

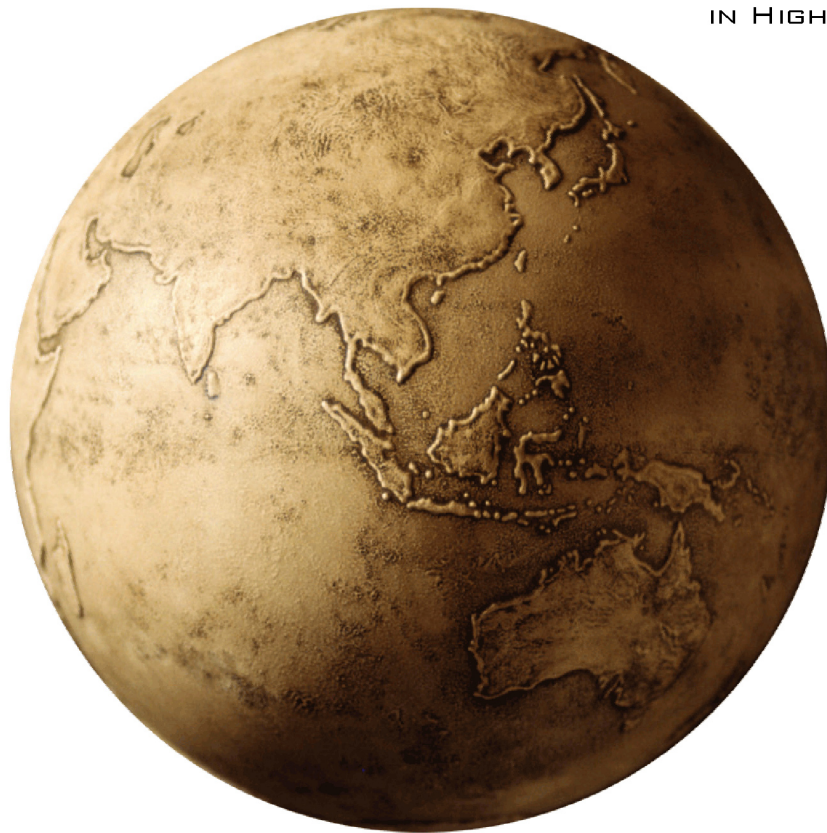
ISSN 1812-9129

VOLUME 26 • NUMBER 1 • 2014

INTERNATIONAL JOURNAL OF

TEACHING & LEARNING

IN HIGHER EDUCATION



The University of Georgia

Center for Teaching and Learning



International Society for
Exploring Teaching and Learning

VirginiaTech

Center for Instructional
Development and Educational Research

Executive Editors

Peter E. Doolittle, *Virginia Tech, USA*
C. Edward Watson, *University of Georgia, USA*

Managing Editor

Danielle Lusk, *Virginia Tech, USA*

Senior Associate Editor

Susan Copeland, *Clayton State University, USA*

Associate Editors

Craig Brians, *Virginia Tech, USA*
Lauren Bryant, *North Carolina State University, USA*
C. Noel Byrd, *Eastern Kentucky University, USA*
Susan Clark, *Virginia Tech, USA*
Clare Dannenberg, *University of Alaska Anchorage, USA*
Denise Domizi, *University of Georgia, USA*
Bethany Flora, *East Tennessee State University, USA*
David Kniola, *Virginia Tech, USA*
Laura Levi Altstaedter, *East Carolina University, USA*
Holly Matusovich, *Virginia Tech, USA*
Kate McConnell, *Virginia Tech, USA*
Lisa McNair, *Virginia Tech, USA*
Kim Niewolny, *Virginia Tech, USA*
Megan O'Neil, *Virginia Tech, USA*
Gwen Ogle, *ID & E Solutions, Inc., USA*
Todd Ogle, *Virginia Tech, USA*
Kelly Parkes, *Virginia Tech, USA*
Tiffany Shoop, *Virginia Tech, USA*
Krista Terry, *Appalachian State University, USA*
Gresilda Tilley-Lubbs, *Virginia Tech, USA*
Joan Monahan Watson, *University of Georgia, USA*

Editorial Board

Ilene Alexander, *University of Minnesota, USA*
Kevin Barry, *University of Notre Dame, USA*
Denise Chalmers, *University of Queensland, Australia*
Edith Cisneros-Cohernour, *Universidad Autónoma de Yucatán, Mexico*
Alexander Crispo, *Purdue University, USA*
Landy Esquivel Alcocer, *Universidad Autónoma de Yucatán, Mexico*
Colin Harrison, *University of Nottingham, UK*
David Hicks, *Virginia Tech, USA*
Peter Jamieson, *University of Queensland, Australia*
Gordon Joyes, *University of Nottingham, UK*
Kerri-Lee Krause, *University of Melbourne, Australia*
Carolyn Kreber, *University of Edinburgh, UK*
Bruce Larson, *University of North Carolina-Asheville, USA*
Deirdre Lillis, *Institute of Technology-Tralee, Ireland*
Colin Mason, *University of St. Andrews, UK*
Craig McInnis, *University of Melbourne, Australia*
Carmel McNaught, *Chinese University of Hong Kong, China*
A.T. Miller, *University of Michigan, USA*
Jeannetta Molina, *University of Buffalo, USA*
Alison Morrison-Shetlar, *University of Central Florida, USA*
Roger Murphy, *University of Nottingham, UK*
Jack Nigro, *Ontario Ministry of Education, Canada*
Rosemary Papa, *California State University-Sacramento, USA*
Anna Reid, *Macquarie University, Australia*
Bruce Saulnier, *Quinnipiac University, USA*
Tom Sherman, *Virginia Tech, USA*
Alan Skelton, *University of Sheffield, UK*
Robyn Smyth, *University of New England, Australia*
Belinda Tynan, *University of New England, Australia*
Joy Vann-Hamilton, *University of Notre Dame, USA*
Thomas Wilkinson, *Virginia Tech, USA*

Reviewers for Volume 26, Number 1

Leigh Anderson, *Virginia Tech, USA*
Lauren Bryant, *NC State, USA*

Chris Burkett, *Columbia College, USA*
Pete Cannell, *The Open University of Scotland, UK*
Jessica Chittum, *Virginia Tech, USA*
Clare Dannenberg, *University of Alaska Anchorage, USA*
Denise Domizi, *University of Georgia, USA*
Terrence Doyle, *Ferris State University, USA*
Anna-May Edwards-Henry, *University of the West Indies, Jamaica*
Martha Gabriel, *University of Prince Edward Island, Canada*
Tony Harland, *University of Otago, New Zealand*
Nila Ginger Hofman, *DePaul University, USA*
Kathleen Jones, *Virginia Tech, USA*
Christine Kessen, *Marywood University, USA*
Lenore Kinne, *Northern Kentucky University, USA*
Pamela Kiser, *Elon University, USA*
Rita Kumar, *University of Cincinnati Blue Ash College, USA*
Danielle Lusk, *Virginia Tech, USA*
Kate McConnell, *Virginia Tech, USA*
Tiffany Shoop, *Virginia Tech, USA*
Penny Silvers, *Dominican University, USA*
Krista Terry, *Appalachian State University, USA*
Daniela Truty, *Northeastern Illinois University, USA*
Joan Watson, *University of Georgia, USA*
Kay Wilkie, *University of Dundee, Scotland*
Aman Yadav, *Michigan State University, USA*
Sandra Zerger, *Hesston College, USA*

Purpose

The International Journal of Teaching and Learning in Higher Education (ISSN 1812-9129) provides a forum for the dissemination of knowledge focused on the improvement of higher education across all content areas and delivery domains. The audience of the IJTLHE includes higher education faculty, staff, administrators, researchers, and students who are interested in improving post-secondary instruction. The IJTLHE is distributed electronically to maximize its availability to diverse academic populations, both nationally and internationally.

Submissions

The focus of the International Journal of Teaching and Learning in Higher Education is broad and includes all aspects of higher education pedagogy, but it focuses specifically on improving higher education pedagogy across all content areas, educational institutions, and levels of instructional expertise. Manuscripts submitted should be based on a sound theoretical foundation and appeal to a wide higher education audience. Manuscripts of a theoretical, practical, or empirical nature are welcome and manuscripts that address innovative pedagogy are especially encouraged.

All submissions to IJTLHE must be made online through the Online Submission Form. In addition, all manuscripts should be submitted in English and in Microsoft Word format. The following Submission Guidelines pertain to all manuscript types, that is, Research Articles, Instructional Articles, and Review Articles. Ultimately, authors should follow the guidelines set forth in the most recent edition of the Publication Manual of the American Psychological Association (APA).

Review Process

Following a brief editorial review, each manuscript will be blind reviewed by two members of the Review Board. The review process will take approximately 4 weeks. At the end of the four-week review process authors will be notified as to the status of their manuscripts - accept, revise and resubmit, or reject - and will receive substantive feedback from the reviewers. Manuscript authors are responsible for obtaining copyright permissions for any copyrighted materials included within manuscripts.

Research Articles

- Breaking it Down: Knowledge Transfer in a Multimedia Learning Environment 1-11
Gina J. Mariano
- Positive Effects of Peer-Led Reflection on Undergraduates' Concept Integration and Synthesis During Service Learning 12-25
Monika Hudson and Keith Hunter
- Teaching Assistants' Preparation for, Attitudes Towards, and Experiences with Academic Dishonesty: Lessons Learned 26-36
Michael Seals, James Hammons, and Ketevan Mamiseishvili
- Enhancing Educators' Skills for Promoting Critical Thinking in Their Classroom Discourses: A Randomized Control Trial 37-54
Raisa Gul, Shehla Khan, Azra Ahmad, Shanaz Cassum, Tanveer Saeed, Yasmin Parpio, Joanne Profetto-McGrath, and Donald Schopflocher
- Experiences of College Students with Psychological Disabilities: The Impact of Perceptions of Faculty Characteristics on Academic Achievement 55-65
Kathleen Stein
- Free and Open Source Tools (FOSTs): An Empirical Investigation of Pre-Service Teacher's Competency, Attitudes, and Pedagogical Intentions 66-77
Joyce Asing-Cashman, Binod Gurung, Yam Limbu, and David Rutledge
- Talented Tertiary Students: A Largely "Forgotten" Group Within the Tertiary Sector? 78-89
Lynda Garrett and Christine Rubie-Davies
- Exploring Students' Perspectives of College STEM: An Analysis of Course Rating Websites 90-101
YunJeong Chang and Seung Won Park
- Impact of Peer Mentoring on Mentee Academic Performance: Is Any Mentoring Style Better than No Mentoring at All? 102-111
Birgit Leidenfrost, Barbara Strassnig, Marlene Schütz, Claus-Christian Carbon, and Alfred Schabmann

Instructional Articles

- Enhancement of Quality Learning: Capitalizing on the SAL Framework 112-121
Huy Phan
- Children and Violence: An Undergraduate Course Model of Interdisciplinary Co-Teaching 122-131
Linda Bucci, and Sidney Trantham
- Interteaching: An Evidence-Based Approach to Instruction 132-139
Thomas Wade Brown, Kenneth Killingsworth, and Mark P. Alavosius

In Defense of Reading Quizzes <i>Elizabeth Tropman</i>	140-146
Conceptualizing Criticality as a Guiding Principle for High Quality Academic Service Learning <i>Angela Lewellyn Jones, and</i>	147-156

Breaking It Down: Knowledge Transfer in a Multimedia Learning Environment

Gina Mariano
Troy University

The purpose of this study was to determine the effects of segmentation on immediate and delayed recall and transfer in a multimedia learning environment. The independent variables of segmentation and non-segmentation, as well as immediate and delayed transfer assessments, were manipulated to assess the effects of segmentation on the participant's ability to recall and transfer information from the multimedia tutorial. Data was analyzed using a 2x2 factorial design. The results of this study found that segmentation of multimedia tutorials did not result in significant differences in recall or transfer. The results also revealed that the time period between when a tutorial was viewed and when the recall and transfer assessments were taken did significantly affect participants' abilities to recall and transfer information.

The use of multimedia environments as learning tools is on the rise, especially in educational settings. In the past, multimedia research had been primarily focused on the technologies used to deliver instruction. More recently, however, the focus has shifted to a more learner-centered approach that is grounded in theories of how people learn (Mayer & Moreno, 2002).

The purpose of this study was to examine the role of transfer in multimedia instructional environments in light of current multimedia and transfer theory, specifically, how past and current understandings of knowledge transfer impact current learning and instructional design of multimedia environments.

Cognitive Theory of Multimedia Learning

The cognitive theory of multimedia learning seeks to explain how humans learn in a multimedia environment. The theory focuses on how humans process information in working and long-term memory so that delivery of information in a multimedia environment can result in a meaningful learning experience (Mayer, 2001). Specifically, the theory focuses on how words and pictures are selected, organized and integrated to form meaningful learning. This theory is based on a combination of three different theories—(a) working memory model (Baddeley, 1986; Baddeley & Hitch, 1974), (b) dual-coding theory (Paivio, 1990; Sadoski & Paivio, 2001), and (c) cognitive load theory (Chandler & Sweller, 1991; Sweller, 1994)—and three related assumptions: (a) dual-channel processing, (b) limited capacity, and (c) active processing. The cognitive theory of multimedia learning theory has also resulted in several principles demonstrated to affect the cognitive processing of information: the modality principle, redundancy principle, contiguity principle, coherence principle, signaling principle, segmenting principle, personalization principle, voice principle and individual differences principle (Mayer, 2005).

Dual-channel processing assumption. The dual-channel processing assumption states that humans have two separate channels that process auditory and visual information. This dual-channel assumption aligns with and merges both Baddeley's (1986) working memory model and Paivio's (1990) dual-coding theory. Baddeley's (1986, 2007) working memory model describes how information is processed after it is perceived by sensory organs and proposes separate channels for processing visual and auditory information.

While Baddeley's (1986, 2007) working memory model focuses on dual channels of visual and auditory information, Paivio's (1971, 1990) dual-coding theory emphasizes dual channels for verbal and non-verbal information. These two processing channels, verbal and non-verbal, are functionally independent, yet interconnected. The verbal system processes verbal information, such as spoken or written words, regardless of the modality of origin. The nonverbal system processes nonverbal information, such as pictures, gestures and music, again, regardless of origin.

It is apparent that Baddeley's (1986, 2007) and Paivio's (1971, 1990) interpretation of "dual-channels" is different: visual/auditory versus verbal/non-verbal. Mayer (2005) sought a compromise between both Baddeley's (1986, 2007) and Paivio's (1971, 1990) understandings of the separate channels. Mayer (2005) offered this explanation:

For purposes of the cognitive theory of multimedia learning, I have opted for a compromise in which I use the sensory modality approach to distinguish between visually presented material (e.g., pictures, animations, video, and on-screen text) and auditorily presented material (e.g., narration and background sounds) as well as a presentation-mode approach to distinguish between the construction of pictorially based and verbally based models in working memory. (p. 34).

Limited capacity assumption. The limited capacity assumption holds that individuals are limited in the amount of information, or load, that can be processed in either of the dual channels at one time.

The limited capacity assumption follows the view of the working memory capacity literature. Working memory capacity has been seen as a limit in the ability to store information in working memory (Miller, 1956). This view was expanded upon to include the idea that working memory has two functions that must be considered: a limited storage capacity and a limited processing capacity (Engle, Tuholski, Laughlin, & Conway, 1999).

Active processing assumption. The active processing assumption holds that individuals actively engage in cognitive processing to construct mental representations of their experiences. This occurs through attending to, organizing and integrating incoming information (Mayer, 1997, 2005). The active processing assumption views individuals as actively processing and interacting with incoming information.

These three assumptions—dual-channel processing, limited capacity processing, and active processing—form the foundation of the cognitive theory of multimedia learning (Baddeley, 1986, 2007; Engle, Tuholski, Laughlin, & Conway, 1999; Mayer, 1997, 2005; Miller, 1956). They affect each other and should be viewed as a collective unit of variables that affect learning in multimedia environments (Mayer, 1997, 2005). This foundation is important because it provides a starting point for decisions regarding how to design multimedia instruction.

The cognitive theory of multimedia learning incorporates several principles based on these three assumptions (Mayer, 1997, 2005). These principles focus on how to design instruction in multimedia environments that take into account what is known about the cognitive processes and limitations of working memory, in order to promote meaningful learning (Mayer, 1997, 2005).

