetings of professional associations, scholarly journals in the student's field of study and those scholarly journals outside the student's field of study, as well as theses and dissertations. Time was spent in the library with a research librarian to evaluate books and the reputation of the publishers. There were classroom lectures, application exercises in the classroom and library, and student presentations and testing.

Tremblay reports that students valued the class and felt they were ready to conduct their own original research. Added benefits that the students shared were bonding with other students when visiting the library together as well as from the discussions and student presentations in the classroom.

Vanderburgh, P.M. (2005, September). Open-book tests and student-authored exam questions as useful tools to increase critical thinking. *Advances in Physiology Education*, 29(3), 183-184.

Paul Vanderburgh from the Health and Sport Science Department of the University of Dayton, Dayton, Ohio, researched the use of open-book tests and exam questions by students after complaints that the lecture portion of a class for first- and second-year students in allied health, physical education, sports management or exercise science needed an evaluation that promoted more active learning. According to literature reports, students benefit because they have an awareness of the learning process and mastery of the material. For one section of 42 students, the researchers implemented the Open-Book Exam Student Authored Question (OBESAQ) approach to evaluation. This semester-long course had three open-book/notes exams and required students to frame one or two test questions per chapter for a total of eight sets of student-authored exam questions for homework. Student evaluation of the OBESAQ included these questions:

- What elements increased your knowledge and /or understanding?
- What elements of this course need improvement?

This method was found to promote more active learning and emphasize writing skills. Thus it would appear that open-book exams and student-authored exam questions seem to cultivate critical thinking.

Vanderburgh reported that some of the limitations of open-book exams included the excessive amount of time needed to look for answers, student anxiety, and being unprepared to take the test. Faculty spent a lot of time preparing and grading exams. This was especially true of open-book test construction for faculty who were inexperienced or not fully trained.

Although it does require time for preparing and grading exams, faculty felt that the emphasis on students writing and engagement in active learning made this a beneficial and worthwhile approach to teaching a higher level of critical thinking.

Williams, R.L. (2005, Winter). Targeting critical thinking within teacher education: The potential impact on society. *The Teacher Educator*, 40 (3), 163-187. Retrieved full-text on Wilson Web Education Full-Text, April 10, 2006).

The author's statement that critical thinking in teacher education could potentially increase society's effectiveness in addressing national and international problems sounds far-fetched when first heard, but one can easily understand that the lack of critical thinking within teacher education could certainly have a negative effect on problem solving. New approaches need to be consistent and start at an early age.

Williams makes reference to Halpern's critical thinking model as well as other instructional models. The importance of questioning is stressed, both by the instructor (TeachQuest) and having students frame questions

(ReQuest) that relate to the text. Examining pros and cons of an issue helps students see all sides of controversial issues. Students who learn to question the status quo as well as authority figures and become skilled in these discussions will model and teach their students to think critically. Everyone needs to notice or be aware of questioning both the written and the spoken word.

Other Readings of Interest Available at The Park McAfee Memorial Library

Brookfield, S.D. (1997, Fall). Assessing critical thinking. *New Directions for Adult and Continuing Education*, No. 75, 17-29.

Macpherson, K. (September, 1999). The development of critical thinking skills in undergraduate supervisory management units. *Assessment & Evaluation in Higher Education*, 24(3), 273-284.

New Directions for Community Colleges (Summer 2005 volume) is devoted to critical thinking.

Paul, R. and Elder, L. (2005, Fall). Critical thinking...and the art of substantive writing. (Part I). *Journal of Developmental Education*. 29 (1). 40-41.

---. (2006, Spring). Critical thinking...and the art of substantive writing, (Part II). *Journal of Developmental Education*, 29 (3). 38-39.

---. (2003, Fall). Critical thinking: Teaching students how to study and learn. (Part IV). *Journal of Developmental Education*, 27 (1) 36-37.

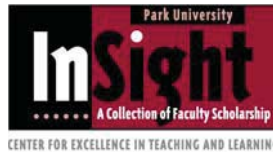
---. (2003, Winter). Critical thinking...and the art of close reading (Part I). *Journal of Developmental Education*. 27 (2). 36-37, 39.

---. (2003, Winter). Critical thinking...and the art of close reading (Part II). *Journal of Developmental Education*, 27 (3). 36-37. (2004, Spring).

---. (2003, Winter). Critical thinking...and the art of close reading (Part III). *Journal of Developmental Education*, 28 (1). 36-37. (2004, Fall).

---. (2003, Winter). Critical thinking...and the art of close reading (Part IV). *Journal of Developmental Education*, 28 (2). 36-37. (2004, Winter).

Shriner, reference librarian, has been a faculty member at Park University since 1996. After earning a BA at Emporia State Teacher's College, she taught elementary school. In 1991 she received her MLS from Emporia State University. She worked in medical libraries prior to coming to Park University. She has also taught SS100—New Student Seminars. Research interests include information literacy and critical thinking.



Call for Papers
Volume 2
Focus on *Student Motivation*

InSight is a collection of faculty scholarship highlighting the work of Park University faculty. It is a refereed journal published annually by the Center for Excellence in Teaching and Learning (CETL) that features theoretical and empirically-based research articles, critical reflection pieces, case studies and classroom innovations relevant to teaching, learning and assessment.

The second volume of *InSight* will focus on *Student Motivation*. Faculty are encouraged to submit original manuscripts related to:

- Designing a general education program to promote student motivation;
- The role of student motivation in interdisciplinary or liberal studies courses;
- Student motivation in the Online or accelerated classroom;
- Motivating students to achieve higher order (critical) thinking skills in the classroom;
- Motivating students to understand and appreciate diversity in the global society;
- Motivating students to use learning technology;
- Specific classroom activities and/or instructional behaviors that enhance student motivation; these submissions must include the original assignment, methods for facilitation, samples of student products, and revised assignment (if applicable);
- Course design strategies for motivating students to achieve desired learning outcomes;
- Assessments to increase student motivation;
- Theories of motivation (including issues with intrinsic and extrinsic motivation) and their role in the learning environment;
- Unique perspectives on motivating international, military, transfer, or non-traditional student populations.

Submission Requirements

- *STYLE* - All manuscripts must be formatted in the style appropriate to your discipline (APA, MLA or CBE style will be accepted).
- *LENGTH* - Manuscript should be no more than 10 pages (not including abstract, references or appendices). Authors are encouraged to include appendices that promote application and integration of materials (i.e., assignments, rubrics, examples, etc.).
- *ABSTRACT* - Each manuscript must be summarized in an abstract of 50 to 100 words.
- *AUTHOR* - Each author should provide his/her full name, title and departmental affiliation, campus address, telephone number, and email address. Each author must also include a brief biography (no more than 50 words per author).
- *FORMAT* - All manuscripts must be submitted via email as attachments in Microsoft Word or Rich Text Format. Do not include personal identifiers

within the manuscript. Include contact information only on a separate cover sheet. Each manuscript will be assigned a unique identifier for blind review processes. Send submissions to cetl@park.edu.

- **DEADLINE** - All submissions must be received by **4:00pm on April 4, 2007 (CST)**.

Review Procedures

Submissions will be subject to a double blind peer-review (from both internal and external university reviewers) and editorial revisions may be required. A manuscript is evaluated based on relevance, practical utility, originality, scholarship of teaching, generalizability, clarity, significance and the extent to which the subject matter contributes to the promotion of critical thinking. Review process and publication decisions will require approximately 4 to 6 weeks. Referees' feedback and editorial comments will be provided to the author when revisions are requested. If accepted, final versions of manuscripts will be due June 13, 2007. CETL retains the final authority to accept or reject all submitted manuscripts. The publication will be distributed at the 2007 Fall Faculty Conference in August and available Online. publication will be distributed at the 2007 Fall Faculty Conference in August and available Online.

Copyright

Manuscript submissions are accepted with the assumption that they neither have been nor will be published elsewhere. Authors and CETL will hold joint copyright to all published manuscripts.

Contact

All inquiries should be directed to:

B. Jean Mandernach, PhD

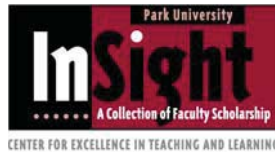
Editor, *InSight*

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For more information, visit the CETL website at www.park.edu/cetl.