Segmenting principle. The segmenting principle explains that individuals learn better when a multimedia message is presented in learner-paced segments instead of a continuous flow of information (Mayer & Chandler, 2001). Learner-paced segments refers to segments of multimedia instruction that stop and provide a “Continue” button that allows the student to decide when to resume the instruction. Studies have found that when individuals have control over the pace of presented information, connections between verbal and visual stimuli have an increased chance of being made (Aly, Elen, & Willems, 2005; Dalton, 1990). Although there are nine principles, the segmentation principle will be the focus of this research.

The cognitive theory of multimedia learning seeks to explain how individuals can learn in a multimedia

environment. The three assumptions and nine principles of multimedia learning provide guidelines regarding the development and design of multimedia instruction. The theory seeks to develop approaches to instructional design, which take into account information processing, in order to better understand human learning. This effectiveness of multimedia instruction has been measured by recall and transfer tests (Mautone & Mayer, 2001; Moreno & Mayer, 1999). Transfer is an important concept in the areas of learning and education because the goal of learning is to apply information to different situations and problems (Anderson, Reder, & Simon, 1996).

Knowledge Transfer

Researchers in the area of learning have studied and supported the concept of transfer and its importance in academic settings for decades. Transfer can be described as the ability to apply or use knowledge from one problem, situation or context to another (Anderson, 2005). Edward Thorndike, a learning theorist in the early 1900s, developed the seminal “identical elements” theory of transfer (Thorndike, 1903; Thorndike & Woodworth, 1901). The identical elements theory of transfer states that the amount of transfer between familiar and unfamiliar situations is determined by the number of elements the situations have in common (Thorndike, 1903; Thorndike & Woodworth, 1901). Charles Osgood (1949) developed a theory of transfer based on behaviorist stimulus-response pairs. Osgood’s (1949) theory states that when stimulus-response pairs are similar in two situations, positive transfer occurs; when stimuli are different but responses are the same in two situations, some degree of positive transfer will occur; and when stimuli are the same but responses are different in two situations, no transfer will occur. Singley and Anderson (1989) stated that transfer was the product of overlapping or shared elements or abstract knowledge structures between a learned task and a new task. Each of these three theories of transfer is based to some extent on Thorndike’s original idea that transfer is based on some type of similarity between the original learning situation and the subsequent transfer situation (Thorndike, 1903; Thorndike & Woodworth, 1901). However, what constitutes “similarity” is still at issue. These theories, however, have helped bring the concept of transfer to light within both research and education. Within the field of education, a central goal is that information learned in the classroom will be applied to problems and situations outside of the classroom. Unfortunately, this goal is not always achieved and students are often unable to transfer information outside of the context in which it was originally learned (Detterman & Sternberg, 1993).

Types of Transfer

While the concept of transfer has evolved, researchers have constructed several types of transfer. These types of transfer can be divided along three dimensions: (a) positive, negative, and zero transfer; (b) near and far transfer; and (c) lateral and vertical transfer (Glick & Holyoak, 1987). Positive transfer occurs when knowledge learned in one situation benefits learning in a new situation. For example, when key words and phrases were signaled, using a slower, deeper tone in the narration of a multimedia tutorial, there was an increase in problem solving transfer (Mautone & Mayer, 2001). Negative transfer occurs when knowledge learned in one situation interferes or hinders learning in another situation. An example of this occurred when Mayer, Sobko and Mautone (2003) found that problem solving transfer decreased when native-English speaking individuals listened and viewed a multimedia tutorial with a foreign accent narration. And finally, zero transfer occurs when learning in one situation has no effect on learning in another situation.

Near transfer, or specific transfer, refers to the transfer that occurs between two situations or tasks that are similar in both their superficial and underlying characteristics and principles (Glick & Holyoak, 1987). Far transfer, or general transfer, refers to transfer between two situations or tasks that are dissimilar in both their superficial and underlying characteristics (Glick & Holyoak, 1987). In a different vein, lateral transfer is said to occur when the transfer of knowledge or skills occurs between two tasks or skills that are of similar complexity (Lee, Pass, & Homer, 2006). This was found when Lee et al. (2006) observed that individuals showed transfer between low complexity multimedia tutorials and low complexity problem solving transfer tasks requiring them to answer questions of similar concepts to the tutorial. And finally, vertical transfer refers to the transfer of knowledge or skills between a less complex task or skill, usually a pre-requisite skill, and a more complex task or skill (Gagné & Paradise, 1961). An example of this can be seen when a segmented and non-segmented multimedia tutorial found that individuals engaging in the segmented version of the tutorial prior to the non-segmented version were able to make connections between the segments at their own pace (Mayer & Chandler, 2001).

In light of this, it should be noted that positive/negative, near/far, and lateral/vertical transfers can occur simultaneously as they all incorporate the transfer of knowledge among similar pieces on knowledge. Thus, if a student learns the cause of lightning and then successfully transfers this to a problem addressing how to reduce the likelihood of lightning, positive-near-lateral transfer will have occurred.

Transfer Within the Cognitive Theory of Multimedia Learning

Knowledge transfer in multimedia learning literature is often represented by how basic cause and effect knowledge can be transferred to similar situations and problems (Hummel, Paas & Kroper, 2004; Mayer & Moreno, 1998). These cause and effect situations involve the use of animation and narration (i.e., concurrent visual animation and audio narration) in scenarios such as how a tire pump works, as compared with animation or narration alone (Mayer & Anderson, 1991). It has consistently been found that individuals construct a more integrated mental model when animation and narration are provided concurrently, rather than animation or narration only (Fletcher & Tobias, 2005).

Knowledge transfer in multimedia learning research tends to be measured through a series of problem-solving transfer questions (Mayer, 1999; Mayer & Chandler, 2001). These questions are designed to measure near, lateral, and positive transfer. The determining factor is whether or not learners are able to answer these questions. For example, Mayer, Moreno, Boire, and Vagge (1999) had students watch a multimedia tutorial addressing the cause of lightning, followed by a recall item (i.e., "Write down an explanation of how lightning works"; p. 639) and four transfer questions: (a) "What could you do to decrease the intensity of lightning?"; (b) "Suppose you see clouds in the sky but not lightning. Why not?"; (c) "What does air temperature have to do with lightening?"; and, (d) "What do electrical charges have to do with lightning?" (p. 639).

Multimedia learning research has focused not only on near, lateral, and positive transfer, but also on immediate transfer: transfer that is measured immediately after the learning episode. This type of measurement, however, does not provide evidence of sustained and durable transfer. Would the learning tasks typically provided in the current multimedia learning literature (e.g., how lightning forms, how a car brake works, how human respiration works) result in far transfer: transfer to a transfer task that is less similar to the learning task than the typical problem-solving transfer questions and/or a delayed transfer task? For example, the multimedia learning principle of segmentation has been studied and has been demonstrated to foster near and lateral transfer when assessed immediately. Would this principle also demonstrate deep, sustained, and durable learning as evidenced by delayed transfer?

Delayed Transfer

Current transfer tests within multimedia learning environments are typically given immediately after learning occurs. Historically, delay periods have not been

a primary focus. Glick and Holyoak (1987) stated that “studies of delayed transfer have been infrequent in contemporary work” (p. 10). However, when delayed transfer is studied, differences vary between immediate and delayed transfer groups regardless of the length of the delay period. According to Salden, Paas, and van Merriënboer (2006), “Another, more indirect, way to create better understanding of the underlying cognitive processes would be to administer a delayed transfer test sometime after the training is given” (p. 360). Moreno and Valdez (2007) studied differences between participants who watched a video and students who read a narrative about the same topic. Participants were given a transfer test immediately after learning and 4 weeks later. Moreno and Valdez (2007) found that although the mean score differences in the delay test were lower, there was not a significant difference. Fong and Nisbett (1991) studied statistical reasoning through the use of the law of large numbers. Participants were given transfer tests immediately after learning or a two-week delay period. They found that, although transfer did decrease over the delay period compared to the immediate transfer tests results, delayed transfer was still significant. They attributed this to participants’ memory for a rule or law instead of memorizing the details of a problem. Phye (1989) studied immediate and delayed transfer using advice and feedback given during analogical reasoning problem solving. Phye (1989) found that the combination of advice and feedback had a positive effect on transfer; however, a comparison between the immediate and delayed groups was not discussed in depth and the length of the delay period was not reported. Schroth (2000) studied pretraining and its effect on immediate and delayed transfer, the delay period being 7 days. It was found that pretraining did facilitate transfer for both groups; however, no differences were reported for the delayed group. Delayed transfer has been used as a dependent variable, although differences between immediate and

delayed groups, specific details regarding length of delay period, as well as differences among multiple delayed groups are often limited, or not compared. There is a paucity in the literature comparing results of immediate and delayed transfer groups, as well as studies using immediate and delayed transfer as independent variables. Therefore, differences between immediate and delayed transfer in multimedia environments has yet to be determined.

Research Questions

1. What are the effects of segmentation on recall and transfer in a multimedia instructional environment?
2. What are the effects of immediate and delayed assessment on recall and transfer in a multimedia instructional environment?
3. Are there interaction effects between (a) segmentation and non-segmentation, and (b) immediate and delayed assessment on recall and transfer in a multimedia instructional environment?

Method

Participants and Design

The participants in this study were 214 undergraduate students at a large research university in the Mid-Atlantic region of the US enrolled in a 1000-level non-major personal health course who were provided course credit for participating. Participants were randomly assigned to either a “Segmentation” or “No Segmentation” condition and an “Immediate Transfer” or “Delayed Transfer” condition (see Figure 1). The experimental design was a 2 (immediate transfer, delayed transfer) x 2 (no segmentation, segmentation) factorial design.

Figure 1
Experimental Design

		Transfer	
		Immediate	Delayed
Segmentation	No Segmentation		
	Segmentation		

Materials

The materials used in this study included a pre-experiment questionnaire, a recall test, a transfer test, and two versions of a multimedia tutorial addressing how a car's braking system works. The pre-experiment questionnaire assessed the participants' general mechanical experience. The recall test assessed the participant's knowledge of how brakes work. The transfer test assessed the participant's level of knowledge transfer of how brakes work to questions relating to this content. The multimedia tutorial explained how car brakes work. The content for each study session was exactly the same, but delivered via a segmented or non-segmented multimedia tutorial. The study and the test sessions were administered on Apple laptop computers using Adobe Flash with the aid of standard over-the-head audio headphones. The instruction was based upon a unit of instruction originally developed by Moreno and Mayer (2000) addressing the function of car brakes. The assessment questions for the recall test and transfer test were verbatim from the Moreno and Mayer (2000) study.

Pre-experiment questionnaire. Prior to beginning the actual experiment, participants were given a questionnaire to assess their knowledge of automobile mechanics and repair, as well as demographic information. The participants were given a six-item activity checklist and a five-item self-rating. The instructions for the six-item knowledge checklist explained that participants should "Place a check mark next to the things you have done" (Moreno & Mayer, 2000, p. 121). The six items were as follows:

- I have a driver's license
- I have put air into a tire on a car
- I have changed a tire on a car
- I have changed oil on a car
- I have changed spark plugs on a car
- I have replaced brake shoes on a car

In addition, a five-item self-rating scale required the participants to rate their knowledge of car mechanics and repair on a 5-point scale from 1 = *very little* to 5 = *very much*. The instructions for the self-rating were "Please put a check mark indicating your knowledge of car mechanics and repair" (Mayer & Moreno, 1998, p. 242). The pre-assessment questionnaire score was calculated by giving a point for each domain-related activity the participant checked from the checklist and adding that number to the number indicated by the participant in the self-rating scale. The maximum score a participant could receive on the pre-assessment questionnaire was 11. Only

participants with low experience in car mechanics and repair indicated by a score of 5 or less were included in this study.

Recall assessment. The recall assessment consisted of one item: "Please write an explanation of how a car's braking system works." Participants were given 10 minutes to complete this assessment. This was the same question used in the Moreno and Mayer (2000) study.

Transfer assessment. The transfer assessment consisted of the same four questions used in the Moreno and Mayer (2000) study and are as follows:

1. What could be done to make them more reliable, that is, to make sure they would not fail?
2. What could be done to make brakes more effective, that is, to reduce the distance needed to bring a car to a stop?
3. Suppose that you press on the brake pedal in your car but the brakes don't work? What could have gone wrong?
4. What happens when you pump the brakes (i.e., press the pedal and release the pedal repeatedly and rapidly)? (p. 122)

The transfer test was given to participants either immediately after viewing the tutorial or after a delay period of one week. Participants were given 20 minutes to complete all four transfer questions.

Multimedia tutorial. The computer based materials consisted of two versions of a multimedia tutorial on how car brakes function created using Adobe Flash animation. Both versions of the tutorial consist of a 60-second tutorial in which the animation demonstrates how car breaks function. The animation consisted of drawings of a foot pressing a brake pedal, a piston moving inside a master cylinder, brake fluid being pushed out of the master cylinder and expanding smaller pistons in the wheel cylinder, and the smaller pistons pushing the brake shoes against the brake drum. The segmented version was broken into three 20-second segments, whereas the non-segmented version ran continuously for 60 seconds (see Appendix). The segmented version had a "Continue" button on the screen, which the participant selected at the end of each segment of the tutorial in order to move on to the next segment.

Procedure

Undergraduates taking an introductory personal health course were solicited to take part in the study. Participants who were interested were required to go to a website and register for the study. The compensation for participating in the study was 15% of the

participants' final course grade for the personal health course. Participants who chose not to participate in the study were given the option of a weight change project worth 15% of their final course grade. As part of the registration for the study, participants provided demographic information, took a pre-experiment questionnaire, and scheduled a time to participate in the study. Prior to the registration process and the actual study, the protocol was approved by the university in accordance with the institution's Institutional Review Board (IRB) that governs all research conducted using human subjects.

As part of the online registration all participants were asked to read an electronic informed consent form, which provided general information about the study- purpose of the study, procedures, risks, contact information, confidentiality statement, and disclaimer that participation in the study is voluntary. The participants selected if they agreed or disagreed to take part in the study. Participants that agreed to take part in the study were automatically sent a copy of the Informed Consent form by e-mail and proceeded to the participant questionnaire section.

The first section, the participant questionnaire, consisted of general demographic information (i.e., e-mail, age, gender, academic classification, ethnicity, and major). After participants completed the demographic information, they were given basic instructions for the second section: the pre-experiment questionnaire. Participants were asked to place a check mark next to the items that applied to their knowledge of car mechanics (i.e., the six-item checklist) and place a check mark indicating their knowledge of car mechanics (i.e., five-item self-assessment). Once the online pre-experiment questionnaire was completed, the six-item knowledge checklist and five-item self-assessment scores were calculated and stored in a database along with the demographic information. The third section, the scheduling page, was designed for the participants to schedule a time to come into the computer lab to participate in the study. Once the participants submitted their schedule, the registration process was complete. The participants received an email confirmation that includes the date and time that they had selected and further details regarding the study.

Upon arrival at the computer lab, each participant was asked by the experimenter to sit at an available computer workstation. Participants were tested individually in groups of one to ten per session. Once all of the participants had arrived the session began. First, the experimenter presented oral instructions regarding the procedures for the study. The experimenter then explained that the study will take approximately 30 to 45 minutes to complete. After the oral presentation of instructions, the participants were provided with an opportunity to ask questions.

Second, the participants were asked to log in using the user information that they used during the registration process. Once the participants had logged in successfully, they were given on-screen instructions to wait for the experimenter before proceeding. After the experimenter confirmed that all participants have successfully logged in, the experimenter informed the participants that they should click the "Continue" button to begin the first part of the study.

Third, the participants were directed to the on-screen instructions for the unit on "how a car's braking system works" and were prompted to put on headphones. The participants then clicked "Continue" when they were ready to proceed. The participants in the non-segmented instructional group were presented with a 60-second tutorial with no opportunity to stop, pause, advance, or rewind. Participants in the segmented instructional group were presented with a 60-second tutorial broken into three 20-second segments. At the end of each segment, a "Continue" button appeared at the bottom of the screen. Once all participants completed the tutorial, they were instructed to click "Continue" to proceed to the assessment, starting with the recall question followed by the four transfer questions.

Following the tutorial, the recall question appeared ("Please write down an explanation of how a car's braking system works"). A text box appeared and the participants were asked to type their response. Participants were given 10 minutes to complete the recall test.