QUICK TIPS: PREPARING MANUSCRIPTS FOR *INSIGHT*

The following “Quick Tips” provide suggestions and guidance for preparing manuscripts for potential publication in *InSight: A Collection of Faculty Scholarship*. *InSight* is a peer-reviewed publication highlighting the scholarly contributions of Park University faculty. As is the nature of refereed journals, acceptance and publication of original manuscripts is a competitive process. The goal of the following information is to assist faculty in preparing manuscripts in a manner that maximizes the chances of publication.

Preparing the Manuscript

The organization and style your manuscript will be largely dictated by the type of submission (e.g., theoretical, empirical, critical reflection, case study, classroom innovation, etc.). Thus, while guidelines will follow to assist you in preparing your manuscript, the key to successful submission is clear, effective communication that highlights the significance and implications of your work to post-secondary teaching and learning in relation to the target topic. To prepare and effectively communicate your scholarly work, the American Psychological Association (2001) provides the following general guidelines:

- Present the problem, question or issue early in the manuscript.
- Show how the issue is grounded, shaped, and directed by theory.
- Connect the issue to previous work in a literature review that is pertinent and informative but not exhaustive.
- State explicitly the hypotheses under investigation or the target of the theoretical review.
- Keep the conclusions within the boundaries of the findings and/or scope of the theory.
- Demonstrate how the study or scholarly approach has helped to address the original issue.
- Identify and discuss what theoretical or practical implications can be drawn from this work.

There is no mandatory format for *InSight* articles; rather authors should organize and present information in a manner that promotes communication and understanding of key points. As you write your manuscript, keep the following points in mind:

- Title - Generally speaking, titles should not exceed 15 words and should provide a clear introduction to your article. While it is okay to incorporate “catchy” titles to pique interest, be sure that your title effectively captures the point of your manuscript.
- Abstract - Do not underestimate the importance of your abstract. While the abstract is simply a short summary (50-100 words) of your work, it is often the only aspect of your article that individuals read. The abstract provides the basis

from which individuals will decide whether or not to read your article, so be certain that your abstract is “accurate, self-contained, nonevaluative, coherent, and readable” (Calfee & Valencia, 2001).

- **Body** - Within the body of a manuscript, information should be organized and sub-headed in a structure that facilitates understanding of key issues. There is not a mandatory format for *InSight* articles, rather authors should use professional guidelines within their discipline to present information in a manner that is easily communicated to readers. For example:
 - *Empirical investigations* should be organized according to the traditional format that includes introduction (purpose, literature review, hypothesis), method (participants, materials, procedures), results, and discussion (implications). The following links provide general examples of this type of article:
 - <http://www.thejeo.com/MandernachFinal.pdf>
 - <http://www.athleticInSight.com/Vol7Iss4/Selfesteem.htm>
 - *Theoretical articles and literature reviews* should include an introduction (purpose), subheadings for the relevant perspectives and themes, and a detailed section(s) on conclusions (applications, recommendations, implications, etc.). The following links provide general examples of this type of article:
 - <http://www.westga.edu/%7Edistance/ojdla/winter84/royal84.htm>
 - <http://www.westga.edu/%7Edistance/ojdla/winter84/mclean84.htm>
 - *Classroom innovation and critical reflections* should be organized via an introduction (purpose, problem, or challenge), relevant background literature, project description, evaluation of effectiveness (may include student feedback, self-reflections, peer-*InSight*, etc.), and conclusions (applications, implications, recommendations, etc.). If describing classroom-based work, please include copies of relevant assignments, handouts, rubrics, etc. as appendices. The following link provides a general example of a critical reflections article:
 - <http://www.compositionstudies.tcu.edu/coursedesigns/online/33-2/ritter.html>

The limited length of *InSight* articles (manuscript should be no more than 10 pages, not including abstract, references or appendices) requires authors to focus on the most significant, relevant factors and implications.

- **References** - Select your references carefully to ensure that your citations include the most current and relevant sources. As you select your references, give preference to published sources that have proven pertinent and valuable to the relevant investigations. The goal is not to incorporate ALL relevant references, but rather to include the most important ones.
- **Tables, Figures, Appendices & Graphics** - Authors are encouraged to include supporting documents to illustrate the findings, relevance or utilization of materials. Particularly relevant are documents that promote easy, efficient integration of suggestions, findings or techniques into the classroom (such as rubrics, assignments, etc.). Supplemental information should enhance, rather than duplicate, information in the text.