Once the experimenter acknowledged that all participants had completed the recall questions, they were verbally instructed to click the "Continue" button to proceed to the next section. This section consisted of the four transfer questions. Following each of the four questions, a text box appeared, and the participants were asked to type in the appropriate response. Once the participants completed the fourth question, they were instructed to click a "Continue" button to proceed. The transfer test that each participant completed depended on whether he or she was in the immediate transfer group or delayed transfer group. The immediate transfer group answered four transfer questions related to how brakes work immediately following the brakes tutorial. The delayed transfer group answered four questions related to the cause of lightening. In a second session one week later, the delayed transfer group took a transfer test consisting of the four transfer questions relating to how car brakes work, while the immediate transfer group answered the four questions related to the cause of lightening (see Table 1). The final screen of each session thanked participants for participating in the study. The experimenter also verbally thanked the participants for participating in the study and dismissed the participants.

Table 1
Assessment Schedule

	Week 1	Week 2
Immediate	Recall and Transfer Test—Brakes	Recall and Transfer Test—Lightning
Delayed	Recall and Transfer Test—Lightning	Recall and Transfer Test—Brakes

Scoring

Recall test. Two trained scorers were used to score the recall test. The recall test was scored by adding the number of idea units from the narration, out of a possible eight, although the wording did not have to be specific, just the main idea. One point was given for each of the following idea units:

(a) driver steps on brake pedal, (b) piston moves forward inside master cylinder, (c) piston forces brake fluid out to the wheel cylinders, (d) fluid pressure increases in wheel cylinders, (e), small pistons move, (f) small pistons activate brake shoes, (g) brake shoes press against drum, and (h) drum and wheel stop or slow down. (Moreno & Mayer, 2000, p. 122)

Transfer test. Two trained scorers were also used for the transfer test. The transfer test was scored by adding the number of acceptable answers for the four questions. Acceptable answers were determined by those established by Moreno and Mayer (2000). Acceptable answers for the first transfer question—“What could be done to make them more reliable, that is, to make sure they would not fail?”—included adding a backup system or adding a cooling system; acceptable answers for the second transfer question—“What could be done to make brakes more effective, that is, reduce the distance needed to bring a car to a stop?”—included using more friction sensitive break shoes friction or reducing the distance between brake shoe and brake pad; acceptable answers to the third transfer question—“Suppose you press on the brake pedal in your car but the brakes do not work. What could have gone wrong?”—included that there may be a leak in the brake fluid line or a piston stuck in one position; and finally, acceptable answers to the fourth question—“What happens when you pump the breaks?” included reducing heat or preventing the pad from becoming worn in one spot. The two scorers determined whether the responses to the questions were within the acceptable answer range or were unacceptable. Inter-rater reliability was determined using a Pearson’s r correlation.

Results

This experiment was designed to (a) validate the effects of segmentation on recall and transfer in a multimedia learning environment (Mayer & Moreno, 1998; Mayer et al., 1999; Moreno & Mayer, 2000), (b) evaluate the effects of segmentation on immediate and delayed recall and transfer, and (c) evaluate whether interactions effects occur between segmentation and transfer. These questions were analyzed using two 2 (non-segmentation, segmentation) \times 2 (immediate recall and transfer, delayed recall and transfer) ANOVAs using the recall and transfer data. All pairwise comparisons used an alpha criterion of 0.05 and all effect size calculations involved Cohen’s d (Cohen, 1998). Cohen’s d effect sizes are interpreted as small, $d = 0.2$, medium, $d = 0.5$, and large, $d = 0.8$.

Analysis of the Segmentation Effect on Recall and Transfer

The first research question was the following: What are the effects of segmentation on recall and transfer in a multimedia environment? According to the segmentation principle of the cognitive theory of multimedia learning (Mayer, 2005), students who engage in segmented multimedia tutorials should achieve significantly higher on recall and transfer assessments than students who engage in non-segmented multimedia tutorials. Segmentation did not improve recall (see Table 2); therefore, no statistically significant main effect for the segmented group was found, $F(1, 210) = .96, p = .33$. Similarly, the segmented group showed no statistically significant main effect for transfer, $F(1, 210) = .16, p = .69$.

Analysis of Immediate and Delayed Assessment of Recall and Transfer

The second research question was the following: what are the effects of immediate and delayed assessment on recall and transfer in a multimedia environment? There was no statistically significant difference between segmented groups on immediate and delayed recall and transfer assessments. However, there were differences between the segmented and non-

Table 2
Means and Standard Deviations for Recall and Transfer Scores for Non-Segmented and Segmented Instruction

	Recall		Transfer	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Non-Segmented	3.56	1.73	2.59	1.43
Segmented	3.29	1.62	2.48	1.28

Note. Max recall score = 8, max transfer score = 8.

Table 3
Means and Standard Deviations for Recall and Transfer Scores for Immediate and Delayed Assessment

	Recall		Transfer	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Immediate	3.93	1.73	2.95	1.25
Delayed	2.89	1.46	2.10	1.34

Note. Max recall score = 8, max transfer score = 8.

Table 4
Means and Standard Deviations for the Interaction Between Segmentation and Immediate/Delayed Assessment

	Recall				Transfer			
	Non-Segmented		Segmented		Non-Segmented		Segmented	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Immediate	4.17	1.72	3.61	1.72	3.06	1.27	2.80	1.24
Delayed	2.83	1.46	2.96	1.47	2.04	1.43	2.16	1.26

segmented groups on immediate and delayed recall and transfer assessments. There was a significant difference on recall between the immediate and delayed assessment groups (see Table 3), resulting in a significant main effect for the non-segmented group, $F(1, 210) = 20.53, p = .00, d = .64$. Similarly, there was a statistically significant main effect for immediate and delayed assessment on transfer for the non-segmented group, $F(1, 210) = 21.45, p = .00, d = .65$. These results demonstrated that statistically significant differences occurred between immediate and delayed recall and transfer groups.

Analysis of Interaction Effect

The third research question addressed whether non-segmentation and segmentation had differential effects on immediate and delayed transfer, that is, if there are any interaction effects between the groups (see Table 4). No interaction effect was found for recall, $F(1, 210) = 2.46, p = .12$. Similarly, no interaction effect was found for transfer, $F(1, 210) = 1.21, p = .27$.

Discussion

The goal of this research was to determine the effects of segmentation on immediate and delayed

recall and transfer in a multimedia learning environment. The study utilized a multimedia tutorial to provide instruction on how car brakes work and was based on the segmentation principle of the cognitive theory of multimedia learning (Mayer, 2005).

The effects of segmentation were measured by immediate and delayed recall and transfer assessments. Participants were assessed on their ability to both remember and apply information from the tutorial to answer recall and transfer questions. Specifically, the independent variables of segmentation, non-segmentation, immediate transfer, and delayed transfer were manipulated to assess the effects of segmentation on the participants' ability to recall and transfer information regarding how brakes work during periods of immediate and delayed assessment.

In summary, the findings of the present study were consistent with previous segmentation research. Segmentation effects have been found to occur in multimedia learning environments, but not with consistency. This study found that segmentation had no effect on transfer and recall. This was consistent with previous findings, which suggest that variables such as length of segments (Hasler, Kersten, & Sweller, 2007) and type of tutorial, such as cause-and-effect (Mayer, 2005), may play a role in segmentation's effect on learning. Therefore,

segmentation effects appear to be significant for longer length multimedia tutorials, but not significant for short duration (i.e., 60-second) multimedia tutorials. This study also found that recall and transfer decreased over a delay period. This was not surprising because memory is believed to decay over time. However, because delayed transfer was assessed only one time, after a week, it is not known how a longer delay period would compare to these findings.

Implications for Future Research or Theory

Previous research on the cognitive theory of multimedia learning environments and the results of the present study have raised many questions regarding segmentation and transfer in multimedia learning environments. Although this study did use segmentation within multimedia tutorials, the length of these tutorials may have played an important role in the results. Both the segmented and non-segmented tutorials were 60 seconds in length, and no segmentation effect was found. If the length of the tutorials were increased, then findings with regard to the segmentation effect may vary.

Although a delay period of one week was used in this study, more research involving longer delay periods will be important to help determine the effects of segmentation on delayed transfer. Studying how transfer is affected over varying delay periods can help increase our understanding of not only memory, but also how the transfer of knowledge changes over periods of time.

Limitations

The present study did face some limitations. First, the multimedia tutorial on how car brakes work is short in length and is a cause-and-effect lesson. A longer tutorial or a tutorial presenting information that is not primarily cause-and-effect may produce different results relating to the segmentation principle and recall and transfer assessments. Second, the delay period was one week. Studies using delay periods of varying length may see different results on recall and transfer assessments. Third, the transfer assessments consisted of four questions. Transfer assessments consisting of more questions may produce different results.

References

- Aly, M., Elen, J., & Willems, G. (2005). Learner-control vs. program-control instructional multimedia: A comparison of two interactions when teaching principles of orthodontic appliances. *European Journal of Dental Education*, 9(4), 157-163. doi:10.1111/j.1600-0579.2005.00385.x
- Anderson, J. R. (2005). *Cognitive psychology and its implications*. New York, NY: Worth.
- Anderson, J. R., Reder, L. M., & Simon, H. A. (1996). Situated learning and education. *Educational Researcher*, 25(4), 5-11. doi:10.3102/0013189X025004005
- Baddeley, A. (1986). *Working memory*. New York, NY: Oxford University Press.
- Baddeley, A. (2007). *Working memory, thought, and action*. Oxford, UK: Oxford University Press.
- Baddeley, A., & Hitch, G. (1974). Working memory. In G. A. Bower (Ed.), *Recent advances in learning and motivation* (Vol. 8, pp. 47-89). New York, NY: Academic Press.
- Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction*, 8(4), 293-332. doi:10.1207/s1532690xci0804_2
- Dalton, D. W. (1990). The effects of cooperative learning strategies on achievement and attitudes. *Journal of Computer-Based Instruction*, 17(1), 8-16.
- Detterman, D. K., & Sternberg, R. J. (1993). *Transfer on trial: Intelligence, cognition, and instruction*. Norwood, NJ: Ablex.
- Engle, R. W., Tuholski, S. W., Laughlin, J. E., & Conway, A. R. (1999). Working memory, short-term memory and general fluid intelligence: A latent variable approach. *Journal of Experimental Psychology: General*, 128(3), 309-331. doi:10.1037/0096-3445.128.3.309
- Fletcher, J. D., & Tobias, S. (2005). The multimedia principle. In R. Mayer (Ed.), *Cambridge handbook of multimedia learning* (pp. 117-133). New York, NY: Cambridge University Press.
- Fong, G. T., & Nisbett, R. E. (1991). Immediate and delayed transfer of training effects in statistical reasoning. *Journal of Experimental Psychology: General*, 120(1), 34-45. doi:10.1037/0096-3445.120.1.34
- Gagné, R. M., & Paradise, N. E. (1961). Abilities and learning sets in knowledge acquisition. *Psychological Monographs: General and Applied*, 75(14), 1-23. doi:10.1037/h0093826
- Glick, M. L., Holyoak, K. J. (1987). The cognitive basis of knowledge transfer. In S. M. Cormier & J. D. Hagman (Eds.), *Transfer of learning: Contemporary research and application* (pp. 9-46). San Diego, CA: Academic Press.
- Hasler, B. S., Kesten, B., & Sweller, J. (2007). Learner control, cognitive load and instructional animation. *Applied Cognitive Psychology*, 21(6), 713-729. doi:10.1002/acp.1345
- Hummel, H. G. K., Paas, F., & Kroper, E. J. R. (2004). Cueing for transfer in multimedia programmes: Process worksheets vs. worked-out examples. *Journal of Computer Assisted Learning*, 20(5), 387-397. doi:10.1111/j.1365-2729.2004.00098.x

- Lee, H., Plass, J. L., & Homer, B. D. (2006). Optimizing cognitive load for learning from computer-based science simulations. *Journal of Educational Psychology, 98*(4), 902-913. doi:10.1037/0022-0663.98.4.902
- Mautone, P., & Mayer, R. (2001). Signaling as a cognitive guide in multimedia learning. *Journal of Educational Psychology, 93*(2), 377-389. doi:10.1037/0022-0663.93.2.377
- Mayer, R. E. (1997). Multimedia learning: Are we asking the right questions? *Educational Psychologist, 32*(1), 1-19. doi:10.1207/s15326985ep3201_1
- Mayer, R. E. (1999). Multimedia aids to problem-solving transfer. *International Journal of Educational Research, 31*(7), 611-623. doi:10.1016/S0883-0355(99)00027-0
- Mayer, R. E. (2001). *Multimedia learning*. Cambridge, UK: Cambridge University Press.
- Mayer, R. E. (2005). *The Cambridge handbook of multimedia learning*. Cambridge, UK: Cambridge University Press.
- Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: An experimental test of a dual-coding hypothesis. *Journal of Educational Psychology, 83*(4), 484-490. doi:10.1037/0022-0663.83.4.484
- Mayer, R. E., & Chandler, P. (2001). When learning is just a click away: Does simple user interaction foster deeper understanding of multimedia messages? *Journal of Educational Psychology, 93*(2), 390-397. doi:10.1037/0022-0663.93.2.390
- Mayer, R. E., & Moreno, R. (1998). A split-attention effect in multimedia learning: Evidence for dual processing systems in working memory. *Journal of Educational Psychology, 90*(2), 312-320. doi:10.1037/0022-0663.90.2.312
- Mayer, R. E., & Moreno, R. (2002). Aids to computer-based multimedia learning. *Learning and Instruction, 12*(1), 107-119. doi:10.1016/S0959-4752(01)00018-4
- Mayer, R. E., Moreno, R., Boire, M., & Vagge, S. (1999). Maximizing constructivist learning from multimedia communications by minimizing cognitive load. *Journal of Educational Psychology, 91*(4), 638-643. doi:10.1037/0022-0663.91.4.638
- Mayer, R. E., Sobko, K., & Mautone, P. (2003). Social cues in multimedia learning: Role of speaker's voice. *Journal of Educational Psychology, 95*(2), 419-425. doi:10.1037/0022-0663.95.2.419
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review, 63*(2), 81-97. doi:10.1037/h0043158
- Moreno, R., & Mayer, R. E. (1999). Cognitive principles of multimedia learning: The role of modality and contiguity. *Journal of Educational Psychology, 91*(2), 358-368. doi:10.1037/0022-0663.92.1.117
- Moreno, R., & Mayer, R. E. (2000). A coherence effect in multimedia learning: The case for minimizing irrelevant sounds in the design of multimedia instructional messages. *Journal of Educational Psychology, 92*(1), 117-125. doi:10.1037/0022-0663.92.1.117
- Moreno, R., & Valdez, A. (2007). Immediate and delayed effects of using a classroom case exemplar in teacher education: The role of presentation format. *Journal of Educational Psychology, 99*(1), 194-206. doi:10.1037/0022-0663.99.1.194
- Osgood, C. E. (1949). The similarity paradox in human learning: A resolution. *Psychological Review, 56*(3), 132-143. doi:10.1037/h0057488
- Paivio, A. (1971). *Imagery and verbal processes*. Hillsdale, NJ: Lawrence Erlbaum.
- Paivio, A. (1990). *Mental representations: A dual coding approach*. New York, NY: Oxford University Press.
- Phye, G. D. (1989). Schemata training and transfer of an intellectual skill. *Journal of Educational Psychology, 81*(3), 347-352. doi:10.1037/0022-0663.81.3.347
- Sadoski, M., & Paivio, A. (2001). *Imagery and text: A dual coding theory of reading and writing*. Mahwah, NJ: Erlbaum.
- Salden, R. J. C. M., Paas, F., & van Merriënboer, J. J. G. (2006). Personalised adaptive task selection in air traffic control: Effects on training efficiency and transfer. *Learning and Instruction, 16*(4), 350-362. doi:10.1016/j.learninstruc.2006.07.007
- Schroth, M. L. (2000). The effects of type and amount of pretraining on transfer in concept formation. *Journal of General Psychology, 127*(3), 261-269. doi:10.1080/00221300009598584
- Singley, M. K., & Anderson, J. R. (1989). *The transfer of cognitive skill*. Cambridge, MA: Harvard University Press.
- Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction, 4*(4), 295-312. doi:10.1016/0959-4752(94)90003-5
- Thorndike, E. L. (1903). *Educational psychology*. New York, NY: Lemcke & Buechner.
- Thorndike, E. L., & Woodworth, R. S. (1901). The influence of improvement in one mental function upon the efficiency of other functions. *Psychological Review, 8*(3), 247-326. doi:10.1037/h0074898

GINA MARIANO is an Assistant Professor of Psychology at Troy University, where she teaches courses in educational psychology, basic statistics, and

research methods. Most recently, she served as chair for the Institutional Review Board (IRB) at Troy University. Dr. Mariano's current research interests include knowledge transfer in traditional and online environments, and faculty development in the area of online teaching improvement.