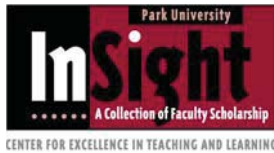
The importance of clear, effective communication cannot be highlighted enough. Many manuscripts with relevant, original, applicable ideas will be rejected because authors do not communicate the information in a manner that facilitates easy understanding and application of key points. The value of a manuscript is lost if readers are unable to overcome written communication barriers that prevent use of

the knowledge. With this in mind, authors are strongly advised to seek informal feedback from peers and colleagues on manuscripts prior to submission to *InSight*. Requesting informal reviews from relevant professionals can highlight and correct many concerns prior to formal submission, thus improving chances of publication.

References

American Psychological Association. (2001). Publication manual of the American Psychological Association (5th ed.). Washington, DC: Author.

Calfee, R. & Valencia, R. (2001). APA Guide to preparing manuscripts for journal publication. Washington, DC: APA.



QUICK TIPS: SUBMISSION GUIDELINES FOR *INSIGHT*

The following “Quick Tips” provide suggestions and guidance for submitting manuscripts to *InSight: A Collection of Faculty Scholarship*. *InSight* is a peer-reviewed publication highlighting the scholarly contributions of Park University faculty. The following information provides an overview of the purpose, scope and functioning of *InSight* so that faculty may better understand the *InSight* publication process.

Scope & Focus

InSight features theoretical and empirically-based research articles, critical reflection pieces, case studies, and classroom innovations relevant to teaching, learning and assessment. While there are a broad range of acceptable topics, all manuscripts should be supported with theoretical justification, evidence, and/or research (all methods and approaches relevant to qualitative and quantitative research are welcome); all manuscripts should be appropriately grounded in a review of existing literature.

It is important to note that each edition of *InSight* will focus on a particular theme (the second issue will target *Student Motivation*). As such, only articles that are directly relevant to the target theme will be selected for publication; please review the call-for-papers for more detailed information on appropriate topics for each theme.

Audience

InSight emphasizes the enhancement of post-secondary education through the professional exchange of scholarly approaches and perspectives applicable to the enrichment of teaching and learning. Relevant to this mission, manuscripts should be geared toward post-secondary faculty and administrators; included in this audience are full-time and adjunct faculty; face-to-face, hybrid and online faculty; tenure and non-tenure track instructors; trainers in corporate, military, and professional fields; adult educators; researchers; and other specialists in education, training, and communications. Recognizing the cross-disciplinary readership of *InSight*, manuscripts should present material generalizable enough to have relevance to post-secondary instructors from a range of disciplines.

Review Process

All submissions are evaluated by a double-blind, peer-review process including both internal and external reviewers. As such, your manuscript will be anonymously reviewed by professionals working at Park University as well as individuals unfamiliar with our particular institution; the masked nature of the reviews helps ensure impartial evaluation, feedback and decisions concerning your manuscript.

This review process utilized by *InSight* mandates that you should keep the following points in mind when preparing your manuscript:

- Your name and other identifying information should only appear on the title page; the remainder of the manuscript should be written in a more generalized fashion that does not directly divulge authorship.

- All information needs to be explained and supported to the extent that an individual not familiar with Park University's mission, vision or structure can still clearly understand the relevance, significance and implications of the article.

Focus of the Review

Prior to dissemination to the reviewers, the *InSight* Editor will conduct a preliminary appraisal for content, substance, and appropriateness to the journal. If the manuscript is clearly inappropriate, the author will be informed and the manuscript returned. Appropriate manuscripts will be electronically sent to two reviewers for blind evaluation. Although there is an attempt to match manuscripts and reviewers according to content, interests, and topical relevance, the broad focus of the journal dictates that papers be written for applicability to a wide audience. As such, reviewers may not be content experts in a relevant, matching academic discipline.