Positive Effects of Peer-Led Reflection on Undergraduates' Concept Integration and Synthesis During Service Learning

Monika Hudson and Keith O. Hunter
University of San Francisco

Service learning that features mutually constructed community-based service can enhance the understanding of a range of concepts (Butin, 2006). However, such service is often seen as "charity" as opposed to a dually constructed experience that is central to real learning (Howard, 2000; Tellis, 2011). This project was designed to determine whether the early interjection of peer-led reflections into an undergraduate course would result in students having gained a dual partnership perspective by mid-semester. Exploratory results suggest that peer-led reflections may have both increased student understanding of service learning and contributed to the quantity and quality of theoretical course concepts cited.

Conscientious instructors often puzzle over the best way to create an environment of "wonder and mystery" (Kolvenbach, 1986, p. 7) that, combined with individual internal effort and ability, allows students to successfully move from unconscious incompetence to unconscious competence (Ambrose, Bridges, Lovett, DiPietro, & Norman, 2010). In this spirit, service learning has become a natural and integral part of modern Jesuit business education. Through simultaneous immersion in reflective practice, disciplinary training and community service, students are encouraged and empowered to develop as effective contributors and leaders within communities of all kinds (Byron, 2011; Cone & Harris, 1996; Eyler, 2002). The intimate connection of service learning and Jesuit business school pedagogy requires that instructors consciously consider how service learning can be both an effective educational tool and a means of guiding students toward personal transformation (Wright, Calabrese, & Henry, 2009). Using a case study, this paper examines the capacity of peer-led reflection to facilitate a deeper grasp of both course content and service learning themes by undergraduate business students.

Disciplinary Training and the Service Learning Reflective Cycle

In general, service learning programs combine course-related training in relevant disciplines with community service work (Bringle & Hatcher, 1999). Given that service learning courses should also be designed to provide content information that students must subsequently demonstrate mastery of, within-course service learning assignments should give participants the opportunity to both take lessons from the classroom into the world of practice and provide a forum where their individual interpretation and understanding of course material can be challenged, adapted and improved (Bringle & Hatcher, 1999, 2002; Eby, 1998; Tellis, 2011).

Thus, the essential role of the community service component of service learning extends beyond the merely definitional. Students engaging in service learning are not simply learning how to apply themselves to enhancing the well-being of others (Howard, 2000; McEwen, 1996). Service learners also undergo the transformation of their insight and beliefs with respect to communities in which they are working and refine their broader identities as servant leaders (Palmer, 1997; Tellis, 2011).

Reflective Practice as an Essential Aspect of Service Learning

Reflective practice has long been strongly associated with Jesuit education (Bringle & Hatcher, 2002; Haughey, 2011; Kolvenbach, 1986; Tellis, 2011). In the context of service learning, reflection involves the generation and refinement of observations regarding core elements of disciplinary training and lessons provided by practice. Moreover, reflection on service learning pushes the student to identify important relationships between the artifacts of disciplinary pedagogy and the dynamics of the real world (Johnson & O'Grady, 2006). For courses featuring service learning, the framing and coordination of reflection is important. Students need to understand not only the purpose of service engagement and expected learning outcomes but also why all of the elements of service learning and the disciplinary material in the lesson plan are included together in the course.

The literature across multiple disciplines identifies beneficial learning effects derived from democratic or peer-driven reflective practice (Burton, 2000; Ikpeze, 2007; Mackintosh, 1998; Tollison et al., 2008). In the context of clinical nursing, Walker, Cooke, Henderson, and Creedy (2013) adapted a strategy of learning circles to facilitate open discourse between registered nurses, clinical leaders, clinical facilitators and students in order to critically reflect on practice experiences. Their

findings identify learning benefits due to democratic participation and safety in the sharing of ideas and perceptions among peers. Our interest in peer-led reflection, in particular, is partially motivated by literature that emphasizes the importance of assuring trust, comfort, safety and commitment when experiences are being shared in a group setting (Williams & Walker, 2003). The research strongly indicates that it is much easier in this environment to receive advice and modeling from an appropriately prepared peer individual as opposed to a perceived authority figure such as a professor or supervisor.

Coordinating the delivery of knowledge, meaning, community engagement and reflection draws naturally from the instructor's disciplinary knowledge and experience. Institutional support and reinforcement of key themes associated with service learning play a very important role as well. One way that many institutions have sought to support instructors in this effort is by incorporating established standards of service learning into course designs and curricula. The 1995 service learning standards developed by the Alliance for Service-Learning in Education Reform (ASLER) described a seven-step model they believed should guide practice to assure that it is coordinated with and addresses actual community needs (see Table 1). The ASLER model, as summarized by Table 1, provides a structured roadmap that instructors can use to approach the service learning experience effectively and formally evaluate its outcomes (Leiderman, Furco, Zapf, & Goss, 2002).

We apply the essential components of this model (summarized in Table 1) in our discussion here. Within Jesuit education, service learning and all of its associated standard components are typically embedded within the overarching themes of *cura personalis* and *magis*.

The Roles of *Cura Personalis* and *Magis*

Service learning draws much of its holism and power from the fact that it connects with the learner on

multiple levels. In the Ignatian tradition, these levels range in scope from *cura personalis*, exemplified by acknowledgment, understanding, and concern for other individuals, all the way to the interpretation of *magis* as a concept exemplified by appreciation of, and commitment to, extending the boundaries of reality to seek more meaningful engagement with the broader world and a more complete commitment of self to the improvement of that world (Tellis, 2011).

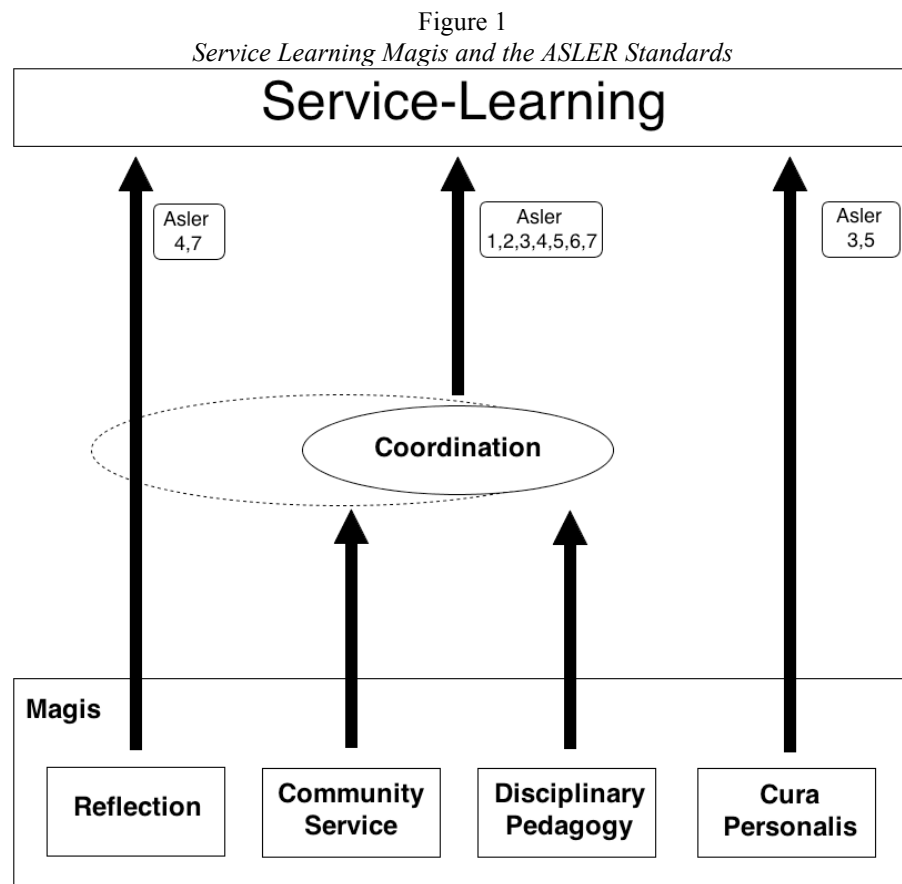
This perspective on effective experiential learning is shared by many schools of thought in addition to Ignatian pedagogy. Whatever the environment, we argue for the critical importance of the learner progressing beyond self, beyond individual other, and toward a reality within which knowledge is considered and applied critically with its broader implications understood. Hence, the results of our investigation of peer-led reflection's impact on the incorporation of service learning concepts has bearing on learning outcomes in many types of classrooms and courses.

The experience gained through intellectual and spiritual engagement with the real world fuels the process of reflection (Martin, 2010). This awareness of current and possible realities is then available for internalization and incorporation on the part of the learner through the refinement of values, identity and purpose. The essential elements of service learning, reflection, community engagement, disciplinary training, and *cura personalis* are depicted along with the role of coordination in Figure 1. Critical to the distinctiveness of this educational pedagogy is the overarching spirit of *magis* that drives learners, both as individuals and in groups, to be integrative, action-oriented, and socially responsible thinkers (Haughey, 2011; Wright et al., 2009).

Relying upon the ASLER's definition of service learning (items labeled according to their associations), Figure 1 illustrates the congruence of peer-guided reflection and engagement with service learning as part of a disciplinary course of study. As is shown in Figure 1,

Table 1
Alliance for Service-Learning in Education Reform (ASLER) Standards

Standards
Service learning is designed to:
1. Meet actual community needs.
2. Be coordinated in collaboration with the educational institution and the community.
3. Be integrated into each individual's academic curriculum.
4. Provide structured time for learners to think, talk, and write about what they did and said during the service project.
5. Provide individuals with opportunities to use newly acquired academic skills and knowledge in real life situations in their own communities.
6. Enhance what is taught by extending learning beyond the classroom and permitting individuals to learn from the communities in which they are serving.
7. Help foster and develop a sense of caring for others.



the actions of a peer—experienced in service learning—bridges the reflection and coordination actions that complete the definition of broader engagement. Thus, service learning serves as a microcosm of the broader Jesuit business education experience, defined by key learning theory inputs, grounded in spiritual balance and well-being (Tellis, 2011; Wright et al., 2009).

There is no standard formula that teachers can use to demonstrate cura personalis on a course-by-course basis. Rather, context plays a major role in defining educational success, particularly as it relates to the achievement of course learning outcomes. Jesuit and critical theorists (e.g., Duncan-Andrade & Morrell, 2008) remind us that context is most readily taken into account by actively engaging students, instructors, schools, and neighborhoods in creating learning communities that individually and collectively generate, critique, reproduce, and transform knowledge, practice, ideologies, and cultural artifacts and facilitate learning “as a socio-cultural and political activity” (Byron, 2011, p. 15). This notion of engaged learning communities may be even more critical for the learning success of university students, who often are located in isolated

campus environments, segregated from the education that the surrounding area might otherwise provide. Haughey (2011) pointed out that this need is particularly pronounced among business schools “where ‘learning to earn’ is likely to be more pressing than ‘learning to know’” (p. 1). Similar isolation and disconnection from lessons offered by the environment may also be associated with any disciplines within which the locations and modalities for learning tend to be restricted to the classrooms, campus laboratories, computing facilities, or libraries.

Thus, in order to deliver fully on the promise of Jesuit business education or that of other systems seeking to develop students who bring high, positive impact to the world, instructors and students are called upon to work together to construct learning experiences that integrate all of these components and empower learners to develop deeper community insight and purpose as they acquire disciplinary competencies. The concept of service as laid out by the ASLER standards is also designed to engage students, via critical pedagogy, in an examination of culture, time, and change; people and environment; individual development and identity; interactions

among groups and institutions; power and authority; production and consumption; global connections and civic ideals; and practices (Duncan-Andrade & Morrell, 2008). As overarching themes, *magis* and *cura personalis* appropriately complement the more specific and instrumental framing provided by instructor facilitators to fully embed the service learning experience within both Jesuit and non-Jesuit education (Wright et al., 2009).

Area of Focus

In line with Ignatian and ASLER goals, a West Coast Jesuit university requires service learning of all of its undergraduate students. An organizational behavior survey course in the business undergraduate program allows these particular individuals to fulfill their service learning requirement. Within the survey class, the service learning component represents 67% of a participant's final grade and the various assessment aspects of service learning are woven throughout the course. While community-based organizations define their original service needs, the community partners and the respective student teams mutually design the final project. Course outcomes are constructed to allow the participant students, community partners, and the instructor to determine how well the students learned from the community as well as what the community learned from the students. This iterative process represents the essence of the pragmatic-situative perspective of learning, which specifically emphasizes how individuals must engage with the goals of communities in order to really learn (Greeno, Collins, & Resnick, 1996).

The research effort was complicated by the fact that there were two interventions concurrently underway. First, in August 2010, a peer advocate for community engagement (ACE) was assigned to all course instructors to assist with deepening student reflections and supporting social justice comprehension. Second, with the addition of the peer facilitator, faculty were asked to make associated modifications to the course syllabi. Classes were scheduled for the peer facilitator to conduct formal reflections about the service learning experience, and evaluative reflections were created. The sessions drew specifically upon the in-class work of the peer facilitator, and peer facilitator-generated comments were factored into the grades for these assessment segments.

The researchers wanted to determine what effect the peer-led reflection intervention might have had as part of a longer-term strategy to enhance course learning outcomes. As a result, this project was designed to answer two questions: (1) Did the early integration of peer-led service learning reflections into this course result in some increase in students' ability to

appropriately cite and apply various disciplinary (organizational behavior) concepts? and (2) With respect to service learning themes, was the quality of students' cited knowledge any different than might be expected if peer-led service learning reflections had not been used as an additional mode of instruction?

Definitions

What is Service Learning?

Service learning has been defined as "an experiential education approach that is premised on 'reciprocal learning'" (Sigmon, 1979, as cited in Furco, 1996, p. 9), incorporating an experiential education model developed by Kolb (1984), that mirrors the model of Ignatian pedagogy (Tellis, 2011). Both pedagogies presume deep learning occurs through a four-step process incorporating concrete experience, reflection upon that experience, active experimentation, and abstract conceptualization or evaluation (Kolb, 1984; Tellis, 2011). In its highest form, service learning also draws upon the philosophies expressed by Brazilian philosopher Paulo Friere (1970), when it actively includes members of the communities where the learning projects are taking place in the concurrent creation of the knowledge that is gained. The inclusion of community members in the service learning process deliberately contradicts the "empty bucket" perspective of learning where students are the vessels into which knowledge is poured by expert instructors and transforms it into a collaborative forum where community, students, and instructors are involved in integrated yet student-centered learning models (Greeno et al., 1996).

Concurrently, it is important to assure that any so-called service learning model meets the overarching ASLER standards. The ASLER characteristics were intended to help distinguish service learning from other forms of experiential education such as volunteerism, field education, internships, and community service. Thus, practitioners would argue that the title "service learning" should only be applied to projects that are designed to equally benefit the provider and the recipients of the service as well as ensure an equal focus on both the service being provided and the learning that is occurring (Furco, 1996; Howard, 2000; Wright et al., 2009).

Application of Ignatian Pedagogy to the Service Learning Model

While Kolb (1984) suggested that action learning begins with concrete experiences, service learning educators have argued that, unless assistance and structure is provided, students may understand their

new experiences in the same ways as they did their old ones (Piaget & Inhelder, 1972). This is because human beings are naturally inclined to use the tools available to them, and thus students readily revert to ways of conceptualization they have from previous experience, a process that Piaget and Inhelder (1972) referenced in their use of the word “schema.” One way that successful service learning educators disrupt these old ways of thinking is to support students in approaching service learning with some specific conceptual tools. Among the most useful means of assuring new ways of thinking are structured reflection sessions, which are subsequently assessed and revised as needed (Bringle & Hatcher, 1999).

Thus, in the case that is the focus of this research, students engaged in an eight-step process that began with discussing what service learning is and concluded with formulating a project contract. The latter document outlined students’ understanding of the project, their questions, pertinent project milestones, contact information, identified resources, and anticipated project outcomes from both an organizational and personal level. The contract provided an opportunity for outcome clarification by all involved parties as well as formalized the relationship between the student team and its community partner.

Once the contract was sent, the student teams began work. Their service learning tasks were complemented by in-class lectures and experiential exercises that paralleled their increased immersion in the project. As a result, participants completed group quizzes and exercises informing them about a range of personality, values, and ethical theories, while they concurrently authored journal responses to reflective questions that asked them to identify how these theories were being enacted within the context of their service learning team and community partner organization. Students also examined motivation within the classroom and were then asked to explore the construct within their respective project work.

So the natural categorization that the students enact was worked through two sets of experiences and followed by critical reflection from both an academic and personal perspective. Students got to demonstrate their emerging facility with the theoretical concepts through the creation of their own experiential exercises, performance on group essays and demonstrations, written and oral peer-led reflections on quizzes (the two Fall 2010 semester interventions), and oral presentations. This process was carefully mediated, however, with instruction that was designed to increase the sophistication of students’ understanding of organizational behavior theory/practice connections, to provide a forum for student experimentation in a real world setting, to allow for the successful application of students’ general business and technical knowledge,

and to engage the students and community in meaningful projects.

2010 Peer-Led Reflections

In Fall 2010, several specific peer-led interventions were incorporated into this course. The first activity involved an initial introductory session, where a trained peer led students in a 70-minute instructional exercise. This exercise was completed during the fourth week of the course.

As part of that day’s instruction, students were asked to complete a personal service learning assessment and collectively reflect upon the same. The personal assessment, which was developed by the Hawaii Campus Compact (see Appendix), was designed to measure five factors including awareness of the purpose of service, application of theory to service, responsibility to the community, impacts on students’ personal lives, and critical thinking. Copies of the tool were distributed to all students, who were given 15 minutes to complete it on an individual basis. The trained peer then conducted a 55-minute oral discussion of the questions with assistance from the faculty instructor.

The peer facilitator subsequently made 15-minute appointments to meet with each of the service learning teams during the sixth or seventh week of the semester. The purpose of these meetings was to ask questions about team progress and reflect upon project experiences prior to each student team’s finalization of their mid-semester team report. The peer facilitator then conducted an in-class session during the ninth semester week to discuss the various teams’ mid-term progress reports and provide written reflections on the same; these written comments were submitted to the course instructor. While the peer facilitator’s written remarks were not factored into the final mid-semester grades, they did influence the course instructor’s evaluation of each student team’s reports.

The methodology described in the next section was designed to examine the general course service learning outcomes and to determine if the described Fall 2010 interventions triggered any increase over previous semesters in the numbers or quality of organizational behavior concepts cited in individual student mid-semester reflection essays.

Methods

To determine whether service learning outcomes were enhanced as a result of incorporating peer-led reflections, individual midterm reaction essays from the Fall 2009, Spring 2010, and Fall 2010 classes were reviewed. These reflection essays were selected because they are typically completed mid-semester,

permitting changes in direction and instructor emphasis at a sufficiently early stage in the course. Students were asked to summarize their service learning experiences and align relevant organizational behavior concepts they had either observed or practiced by this stage of the course. This allowed for an assessment as to whether, at that point in time, students were viewing their service as a one-way or a reciprocal experience with respect to helping and learning.

In order to obtain a representative sample, the names of students from all three semesters were placed on an alphabetical list by class and associated student identification number then sequentially numbered. A SPSS random numbers table (Shavelson, 1996) was applied to the student identification numbers and used to identify a convenience sample of 15 student essays each from the Fall 2009 and Spring 2010 semesters respectively, bringing the pre-intervention sample size to 30. The same process was used to produce a post-intervention sample of 30 essays using students from the Fall 2010 semester. Grades, gender, and the associated essays were analyzed for each of the 60 sampled student sets.

The analysis used the classical iterative approach described by Boyatzis (1998) as cycling through the essay data (Lewis, 1998). The open inductive coding was managed using a combination of Word, Excel, and NVivo9 software in order to provide maximum flexibility to iteratively build codes in the spirit of the hermeneutic circle (Dewey, 1920). The unit of analysis was the individual student essay and the unit of coding was “the entire response, the response to each questions, the paragraph, or the sentence” (Boyatzis, 1998, p. 64).

The resulting summary compared the averaged overall grades accorded to essays from the three semesters, listed the gender of respondents, and identified the theories each individual cited in the service learning segment of his/her midterm reflective essays. A total of 145 codable narratives (Boyatzis, 1998) were identified from the Fall 2009 and Spring 2010 semester responses; a total of 176 codable narratives were identified from the Fall 2010 semester. Using the constant comparison method (Boyatzis, 1998; Lincoln & Guba, 1985), these codable

narratives were grouped into various sub-themes. Using a simple affinity mapping technique, the sub-themes were then grouped into logically connected themes: 13 sub-themes were identified for the Fall 2009 semester, 15 for the Spring 2010 semester, and 21 for the Fall 2010 semester. Finally, the themes were grouped into two categories of “report” versus “analysis” using the methods described by Boyatzis (1998). These final two categories provided a secondary context for the examined concepts.

Results and Discussion

Grades

Six men and nine women were part of the Fall 2009 sample, seven men and eight women made up the Spring 2010 sample, and 24 women and six men made up the Fall 2010 sample. Comparison of average grades, grades by semester, and gender across each semester sample revealed less than a one point difference between all three averaged sample semester scores. These results, as summarized in Table 2, indicate that neither semester nor gender had a statistically significant impact on the overall grades achieved on the respective essays.

Reporting Rather than Reflection

Ten of the 15 Fall 2009 midterm reaction papers were classified as being merely reports as opposed to reflective essays. The distinction between a report and an analysis refers to whether a majority of an individual’s essay focused on what happened without a corresponding indication as to why the student thought such activities occurred, as viewed through the lens of the organizational theories that had been studied as of that point in time. A similar pattern occurred in the following two semesters: eight of the 15 Spring 2010 and 24 of the 30 Fall 2010 midterm reaction papers were classified as only being reports. This desired demonstration of increased critical thinking did not appear in a majority of the evaluated student essays by mid-semester either before or after the peer-led reflections were incorporated into the course instruction.

Table 2
Comparison of Students’ Essay Scores: Overall Class Mean and Mean by Gender

Semester	Overall class <i>M</i>	Males <i>M</i>	Females <i>M</i>
Fall 2009	28.66	28.25	28.75
Spring 2010	27.65	27.75	27.50
Fall 2010	27.58	27.95	28.25

Note. Maximum achievable = 30 points.

Emerging Concepts—Fall 2009 and Spring 2010

In both the Fall 2009 and Spring 2010 semesters, concepts discussed in the mid-term service learning essays tended to fall into one of two categories: students reported on their service learning experiences either from the perspectives of themselves as individuals (individual-focused) or as participants within their respective service learning teams (team-focused). Typically the nouns “I” or “we” were used in the essays along with

organizational behavior concepts, such as communication, behavior modification, emotional intelligence, individual values, ethics, feedback, groupthink, goals, team cohesion, cooperation, roles, stress, and time management. Each of these concepts falls into the individual characteristics, individual mechanisms, or group mechanisms themes as categorized by the course textbook and supportive materials. Examples from the Fall 2009 and Spring 2010 essays are included as the first two rows of Table 3.

Table 3
Selected Excerpts from the Fall 2009, Spring 2010, and Fall 2010 Midterm Reaction Essays

Type of analysis	Gender	Semester	Excerpt
Individual-focused report (Contains mostly “I/we”-centered statements)	Female	Fall 2009	The first component we had to learn was Survey Monkey because in the email we included a short survey in order to get the best possible response from the alumni. Next, we also had to learn how to use mail merge because we were emailing a large number of people but also had specific information that had to be personalized to each alumni. Being in a group helped with learning these new tools because we were able to help each other in the learning process.
Team-focused analysis (Identifies and discusses internalization of key OB concepts)	Male	Spring 2010	We experienced the termination of a teammate, who exercised his counterpower by manipulating our kindness to make us feel bad about not keeping him on the team. This challenge, in some ways, united us to see the power of the distributive justice ethical principle , because we did not want any social loafing on our team. We also figured out the major team-roles each of us had demonstrated .
Mutual-focus analysis (Discusses what individual learned and internalized in connection with the organization’s purpose and mission)	Female	Fall 2010	After our first introductory meeting, our group decided to split into two teams...as part of the fundraising team, . . . I worked on a grant proposal due at the end of September . . . including a history of the organization and reasons for its founding. . . . This research gave us a real understanding for why the organization was started rather than just hearing it from our community partner (far less real). I am grateful to have such an in depth understanding of what Rwandans continue to face (health care, legal rights, etc.).
Mutual-focus analysis (Discusses what the individual learned and internalized in connection with the partner’s purpose and marketing concepts previously learned)	Male	Fall 2010	I recently visited the store, and walked around the surrounding neighborhood . I noticed the majority of people . . . had headphones in, and were not paying close attention to their surroundings . I could only think of the negative affect this self-isolation could have on the marketing of the bookstore itself. . . . Parking in this area is limited, so signage and special activities to grab the attention of the population who are street shoppers could be key to the success of the company. . . . I am excited to see what . . . we are learning about how marketing works Our hopes are that we may turn this bookstore into a popular destination for young and old readers alike, and to diversify their customer base, so that scholars and enthusiasts from the Japanese community may find interest in the literature.

Note. Key organizational behavior concepts highlighted are in **bold** font.

As shown by the Fall 2009 essay excerpt in Table 3, the student simply reported on the various steps she and her team took to carry out the assignment for her community partner. Little insight is gained about what the student or community partner learned as a result of this effort. In the selected Spring 2010 team-focused analysis, the student discussed the group factors that, from his perspective, led to the termination of a team member who had violated the individual's and team's sense of distributive justice. He discussed the power and influence relationship experiences that he and his team had, drawing upon course discussions related to the concept of social loafing. This essay identifies the rationale behind the student's use of the listed concepts, allowing the reader to gain some understanding as to how the student is internalizing the listed concepts.

In only a few cases did the Fall 2009 and Spring 2010 essays move to the organizational level of analysis, describing the ways that students believed staff within their community partner organizations engaged in emotional intelligence or demonstrated organizational commitment. Some students also indicated how important the interaction with their respective community partner or the surrounding community was to their understanding of the purpose of their project or the mission of their community partner. Where they occurred, these organizational analyses more closely corresponded to the service learning outcomes outlined in ASLER standards six and seven (see Table 1). However, the researchers found that this more nuanced response was the exception rather than the norm, occurring in only about seven of the 30 (23%) Fall 2009 and Spring 2010 sample essays examined.

While this result was not completely unexpected, given the fact that some students never break away from having a volunteer or charity perspective, it was nonetheless revealing. Furthermore, the fact that, despite being given the same written instructions as their Fall 2009 counterparts, relatively fewer Spring 2010 students correctly applied the analysis criteria to their mid-semester work indicated a limitation: students needed additional and consistent oral reinforcement regarding the expectation that the reflection papers demonstrate enhanced knowledge and understanding as one of several ways that class learning outcomes were being evaluated. In response to this issue, the instructor welcomed the offer of a peer facilitator and the incorporation of early semester, in-class, peer-led reflections into the overall course and assessment process, believing this would aid in increasing the numbers of essays demonstrating a deeper internalization of organizational behavior concepts. The results of these interventions are discussed in the next section.

Emerging Concepts—Fall 2010

When Fall 2010 semester essays were compared with their Fall 2009 and Spring 2010 counterparts, the balance between the three categories of individual, team, and organizational assessments had notably changed: there were more overall organizational behavior concepts included in the Fall 2010 responses as well as more organizationally-focused rather than individually or team-focused assessments. Overall, the researchers found that 11 out of the 30 (37%) essays examined had some significant organizational components, a change that could not be attributed solely to chance. Two examples of the organizational analysis narratives are included on Table 3.

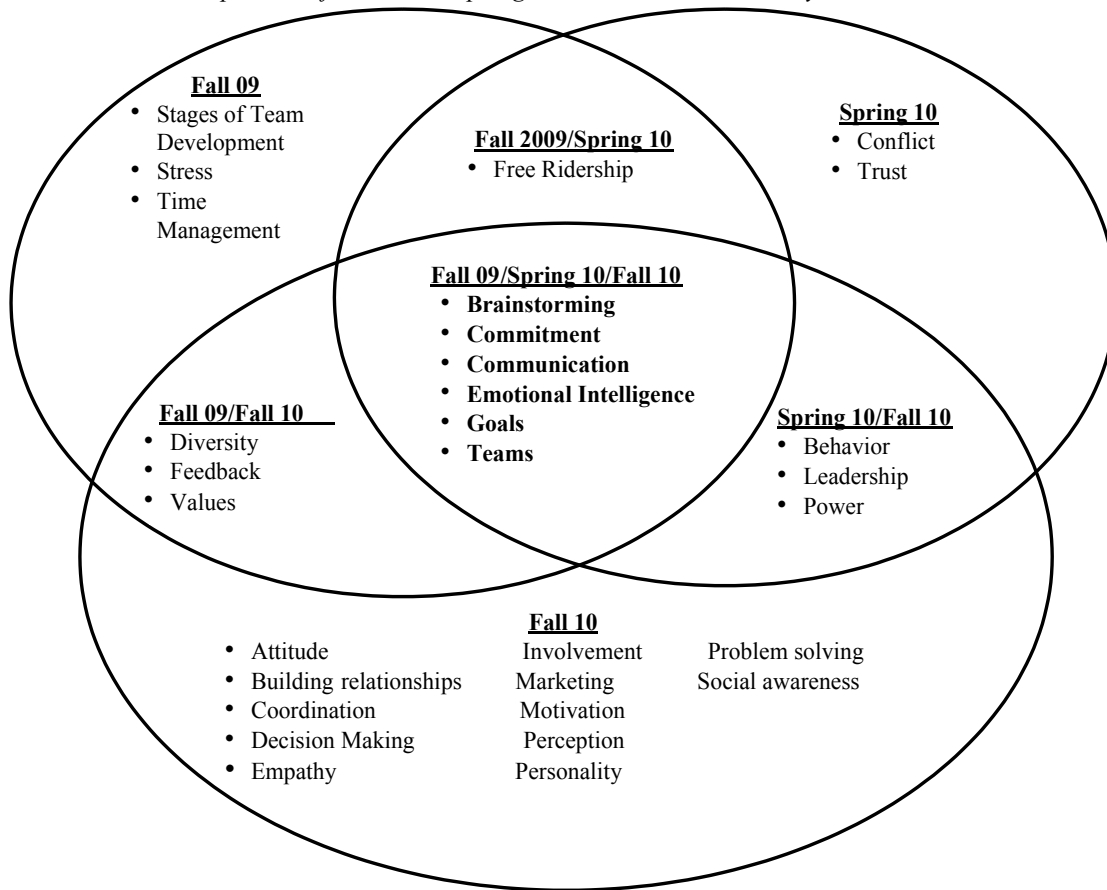
When one examines the two Table 3 organizational level analyses from Fall 2010, the evidence of more comprehensive student learning is clear. In the first case, the student focused on the real-life importance of her project. She then identified the organization's purpose, the feelings she took away from her efforts, and the reasons why she was engaged in required service. In the second example, the student combines new organizational behavior information with his previously acquired marketing knowledge to consider how he can leverage both in his work with his community partner.

The two organizational analysis samples demonstrate that ASLER standards six (mutual connection with community) and seven (caring for others) are on the way to being met with both of these students. It is equally clear that the students who submitted individual or team-focused summaries about their service learning experiences may not have acquired the higher level skills outlined in the latter two ASLER standards. Figure 2 provides a visual comparison of the differences between the Fall 2009, Spring 2010 and Fall 2010 analyses. The diagram indicates that the two Fall 2010 interventions appeared to have been successful in enhancing student demonstrations of learned organizational behavior concepts as well as increasing the level of organizational analyses incorporated into students' midterm essays.

Peer Facilitation of Bridging, Synthesis, and Integration

The inclusion of peer-led reflections in the Fall 2010 organizational behavior curriculum was motivated by the desire to promote a deeper organizational focus as well as true service learning among the instructed students. Comparison of the Fall 2010 essays with their Spring 2010 and Fall 2009 counterparts indicates a desirable shift of emphasis in student thinking. Post-intervention essays indicate not only increased

Figure 2
Comparison of Fall 2009, Spring 2010, and Fall 2010 Essay Sub-Themes



bridging, integration, and synthesis of organizational behavior insight but also an enhanced understanding of the importance and reciprocal nature of service learning.