The manuscript will be reviewed and evaluated according to the following dimensions:

- Relevance - The most important feature of your manuscript is its relevance; the decision to accept or reject a manuscript is typically based on the substantive core of the paper. As such, manuscripts should introduce the substance of the theoretical or research question as quickly as possible and follow the main theme throughout the article in a coherent and explicit manner.
- Significance - Related to relevance, significance refers to the value of your manuscript for substantially impacting the enhancement of post-secondary education relevant to the target topic. Significant manuscripts will clearly highlight the value, importance and worth of a relevant topic within a meaningful context.
- Practical Utility - As highlighted previously, the goal of *InSight* is to enhance teaching and learning through the exchange of scholarly ideas. With this purpose in mind, all manuscripts should emphasize the practical value, relevance or applicability of information. Manuscripts should go beyond the simple reporting of information to provide *InSight* into the implications of findings and the application of information into meaningful contexts.
- Originality - The most effective articles are those that inspire other faculty through innovative practices, approaches and techniques or via the thoughtful self-reflection of the purpose, value and function of educational strategies. Thus, manuscripts that highlight original approaches or perspectives will be given priority. Per the nature of published work, all contributions must be the original work of the author or provide explicit credit for citations.
- Scholarship of Teaching - Contributions to the enrichment of teaching and learning should be grounded in relevant theoretical concepts and empirical evidence. As such, articles should be free from flaws in research substance/methodology and theoretical interpretation. All conclusions and recommendations must be substantiated with theoretical or empirical support; personal classroom experiences and critical reflections should be framed within a structure of existing literature.
- Generalizability - The broad goals and varied audience of *InSight* mandate that manuscripts be written for consumption across a range of disciplines that allows generalizability of findings and implications. Thus, while classroom techniques may be developed, tested and reported for a specific discipline or student population, the manuscript should go on to highlight the implications for other populations.

- Clarity - All manuscripts must be written in a clear, professional manner free from grammatical flaws and errors in writing style. The purpose of the manuscript should be clearly defined, relevant and supported by the evidence provided. All manuscripts should be structured in a manner that promotes a clear, cohesive understanding of the information presented. Be sure that your manuscript is free from organizational, stylistic or “sloppiness” barriers that would prevent effective communication of your work.
- Contribution to the Target Topic - The thematic nature of *InSight* dictates that all manuscripts must be clearly relevant and advance our understanding or application of the target topic within an educational context. Despite the quality of a manuscript, articles that do not directly align with the target topic will not be published.

Review Outcomes

Based upon the feedback and recommendations of the two anonymous reviewers, the Editor will make a final publication decision. Decisions fall into the following categories:

- Reject - Rejected manuscripts will not be published and authors will not have the opportunity to resubmit a revised version of the manuscript to *InSight*. All rejections will be handled in a courteous manner that includes specific reasons for rejection.
- Revise and Resubmit - Manuscripts accepted under this type of conditional status provide the author an opportunity to substantially revise the manuscript based on reviewers feedback and resubmit for additional consideration. Revise-and-resubmit articles show considerable potential but also include major theoretical, empirical or stylistic flaws. Authors receiving a revise-and-resubmit decision will need to commit a significant investment into manuscript enhancements prior to resubmission. If all recommendations are incorporated into the revised manuscript, the article has a very good chance of being published.
- Accept Pending Revisions - A manuscript accepted-pending-revisions meets all the major requirements for publication but may need improvements in substantive, mechanical or methodological issues. Once these issues are adjusted for, the manuscript will receive a “quick review” by the Editor prior to publication. Very rarely is an article accepted with no changes required; as such, most manuscripts are accepted in this category.
- Accept - Accepted manuscripts will be published “as-is” with no further modifications required.

References

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Calfee, R. & Valencia, R. (2001). *APA guide to preparing manuscripts for journal publication*. Washington, DC: APA.

ACKNOWLEDGEMENTS

InSight: A Collection of Faculty Scholarship could not have been created without the contributions of many individuals; the Center for Excellence in Teaching and Learning is deeply indebted to each of them for their support and expertise.

For sharing freely their ideas about good teaching: The faculty of Park University; Park University has many outstanding and distinguished educators and we thank them all collectively for their contributions to this volume.

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For design and production assistance: Jake Marshall, Director of Publications and Graphic Designer. Jason Dill, Graphic Designer.