Instructors and graders often encounter disconnected embedment of terms within reflection essays. However, focused instruction and proper framing of learning experiences can provide students with the stepping stones needed to move fluidly between concepts as they engage in a process of critical thinking that can yield superior learning outcomes (Ambrose et al., 2010). Examination of the most prevalent concepts within the Fall 2010 data indicates the emergence of conceptual bridging and integration less prominent in the essays of students who did not engage in peer-led reflection in previous semesters. As Table 4 illustrates, while the work from previous semesters tended to include subject matter without emphasis on synthesis or development of insight, nearly all of the terms and concepts that emerged in the semester with peer-guided reflection may be viewed as more comprehensive, integrative, and practice-oriented.

It is noteworthy that the interventions also facilitated the emergence of social awareness and related extensions that are logical evidence when the core objectives of service learning are being effectively pursued. One of the biggest challenges educators may face when incorporating service learning into a business or other technical course is inculcating within the student a solid understanding of why this experience can be so powerful and beneficial. Hearing how meaningful and important service learning is from a fellow student appeared to help bring this message home.

Limitations

There are a few limitations associated with this exploratory analysis. First, no attempt was made to analyze these essays in light of the individual student's overall academic capacity. The midterm reports were examined as an isolated measure, not within the context of whether one was looking at an "A" student, "B" student, or so forth. It is possible that those students

Table 4
Comparison of Pre and Post-Intervention Organizational Behavior Knowledge

Persistent course terms and concepts (Found before and after intervention)	Relevance and applications (Found only after intervention)
Brainstorming	Decision-making, problem solving
Communication, commitment, goals, teams	Building relationships, coordination, involvement
Emotional intelligence	Perception, personality, attitude, empathy
Service learning (implicit)	Social awareness, building relationships, involvement, empathy

Note. Prevalent themes from non-intervention essays and corresponding relevance and application insights that appeared after intervention.

who submitted more comprehensive service learning responses were also students who generally tended to do high quality university work.

Second, the midterm reflection essays were written mid-semester prior to the time when the students participated in a comprehensive course examination. As part of preparing for the comprehensive examination, the students are asked to review and reflect upon all of the introduced organizational behavior concepts. One would expect that this reflection would refresh the students' associated vocabulary and increase its effective usage in an associated essay. Perhaps many of the students at mid-semester were still using non-organizational behavior language to describe their service learning experiences due to the lack of reinforcement and/or coaching that a midterm examination automatically provides.

Third, while the written instructions were identical, there may have been some differences in the oral instructions given by the professor to the Fall 2009, Spring 2010, and Fall 2010 students regarding how they were to analyze their mid-semester service learning experiences rather than merely report them. Increased emphasis might have caused the increase in the number of midterm reaction paper analyses in Fall 2010 and Spring 2010 as opposed to those obtained in Fall 2009. It will be important for the instructor to write out her oral instructions and potentially read them in order to assure that students are formally advised that one of the purposes of the midterm reaction paper is to evaluate how well they are applying their newfound organizational behavior vocabulary to their analysis of their service learning experiences.

Finally, only three coders were tasked to analyze the initial three essays used to create coded themes and relatively short amount of time (1 week) was spent in coding. While inter-rater reliability was high (only those codes that were identified as important by two or more coders formed the basis for the software-coded review), having more time as well as including non-researcher taught organizational behavior classes in the evaluation would strengthen the resulting analysis.

Further, it would potentially reduce the level of embedded biases that may have affected this study due to the researcher having instructed all participants as well as designed their curriculum. While these limitations were somewhat offset by the use of electronic software in the identification of repeated themes and narratives, these analytical issues need to be explored in future examination of the course learning outcomes.

Implications and Future Directions

Many of the business undergraduates participating in the survey classes appeared to demonstrate a level of enhanced organizational behavior knowledge as a result of participating in service learning projects, even without the listed Fall 2010 interventions. For example, this study found that students frequently referred to the role that stress, motivation, and both individual and collective values worked within themselves as individuals and within their service learning teams as work was accomplished. Students also demonstrated a more sophisticated capacity to discuss the appropriate use of goals and feedback as well as how groupthink and social loafing can negatively impact the progress of their service learning efforts. In addition, individual students appear to have gained a more sophisticated ability to detail a range of team processes including the importance of cooperation, communication, cohesion, roles, and development as they moved deeper into the details of completing their respective service obligations.

What appeared to be missing from many of the Fall 2009 and Spring 2010 analyses was an early demonstration of ASLER standards six and seven: namely, an understanding that the learning process is reciprocal and involves assistance to their respective community partners as well as the assistance of the community partners in consolidating what students are learning about organizational behavior. Further, while the service learning assignment clearly seemed to enhance students' caring for and about their teammates (as evidenced by the comments contained in their

midterm papers), similar growth was not as evident regarding the assignment's role in enhancing their caring about members of their service organization or the client community.

After the listed interventions, there appears to have been both a quantitative and qualitative change represented within the Fall 2010 midterm essay reflections. More organizational behavior concepts were identified, in general, and more of these concepts were presented in an organizationally-oriented manner rather than in an individual or team-oriented manner. Thus, if nothing else, this case study identifies the clear benefits that appear to have accrued as a result of incorporating peer-led reflections and assessment of the same into the course content. However, only 11 out of 30 randomly selected essays reflected this level of analysis, demonstrating that continued intervention and work in this area is still required.

In his book, *Deep Learning and the Big Questions: Reflections in Service-Learning*, Johnson (2006) suggested that instructors explicitly include six concepts within any service learning curriculum if the hope is to encourage what he called "deep" learning. The six steps include (a) articulating that spiritual growth, moral discernment, and social justice are part of the expected learning outcomes; (b) attending to issues of power and privilege; (c) pushing for depth; (d) cueing to big questions of self and world; (e) thinking about learning and daily life as being woven together as a part of a search for meaning; and (f) helping each other in moving from understanding symptoms to addressing causes. The incorporation of Johnson's (2006) or any other specification of desired content for guided reflection into an organizational behavior class, even with the assistance of a peer facilitator, certainly places new demands upon the instructor. However, this exploratory research suggests that the development of peer-related interventions explicitly targeting the enhancement of service learning may not only be successful but will result in closer alignment with planned course learning outcomes.

References

- Ambrose, S. A., Bridges, M. W., Lovett, M. C., DiPietro, M., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: SAGE.
- Bringle, R. G., & Hatcher, J. A. (1999). Reflection in service learning: Making meaning of experience. *Education Horizons*, 77(4), 179-185.
- Bringle, R. G., & Hatcher, J. A. (2002). Campus-community partnerships: The terms of engagement. *Journal of Social Issues*, 58(3), 503-516. doi:10.1111/1540-4560.00273
- Burton, A. J. (2000). Reflection: Nursing's practice and education panacea? *Journal of Advanced Nursing*, 31(5), 1009-1017. doi:10.1046/j.1365-2648.2000.01395.x
- Butin, D. W. (2006). Future directions for service learning in higher education. *International Journal of Teaching and Learning in Higher Education*, 18(1), 1-4. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE117.pdf>
- Byron, W. J. (2011). Humility, Magis, and discernment: A Jesuit perspective on education for business leadership. *Journal of Jesuit Business Education*, 2(1), 9-20.
- Cone, D., & Harris, S. (1996). Service learning practice: Developing a theoretical framework. *Michigan Journal of Community Service Learning*, 3, 31-43.
- Dewey, J. (1920). *Reconstruction in philosophy*. Mineola, NY: Dover.
- Duncan-Andrade, J. M., & Morrell, E. (2008). *The art of critical pedagogy*. New York, NY: Peter Lang.
- Eby, J. W. (1998). *Why service learning is bad*. Retrieved from <http://www.greatlakesed.net/Resources/documents/WhyServiceLearningIsBad.pdf>
- Eyler, J. (2002). Reflection: Linking service and learning—Linking students and communities. *Journal of Social Issues*, 58(3), 517-538. doi:10.1111/1540-4560.00274
- Freire, P. (1970). *The pedagogy of the oppressed*. New York, NY: Continuum.
- Furco, A. (1996). Service-learning: A balanced approach to experiential education. In *Expanding boundaries: Serving and learning* (pp. 9-18). Washington, DC: Corporation for National Service. Retrieved from https://www.urmia.org/library/docs/regional/2008_northeast/Service_Learning_Balanced_Approach.pdf
- Greeno, J. G., Collins, A. M., & Resnick, L. B. (1996). Cognition and learning. In D. Berliner & R. Calfee (Eds.), *Handbook of educational psychology* (pp. 15-41). New York, NY: MacMillan.
- Haughey, J. C. (2011) Listening a la Ignatius. *Journal of Jesuit Business Education*, 2(1), 1-8.
- Howard, J. (2000). Academic service-learning: Myths, challenges, and recommendations. *Essays on Teaching Excellence*, 12(3), 12-19.
- Ikpeze, C. (2007). Small group collaboration in peer-led electronic discourse: An analysis of group dynamics and interactions involving preservice and inservice teachers. *Journal of Technology and Teacher Education*, 15(3), 383-407.
- Johnson, B. T., & O'Grady, C. R. (Eds.). (2006). *The spirit of service: Exploring faith, service, and social justice in higher education*. Bolton, MA: Anker.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

- Kolvenbach, P.-H. S. J. (1986). *The characteristics of Jesuit education*. Retrieved from http://www.seattleu.edu/uploadedFiles/Core/Arc%20hive/Jesuit_Education/CharacteristicsJesuitEducation.pdf
- Leiderman, S., Furco, A., Zapf, J., & Goss, M. (2002). *Building partnerships with college campuses: Community perspectives*. Washington, DC: Council of Independent Colleges. Retrieved from http://www.cic.edu/Programs-and-Services/PandS-Archives/Past-Programs-and-Services/Documents/engaging_monograph.pdf
- Lewis, M. W. (1998). Iterative triangulation: A theory development process using existing case studies. *Journal of Operations Management*, 16(4), 455-469. doi:10.1016/S0272-6963(98)00024-2
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: SAGE.
- Martin, J. (2010). *The Jesuit guide to almost everything: A spirituality for real life*. New York, NY: HarperCollins.
- Mackintosh, C. (1998). Reflection: A flawed strategy for the nursing profession. *Nurse Education Today*, 18(7), 553-557. doi:10.1016/S0260-6917(98)80005-1
- McEwen, M. K. (1996). Enhancing students' learning and development through service learning. In B. Jacoby (Ed.), *Service learning in higher education* (pp. 53-91). San Francisco, CA: Jossey Bass.
- Palmer, P. J. (1997). Teaching and learning in community. In *The courage to teach: Exploring the inner landscape of a teacher's life* (p. 117-144). San Francisco, CA: Wiley & Sons.
- Piaget, J., & Inhelder, B. (1972). *The psychology of the child* (Vol. 5001). New York, NY: Basic Books.
- Shavelson, R. J. (1996). *Statistical reasoning for the behavioral sciences* (3rd ed.). Needham Heights, MA: Simon & Schuster.
- Tellis, W. (2011). An international service learning course in a developing country. *Journal of Jesuit Business Education*, 2(1), 31-46.
- Tollison, S. J., Lee, C. M., Neighbors, C., Neil, T. A., Olson, N. D., & Larimer, M. E. (2008). Questions and reflections: The use of motivational interviewing microskills in a peer-led brief alcohol intervention for college students. *Behavior Therapy*, 39(2), 183-194. doi:10.1016/j.beth.2007.07.001
- Walker, R., Cooke, M., Henderson, A., & Creedy, D. K. (2013). Using a critical reflection process to create an effective learning community in the workplace. *Nurse Education Today*, 33(5), 504-511.
- Williams, B., & Walker, E. (2003). Facilitating perception and imagination in generating change through reflective practice groups. *Nurse Education Today*, 23(2), 131-137. doi:10.1016/S0260-6917(02)00167-3
- Wright, A., Calabrese, N., & Henry, J. J. H. (2009). How service and learning came together to promote cura personalis. *International Journal of Teaching and Learning in Higher Education*, 20(2), 274-283. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE331.pdf>

MONIKA HUDSON is an assistant professor at the University of San Francisco and teaches organizational behavior, entrepreneurship, and public administration. Dr. Hudson's research interests include identity and entrepreneurial behaviors associated with the strategic implementation of programs in the public, nonprofit, and for-profit sectors. A trained mediator, she developed her expertise in strategic planning, business/economic development, and community engagement over a 30-year career with government and nonprofit agencies. She assists government, nonprofit, and private sector leaders in innovatively working with teams and organizations by enhancing individual and group performance. Dr. Hudson earned her doctorate in management at Case Western Reserve University in Cleveland. Connect with Monika Hudson at [http://www.usfca.edu/Faculty/Monika Hudson/](http://www.usfca.edu/Faculty/Monika%20Hudson/)

KEITH O. HUNTER is an assistant professor at the University of San Francisco's School of Management where he teaches courses in leadership, organizational behavior, and organization development. His research examines issues in social cognition including the dynamics of informal social networks and the influence of social structure on the development of social schemata in individuals and groups. Dr. Hunter earned his PhD in Organizational Behavior and Management at Carnegie Mellon University. Connect with Keith Hunter at http://www.usfca.edu/Faculty/Keith_Hunter/

Appendix
Assignment—Individual Midterm Analysis Paper (MAP)

Your **individually** prepared SL midterm analysis paper should be about 2,000 words (two to three single-spaced pages) and may take ONE of the formats listed below. Please reference the Blackboard **Evaluation Materials** folder to review the rubric that will be used to assess your analysis paper **prior to** submitting it in order to assure the best grade possible.

Option 1: Review any weekly journal notes you have compiled and collapse them into a 2,000-word narrative essay that discusses how you now understand the connection between the organizational behavior concepts we have been studying and the community-based work done by your service learning partner.

Option 2: If you have NOT been journaling on a regular basis, prepare your SL midterm analysis paper with the following three sections:

Section 1: Understanding of organizational behavior: We have examined the following concepts: what is organizational behavior, job satisfaction and organizational commitment; what are some of the individual personality characteristics; and how do perception, emotions/attitudes, motivation, stress, decision making/creativity, team dynamics, and communication work? Use this section to discuss at least **10** OB concepts we have covered and indicate how you believe these concepts apply to your personal or professional life.

Section 2: Reaction to **ONE** In-Class Exercise: Specify what OB concepts you now understand from completing ONE experiential (examples you may want to use: Corporate Social Responsibility, Yolanda Young, Alligator River, Motivation experientials, Job Enrichment, Trust Building TinkerToys, Stress Research Dig, Winter Survival, Escalation of Commitment Dollar Bid, Eggperience, Nesting Boxes, Jet Fighter, Power in the Family Restaurant).

Section 3: Reaction to your Service Learning Assignment to Date: This analysis represents your 500- to 600-word summary of your reflections about OB concepts you have learned as a result of working with your community partner and the associated community. Responses that include a specific recent experience; its affects on you, your team, and your project; and what you learned as a result of this experience will receive a higher grade than a mere “this is what happened” report.

AS THIS IS A PERSONAL REFLECTION, please post your response on the appropriate ASSIGNMENT BOARD by **11:59 p.m. on Friday, October 26th**.

* The assignment rubric is available on the following page.

RUBRIC TO ASSESS SERVICE LEARNING REFLECTION PAPERS

Developed by Hawai'i Campus Compact

AWARENESS OF PURPOSE OF SERVICE

NOVICE	APPRENTICE	PROFICIENT	DISTINGUISHED
Student demonstrates limited awareness of the purpose of obtaining service learning credit.	Student expresses awareness of issues pertaining to connections with the project, but it is not applied.	Student expresses empathy and awareness of personal role in the solution and makes a connection to the bigger picture.	Student expresses and enacts personal role in the solution.

APPLY THEORY TO SERVICE LEARNING

NOVICE	APPRENTICE	PROFICIENT	DISTINGUISHED
Student does not apply theory, or makes very limited, unclear connection of theory to service.	Student expresses some connection between theory and service.	Student develops a perspective that is substantially based on both theory and service.	Student takes own perspective based on both theory and service, applies it beyond the curriculum.

RESPONSIBILITY TO COMMUNITY

NOVICE	APPRENTICE	PROFICIENT	DISTINGUISHED
Student demonstrates a limited awareness of personal responsibility to community.	Student shows insight into community issues pertinent to the service project. Expresses sense of personal responsibility for participating in a solution but does not apply knowledge.	Student accepts a responsibility to the community regarding issues pertinent to the service project and expresses a commitment to applying knowledge to working towards specific solution(s).	Student acknowledges a responsibility to community regarding issues pertinent to service and expresses a commitment to working towards a specific solution. In addition, student gets others involved.

IMPACT ON STUDENT'S PERSONAL LIFE

NOVICE	APPRENTICE	PROFICIENT	DISTINGUISHED
Student expresses very limited or no connection between service and self.	Student expresses a connection between service and self. (e.g., "I feel good about having done this good deed.")	Student expresses how she/he could change as a result of the service.	Student expresses actual change(s) in self because of the service.

CRITICAL THINKING

NOVICE	APPRENTICE	PROFICIENT	DISTINGUISHED
Student accepts ideas at face value, as if all opinions were created equal. Opinions are stated without argument.	Student begins to ask questions, attempts to understand other perspectives.	Student begins to argue for conclusions based on evidence but arguments do not demonstrate thorough consideration of different perspectives.	Student expresses abstract level of responding: requires objective evidence, demonstrates awareness of different perspectives, and weighs evidence to successfully argue for a conclusion/opinion.

Teaching Assistants' Preparation for, Attitudes Towards, and Experiences with Academic Dishonesty: Lessons Learned

Michael Seals
Purdue University

James O. Hammons and Keteven Mamiseishvili
University of Arkansas

This study examined teaching assistants' (TAs) preparation for, attitudes towards, and experiences with academic dishonesty at a public research university. Of 470 TAs, 184 (39%) completed the survey instrument. The major findings of the study were: (a) TAs were more satisfied with their informal than their formal preparation for dealing with academic dishonesty of their students, (b) over 90% of TAs received some form of formal training dealing with academic integrity, (c) a large percentage of TAs have failed to address cheating incidents, and (d) TAs displayed conflicting attitudes towards issues of academic dishonesty. Recommendations for improved practice and further research are provided.

Academic dishonesty has been described as "endemic to the college and university campus" (Pulvers & Diekhoff, 1999, p. 487). While there is a wealth of literature discussing academic integrity from both student and full-time faculty perspectives, there is very little research that deals with teaching assistants' (TAs) experiences with academic dishonesty in the classroom. This is an area that needs to be understood, particularly as TAs continue to play a larger role in undergraduate education. The purpose of this study was to better understand TAs' preparation, attitudes, and experiences regarding academic dishonesty at a public research institution.

Review of the Research Problem

Academic dishonesty is widespread on college and university campuses. Recent literature has reported that the majority of college students cheat, with rates ranging from 57% to 92% (Baetz, Zivcakova, Wood, Nosko, & De Pasquale, 2011; Sterngold, 2004; Vandahey, Diekhoff, & LaBeff, 2007). It has also been reported that cheating has been increasing over the past few decades (Scanlon, 2003). Furthermore, nearly half of high-achieving high school students report the belief that cheating is not necessarily wrong (Shipley, 2009). These data suggest that the decision to cheat is likely a deliberate choice for many students.

Advances in technology have further increased the frequency of students' academic integrity violations. McCabe (2001) noted that the Internet is likely to intensify academic dishonesty. Indeed, four out of five students who cheat on written work used the Internet to do so (McCabe, 2005). Recently, contract cheating, defined as a student hiring others to prepare their written work, has become increasingly commonplace (Walker & Townley, 2012). According to Scanlon (2003), "Widespread use of the Internet may be shaping a new generation of students' conception of 'fair use,' leading them to view the mass of information so freely shared in cyberspace as public

knowledge" (p. 161). Another contribution to the problem is the disparity between what is considered cheating from one faculty member to another. In a study in which faculty were asked to determine whether 25 potential actions constituted cheating or not, faculty members only agreed at rates of 75% or higher on 10 of the actions (Higbee & Thomas, 2002).

Another cause of growing academic dishonesty, according to some students, may be faculty attitudes (Walker & Townley, 2012). According to McCabe (2005), "students suggest that faculty who do nothing about what appears to be obvious cheating simply invite more of the same from an ever-increasing number of students who feel they are being 'cheated' by such faculty reluctance" (p. 29). A Duke University study found that 30% of their faculty were aware of cheating and chose to do nothing about it (Ruderman, 2004). According to Schneider (1999), "The number [of faculty] who do nothing is very small, but the number who do very little is very large" (p. A8). How could faculty have such a laissez faire attitude towards academic dishonesty? The reasons likely include a lack of support from administrators, favoritism for certain students, and overly legalistic policies that often find guilty students innocent (McCabe, 2005). Many faculty deal with cheating quickly and quietly because "the university judicial process is laborious, even labyrinthine, and the punishments frequently bear little connection to the crimes" (Schneider, 1999, p. A8).

The use of TAs further exacerbates the problem of academic dishonesty. TAs are often novice classroom instructors without the skill set and confidence that is required to facilitate a culture of academic integrity among their students. Research has found that cheating is 32% more likely to occur in classes taught by TAs (Schneider, 1999). This contributes greatly to the problem of academic dishonesty, particularly at research institutions where a growing number of TAs are teaching courses (Association of Departments of English, 1999). Compounding this problem even further

is a lack of training for TAs. As Calkins and Kelley (2005) noted, "[Faculty] are generally not expected to guide their graduate teaching assistants through the process of teaching, except in a very rudimentary way" (p. 259). A better understanding of TAs' preparation for, attitudes towards, and experiences with students' academic integrity violations must be attained in order for this problem to be more effectively addressed.

Method

This study investigated teaching assistants' preparation for, attitudes towards, and experiences with academic dishonesty at a public research university. The following research questions were investigated:

1. Preparation: How adequately do TAs feel they were prepared for dealing with academic dishonesty
2. Attitudes: What are the attitudes of TAs regarding academic dishonesty?
3. Experiences: What are the experiences of TAs with regard to academic dishonesty?
 - a. What percentage of TAs encounter academic dishonesty in their classroom?
 - b. What types of academic dishonesty do TAs most frequently experience?
 - c. How do TAs respond to incidents of academic dishonesty?
 - d. Are TAs satisfied with how reported incidents are handled?
4. Preparation and Attitudes: Does a relationship exist between TAs' preparation for dealing with academic dishonesty and their attitudes towards academic dishonesty?
5. Preparation and Experiences: Does a relationship exist between TAs' preparation for dealing with academic dishonesty and their experiences with academic dishonesty?
 - a. Is there a relationship between TAs' preparation and the number of cheating incidents they experience?
 - b. Is there a relationship between TAs' preparation and whether or not they respond to cheating incidents?
6. Attitudes and Experiences: Does a relationship exist between TAs' attitudes towards academic dishonesty and their experiences with academic dishonesty?
 - a. Is there a relationship between TAs' attitudes and the number of cheating incidents they experience?
 - b. Is there a relationship between TAs' attitudes and whether or not they respond to cheating incidents?

Participants

The target population for this study was teaching assistants (TAs) at a public research university consisting of approximately 16,000 undergraduate and 4,000 graduate students. According to Graduate School data, there were 470 TAs on campus during the Spring 2010 semester when this study was conducted.

Instrumentation

The survey that was used to collect data from participants consisted of three main parts. The first part of the survey included questions regarding TAs' demographic characteristics, past teaching experiences, and their experiences with academic dishonesty in the classroom. The second part of the survey assessed how adequately TAs felt prepared for dealing with academic dishonesty, and the third part included questions regarding TAs' attitudes towards academic dishonesty. The researchers designed the survey based on the thorough review of existing research and tested during two pilot tests, which resulted in minor wording changes to provide better clarity.

The initial portion of the survey contained questions about TAs' demographic information and their experiences with academic dishonesty. The demographic questions surveyed participants' gender, race, number of semesters as a TA, course load, average number of students, and number of courses taught in their career. In terms of their experiences with academic dishonesty, TAs were asked the number of cheating incidents they had experienced, their typical responses to cheating, the types of cheating experienced, reasons for ignoring cheating, and satisfaction with the university conduct board process.

The survey also included questions that dealt with how adequately TAs felt prepared for dealing with academic dishonesty. It surveyed both TAs' formal and informal preparation for academic dishonesty relating to four themes: what constitutes academic dishonesty (Higbee & Thomas, 2002), proactive strategies for dealing with academic dishonesty (McCabe, 2005; Vandahey et al., 2007), reactive strategies for dealing with academic dishonesty (Coalter, Lim, & Wanorie, 2007; Walker & Townley, 2012), and the procedures for responding to and reporting cheating incidents (Ruderman, 2004). These four themes were selected because they represented the four most common themes in the overall literature on academic dishonesty. For the purpose of this study, formal preparation referred to department or institution-sponsored training sessions on academic dishonesty and any sessions TAs may have attended at conferences. Informal preparation referred to actions initiated by TAs themselves to gain a better understanding of students' academic integrity violations.

and how to deal with them, such as online research, self-directed reading, questions directed to a faculty member or colleague, or advice sought from a faculty advisor. For this study, formal and informal preparations were examined separately in order to attain a more nuanced profile of TAs' preparation levels received from both structured opportunities for training and other alternative self-initiated means. The researchers felt this approach was important considering the evidence that TAs often cite informal training as their first source of knowledge regarding classroom teaching (Breslow & Tervalon, 2005). Respondents assessed their preparation for each of the themes using a 5-point Likert scale (1 = *no preparation*, 2 = *inadequate*, 3 = *somewhat adequate*, 4 = *adequate*, and 5 = *more than adequate*).

The last part of the survey focused on TA attitudes towards academic dishonesty. This instrument included eight statements. Respondents rated each statement using a 4-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*). The content of these eight items was derived from four attitudinal themes frequently discussed in the literature, with two items addressing each theme. These themes included the seriousness of academic dishonesty (Higbee & Thomas, 2002; McCabe, 2005), prevalence of academic dishonesty (Baetz et al., 2011; McCabe, 2005), ability to affect academic dishonesty within the TAs' courses (Levy & Rakovski, 2006), and importance of addressing academic dishonesty with students (Coalter, Lim, & Wanorie, 2007; Schneider, 1999).

Procedures

After approval was received from the Institutional Review Board (IRB) to conduct the study, the questionnaire was distributed to the target population with permission of the Graduate School via a TA list-serv kept by the Associate Dean of the Graduate School in Fall 2010. This e-mail contained an introduction to the study, a statement of informed consent, and a link to the actual questionnaire. Participants completed the survey using SurveyMonkey, an online research tool that collects survey data. One hundred forty-six TAs completed the questionnaire after the initial e-mail. A second e-mail was sent out two weeks following the initial invitation. This yielded an additional 74 responses. Of the 220 total responses received, 26 were excluded because the respondents did not complete the survey. An additional 10 responses were excluded because respondents reported having no teaching experience. This yielded a total of 184 respondents for a final response rate of 39.1%.

Data Analysis

Data were collected using the SurveyMonkey web utility. These data were then downloaded into an Excel

spreadsheet. The Statistical Package for the Social Sciences (SPSS) software was used to conduct statistical analysis of the data. A summary of demographic information was computed using descriptive statistics. Research questions were addressed as appropriate using a combination of descriptive and inferential statistics, including Pearson's product moment-correlations and biserial correlations.

Results

Tables 1, 2, and 3 show the demographic data of the respondents. A cross-tabulation of participants' gender and race is given in Table 1. The participants' overall teaching experience, including total number of semesters and courses taught, is included in Table 2. The participants' current teaching experience, including current course load and average class size, is indicated in Table 3.

Preparation

The mean rating for formal preparation among Teaching Assistants was 3.04 ($SD = 1.05$). Responses and means for the four areas surveyed are shown in Table 4. TAs felt most formally prepared about what is considered cheating ($M = 3.21$, $SD = 1.22$) and how to address cheating ($M = 3.22$, $SD = 1.22$) and least formally prepared in how to detect cheating ($M = 2.78$, $SD = 1.21$). Between 15.2% and 21.7% of TAs received no formal preparation in one area, with the most common area being how to detect cheating. Eighteen (9.8%) TAs reported receiving no formal preparation at all.

The mean informal preparation among Teaching Assistants was 3.39 ($SD = 0.93$). Responses and means for the individual four areas surveyed are depicted below in Table 5. TAs felt that their informal preparation was strongest in what incidents are considered cheating ($M = 3.56$, $SD = 1.05$) and weakest in how to detect cheating ($M = 3.24$, $SD = 1.12$). TAs reported their informal preparation in regard to academic dishonesty to be more adequate than their formal preparation in each of the four areas. Seven (3.8%) of the TAs received no informal preparation at all.

A cumulative preparation score consisting of the average of formal preparation scores and informal preparation scores was calculated. This yielded a mean score of 3.21 ($SD = 0.87$).

Attitudes

Respondents were asked to indicate their attitudes in regards to eight statements about academic

Table 1
Participants by Gender and Race

Race	Male	Female	Total
African American	1	1	2
American Indian/Alaskan Native	0	2	2
Asian or Pacific Islander	3	3	6
Caucasian	55	88	143
Hispanic	4	2	6
International Student	15	10	25
Total	78	106	184

Table 2
Participants by Overall Teaching Experience

Teaching experience	<i>N</i>	%
Total semesters taught		
1	21	11.4
2	57	31.0
3	18	9.8
4	34	18.5
5	17	9.2
6+	37	20.1
Total courses taught		
1	23	12.5
2	24	13.0
3	17	9.2
4	28	15.2
5	13	7.1
6	8	4.3
7	5	2.7
8	16	8.7
9	4	2.2
10+	46	24.9

Table 3
Participants by Current Semester Teaching Experience

Teaching experience	<i>N</i>	%
Course load		
0	22	12.0
1	58	31.5
2	76	41.3
3	17	9.2
4	7	3.8
5+	4	2.2
Average class size		
< 25	87	47.3
26-50	63	34.2
51-75	18	9.8
76-100	4	2.2
101-150	3	1.6
>150	6	3.3

Table 4
Teaching Assistants' Formal Preparation for Dealing with Academic Dishonesty

Preparation Area	NP	%	IP	%	SAP	%	AP	%	MAP	%	M
What incidents are considered cheating?	30	16.3	13	7.1	49	26.6	73	39.7	19	10.3	3.21
Things you can do to prevent cheating.	30	16.3	29	15.8	53	28.8	60	32.6	12	6.5	2.95
How to detect cheating.	37	20.1	37	20.1	51	27.7	47	25.5	12	6.5	2.78
Policies for addressing and reporting cheating.	26	14.1	23	12.5	47	25.5	64	34.8	24	13.0	3.22

Note. NP = no preparation (1), IP = inadequate preparation (2), SAP = somewhat adequate preparation (3), AP = adequate preparation (4), MAP = more than adequate preparation (5).

Table 5
Teaching Assistants' Informal Preparation for Dealing with Academic Dishonesty

Preparation Area	NP	%	IP	%	SAP	%	AP	%	MAP	%	M
What incidents are considered cheating?	12	6.5	12	6.5	49	26.6	80	43.5	31	16.8	3.56
Things you can do to prevent cheating.	16	8.7	20	10.9	52	28.3	77	41.8	19	10.3	3.35
How to detect cheating.	17	9.2	21	11.4	63	34.2	61	33.2	22	12.0	3.24
Policies for addressing and reporting cheating.	15	8.2	22	12.0	53	28.8	69	37.5	25	13.6	3.36

Note. NP = no preparation (1), IP = inadequate preparation (2), SAP = somewhat adequate preparation (3), AP = adequate preparation (4), MAP = more than adequate preparation (5).

dishonesty (e.g., cheating is a serious offense). As indicated earlier, respondents were asked to rate their agreement with each statement on a 4-point scale using the following responses: 1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*. The overall mean of their responses was 3.28 (Min = 2.17, Max = 4.00, *SD* = 0.34). See Table 6 for a statistical summary of their ratings for each individual statement.

Experiences

Respondents were asked several questions about their experiences with cheating in the courses that they teach. One hundred fifty-seven participants (85.3%) reported experiencing at least one incident of cheating during their time as a TA. The mean number of cheating incidents experienced was 2.93 (Min = 0, Max = 17, *SD* = 2.90).

Of the types of cheating surveyed, the most common ones experienced by TAs were plagiarism that involved using content from a published work without a citation (experienced by 44% of TAs) and copying test answers from another student (43.5%). See Table 7 for the responses to this question. Participants were also able to write in responses to describe types of cheating they had experienced that were not included as answer options for the question. Twenty-one (11.4%)

participants provided additional information. Of these write-in responses, six TAs reported catching students using cell phones during an examination to look up answers or to send and receive answers via text message. Other types of cheating reported were turning in the same work for multiple courses, writing an absent student's name on a group quiz, using files of prior tests kept by fraternities, and correcting a quiz after it had been graded and returned to the student.

The 157 TAs who reported experiencing some form of cheating were asked about the ways that they typically responded to cheating incidents. The majority of TAs typically spoke directly with the student (76.4%), consulted with the lead faculty member (63.9%), and gave the student an "F" on the assignment (58.6%). Fifteen (9.6%) of the TAs routinely ignored cheating incidents. Table 8 provides a summary of their responses. Other responses to cheating provided by TAs in the write-in section included issuing warnings, providing additional tutoring, making students redo assignments, deducting one letter grade from the student's final course grade, deducting points from an assignment, discussing cheating with the class as a whole, and changing classroom procedures to prevent future cheating.

The next question sought to determine TAs' reasons for ignoring cheating. Of the 157 TAs that

Table 6
Teaching Assistants' Attitudes Towards Academic Dishonesty

Statement	SD	%	D	%	A	%	SA	%	M
Cheating is a serious offense.	2	1.1	1	0.5	43	23.4	138	75.0	3.73
Cheating is one of the most important problems in higher education.	7	3.8	37	20.1	93	50.4	47	25.5	2.98
Most students have cheated on college coursework at least once.	6	3.2	61	33.2	84	45.7	33	17.9	2.76
Students rarely cheat in the courses I teach.	10	5.4	61	33.2	101	54.9	12	6.5	2.63
I play an important role in preventing cheating in the classes I teach.	4	2.2	27	14.7	104	56.5	49	26.6	3.07
If students want to cheat, they are going to cheat regardless of what I do.	12	6.5	96	52.2	58	31.5	18	9.8	2.44
Talking to my class about academic integrity at the start of the semester is important.	2	1.1	11	6.0	74	40.2	97	52.7	3.46
It is important to address suspected cheating quickly.	0	0.0	2	1.1	60	32.6	122	66.3	3.66

Note. SD = *strongly disagree*, D = *disagree*, A = *agree*, and SA = *strongly agree*.

Table 7
Types of Cheating Reported by Teaching Assistants

Type of cheating	N	%
Copying another student's work.	70	38.0
Copying test answers from another student.	80	43.5
Copying test answers from a cheat sheet/crib sheet.	26	14.1
Collaborating on an assignment that was intended for individual work only.	54	29.3
Turning in a paper purchased online.	16	8.7
Using content from a published work without citing it.	81	44.0

Table 8
Teaching Assistants' Usual Responses to Cheating Incidents

Response	N	%
Consulted with the lead faculty member.	100	63.9
Gave the student an "F" on the assignment.	92	58.6
Gave the student an "F" in the course.	11	7.0
Ignored the incident.	15	9.6
Reported the student a department head or dean.	25	15.9
Reported the student to the campus judicial board.	37	23.6
Spoke with student.	120	76.4

experienced cheating, 37 (23.5%) had never failed to respond to a cheating incident. The remaining 107 (76.5%) had failed to respond to a cheating incident on at least one occasion. Of these 107 TAs, the majority (87.9%) reported they had failed to address cheating due to not having enough evidence. The least common rationale for failing to respond to cheating was fear of retaliation from the student (6.5%). See Table 9 for more details. Several reasons were also given in the

write-in section of the question. These included apathy, the belief that the judicial process was biased against the student, the belief that the judicial process was too lenient, the desire to avoid a "he said, she said" situation, the desire to avoid having to deal with a student's parents, and being instructed by the lead professor not to report the incident.

The final question regarding TA experiences with academic dishonesty sought to determine satisfaction

Table 9
Teaching Assistants' Reasons for Ignoring Suspected Cheating

Reason	N	%
Have heard about other faculty and/or TAs' bad experiences with confronting cheating.	21	19.6
Not enough evidence to prove cheating.	94	87.9
Judicial process is too complicated and/or time consuming.	21	19.6
Judicial process is unfair to accusers.	15	14.0
Unsure of how to address the incident.	22	20.6
Worried about retaliation from the student.	7	6.5

Table 10
TAs' Satisfaction With the University Judicial System

Satisfaction level	N	%
Satisfied	16	43.2
Somewhat satisfied	16	40.5
Not satisfied	6	16.2

with the university judicial system in terms of addressing suspected academic misconduct. Of the respondents who experienced cheating, 37 (23.6%) had referred a student to the Office of Community Standards and Student Ethics on at least one occasion. Table 10 displays the results to this question.

Relationship Between Preparation and Attitudes

Pearson product-moment correlations were conducted to determine if a relationship existed between TAs' perceptions of their formal, informal, and total preparation for dealing with academic dishonesty and their attitudes towards academic dishonesty. The results of these correlations showed several statistically significant relationships. The statement, "Most students have cheated on college coursework at least once," was negatively correlated with formal ($r = -.229, p < .01$), informal ($r = -.209, p < .01$), and total ($r = -.249, p < .01$) preparation. The statement, "Students rarely cheat in the courses I teach," was positively correlated with formal ($r = .229, p < .01$), informal ($r = .216, p < .01$), and total ($r = .253, p < .01$) preparation. The statement, "I play an important role in preventing cheating in the classes I teach," was also positively correlated with formal ($r = .193, p < .01$), informal ($r = .307, p < .01$), and total ($r = .279, p < .01$) preparation. Finally, overall attitudes had weak positive correlations with informal ($r = .170, p < .05$) and total ($r = .167, p < .05$) preparation.

Relationship Between Preparation and Experiences

Pearson product-moment correlations were conducted to determine if a relationship existed

between preparation and the number of cheating incidents TAs experienced. No significant correlations were found. Biserual correlations were conducted to determine if a relationship existed between preparation and TAs' responses to cheating incidents. There was a significant positive correlation between informal preparation and whether or not TAs responded to cheating incidents ($r = .217, p < .01$). There was also a weak positive correlation between total preparation and TAs' responses to cheating ($r = .162, p < .05$). No statistically significant correlations were found between formal preparation and TAs' responses to cheating.

Relationship Between Attitudes and Experiences

Pearson product-moment correlations were used to examine the relationship between TAs' attitudes and the number of cheating incidents they experienced, while biserual correlations were used to examine the relationship between TAs' attitudes and their responses to cheating. Two statistically significant relationships were observed when examining the associations between TAs' attitudes towards academic dishonesty and the number of cheating incidents they experienced. There was a significant negative correlation between the number of incidents experienced and the level of agreement with the statement, "Students rarely cheat in the courses I teach" ($r = -.310, p < .01$). There was also a significant positive correlation between the number of cheating incidents experienced and overall attitudes ($r = .198, p < .01$). Only one statistically significant correlation was found when examining relationships between TAs' attitudes and their responses to cheating incidents. More specifically, a weak positive correlation was observed between TAs' responses to cheating and

level of agreement with the statement "It is important to address suspected cheating quickly" ($r = .179, p < .05$).

Discussion

Preparation

TAs reported being more satisfied with the quality of their informal preparation (e.g., advice from faculty members, self-study) than their formal preparation (actual training provided by the institution). The greater satisfaction with informal training makes sense for several reasons. First, formal training on academic dishonesty generally occurs early in a TA's career, before he or she has had much classroom experience. Informal training is typically sought out by the TA at a time when the topic is more relevant to them, such as upon suspecting a student of cheating. Additionally, while formal training usually is delivered by a presentation to a group of TAs, informal training would generally be discussion based in a one-on-one setting, which allows TAs to more easily obtain the information they feel is most beneficial to them.

The majority of TAs (90.2%) received at least some form of formal training regarding academic dishonesty. This was surprising because anecdotal evidence along with some research suggested that TAs often do not receive in-depth formal training. In fact, Breslow and Tervalon (2005) found that most TAs' primary sources for training were informal conversations with supervisors and mentors. A related finding of significance was that 21.7% of TAs did not receive formal preparation in at least one of the four major areas surveyed. These results show that while most TAs are getting formal training on issues of academic integrity, there is certainly the ability to provide broader training on the topic.

Attitudes

It is clear that the TAs in the study consider academic integrity to be important. A large majority (98%) of the TAs who participated in this study believed academic dishonesty to be a "serious offense" and agreed that it is important to address suspected cheating quickly. These are attitudes that one would hope to see from undergraduate instructors and future faculty members. This suggests that these TAs may be receptive to learning strategies for improving academic integrity in their classrooms.

According to Schneider (1999), "The number [of faculty] who do nothing [about cheating] is very small, but the number who do very little is very large" (p. A8). This also appears to hold true for TAs in this study. While fewer than ten percent of TAs reported that their usual response to cheating was to ignore it, over three-

fourths (76.5%) reported having ignored suspected cheating at least once. This is problematic because it can send the message that TAs do not care if students cheat. If students feel that their instructors do not care about cheating, they sometimes use this as justification for their decision to engage in academic dishonesty (Levy & Rakovski, 2006).

Another interesting finding was the existence of conflicting attitudes among TAs. Nearly two-thirds (63.6%) of TAs agreed that most college students have cheated; however, only 38.6% believed that students were cheating in their courses. Additionally, while 83.2% of TAs believed that they play an important role in preventing cheating, 58.7% agreed with the statement, "If students want to cheat, they will cheat regardless of what I do." A possible explanation for these conflicting attitudes is attribution theory, which assumes that people will interpret their environment in a way that allows them to maintain a positive self-image (Harvey & Martinko, 2009). Thus, TAs would realize that cheating is widespread but refuse to believe that it occurs in their courses. Attribution theory also suggests that TAs, while believing that they can prevent cheating, would explain any cheating actually experienced as beyond their control.

Experiences

The results of the study indicate that traditional methods of cheating remain the most popular and are being aided by technology. The TAs in this study reported most frequently experiencing plagiarism (44%) and copying test answers from other students (43.5%). However, almost nine percent of TAs reported having a student turn in a paper that was purchased online, and six wrote in responses about discovering students using cell phones to look up or text answers during a test. This supports McCabe's (2001) theory that technology will increasingly support the cheating epidemic. With the rapid speed with which technology advances, it is likely that students will find easier, more efficient ways of cheating. Because of this, it is important that TAs receive continuous training about preventing and detecting cheating.

Relationships

An interesting relationship was observed between TA preparation and attitudes. There was a negative relationship between all types of preparation (i.e., formal, informal, and total) and the belief that most college students have cheated at least once. Each type of preparation was also positively correlated with the belief by TAs that students rarely cheated in their courses. In other words, TAs who reported feeling better prepared for dealing with issues of academic

dishonesty were less inclined to believe that students were cheating, particularly in the courses they teach. Since we know that cheating is pervasive on college campuses and that 85.3% of TAs who participated in this study reported experiencing cheating, these views were probably unrealistic. When this is coupled with the fact that no relationship was found between preparation and the number of cheating incidents experienced, it suggests that preparation for dealing with academic dishonesty by TAs in this study deserves additional attention.

Recommendations for Improved Practice

Based upon the results of this study, the researchers offer the following recommendations for improved practice. First, since informal preparation was consistently rated higher than formal preparation, the institution should make an effort to provide more opportunities for informal training. For example, departments could place an increased emphasis on mentoring relationships between faculty and TAs. Additionally, the Graduate School could designate a contact to call with any questions about addressing academic dishonesty. They could also publish an online Frequently Asked Questions guide to issues of academic dishonesty so that TAs could access reliable information at any time. Another option would be to develop a TA handbook that would include, along with other relevant topics, information about preventing and responding to academic dishonesty.

Second, institutions would be well advised to include a session on academic integrity as a core component of orientations for new TAs. The most essential topics to include would be an overview of the prevalence of cheating, strategies for preventing and detecting cheating, and the institution's process for addressing these incidents. The bulk of the information presented should be strategies for proactively preventing cheating that can be easily applied to the classroom setting. This training would ensure TAs have a base of information prior to their first experience as an instructor.

Additionally, departments should purchase plagiarism detection software and train TAs on how to use it. Forty-four percent of TAs reported encountering plagiarism in their courses. This is congruent with findings in the literature that plagiarism is the most prevalent means of cheating in college (McCabe, 2005). Utilizing this software would enable TAs to detect more cheating incidents and serve as a stronger deterrent to students who are considering cheating.

TAs must clearly delineate when collaborative work is allowed and when it is considered dishonest. Since these expectations vary considerably from instructor to instructor and assignment to assignment, it

is essential to make this clear to students. Higbee and Thomas (2002) found faculty members split on whether or not collaborative work should be supported or considered dishonest, which can send mixed messages to students. Additionally, 29.3% of TAs in this study reported having students collaborate on assignments that were intended for individual work. While many of those students may have intentionally committed academic dishonesty, it is highly likely that at least some of those cases occurred due to confusion about expectations.

If TAs are not already doing so, they should include a candid discussion about academic integrity during the first day of class. This will convey to students that their instructors value ethical academic conduct. It also gives TAs an opportunity to clearly cover their expectations and provides students an opportunity to ask questions. This is important because research has found that students often use a perceived apathy towards cheating on the part of faculty as justification to cheat (Levy & Rakovski, 2006; McCabe, 2005). TAs should support this conversation by having an academic integrity statement as a part of the syllabus. This statement could include a definition of academic integrity, a request that students report potential unethical behavior they observe, and the potential consequences of cheating in the course.

Instructors should consider taking steps to reduce the pressure on students in their courses. This can be done by providing more opportunities for students to demonstrate mastery of the material. Instead of designing a course with one or two major papers or exams, instructors can have four or five examinations, periodic quizzes, or multiple short writing assignments. By doing this, students are tested on smaller chunks of material more frequently and have more opportunities to demonstrate their knowledge. Additionally, this prevents the majority of a student's grade resting on his or her performance on one large assignment or test, which may reduce a student's perception of the need to cheat.

TAs should consider having students sign an academic integrity pledge upon turning in their work. This pledge could be included as a short statement that students must sign at the end of examinations or as a cover sheet to attach to major papers. McCabe and Trevino (1996) found that honor pledges such as this tend to increase academic integrity among students. This provides a simple and low-effort way to keep the issue of integrity in front of students and require them to reflect on their decisions prior to submitting their work.

Another in-class strategy for instructors is to clearly articulate the goals of the course and specific assignments to students. Creating and sharing learning objectives is one way to help students understand exactly what they should be learning from the course and will help them to know the areas upon which to

focus their studies. For writing assignments, sharing rubrics provides additional clarity to students regarding exactly how their work will be graded. Both of these strategies may help students to feel more comfortable in the course by giving them a better understanding of what the instructor expects from them.

Finally, TAs should be strongly encouraged to report suspected cheating incidents to the Office of Student Conduct and Community Standards. Only 20.1% of TAs who participated in this study had referred a student through the formal conduct process; however, 83.7% of those TAs reported being satisfied with that experience. This is in direct contrast with much of the literature on faculty experiences, which finds that faculty are often unhappy with the formal conduct process of universities (Coalter et al., 2007; McCabe, 2005; Schneider, 1999). However, the positive experiences of TAs in this study are encouraging and a sign that the process can be perceived as effective and worthwhile.

Recommendations for Further Study

The most obvious limitation is the fact that this study assessed the preparation, attitudes, and experiences of TAs at one point in time on one campus. Due to this, any findings should not be generalized to other campuses or to TAs in general. Although it may be assumed that the experiences observed in this study may be congruent with those of TAs at institutions with similar demographics, further research is needed for this to be confirmed. It would also be worthwhile to further investigate whether TAs' attitudes towards academic dishonesty change over time or whether TAs' preparation for, attitudes towards, and experiences with academic dishonesty are similar with those of faculty members. Future study can also be designed to include focus groups and other qualitative methods. This would provide an added depth to the subject matter that could be paired with the results of this study to create a more thorough understanding of TAs' experiences with academic dishonesty. Future study can also be conducted to compare TAs' preparation for, attitudes towards, and experiences with academic dishonesty at various types of institutions or with TAs of similar institutions but with different training models (e.g., required day long orientations or on-campus teaching development centers). It would be interesting to examine whether certain instructional strategies would negate students' perceived need to cheat. Potential strategies include utilization of learning objectives, clear syllabi, criterion-referenced grading, in-class discussions of academic integrity, and using multiple teaching approaches. Finally, an important area of research would be the application of attribution theory to understanding TAs' attitudes towards academic

dishonesty. As previously discussed, TAs in this study appeared to view cheating as something that occurs in other instructors' classes or something that they were powerless to affect. Attribution theory may help to understand these attitudes and how to best address them through training.

References

- Association of Departments of English. (1999). *Executive summary report of the ad hoc committee on staffing*. Retrieved from https://www.ade.org/reports/exec_sum.htm
- Baetz, M., Zivcakova, L., Wood, E., Nosko, A., & De Pasquale, D. (2011). Encouraging active classroom discussion of academic integrity and misconduct in higher education business contexts. *Journal of Academic Ethics*, 9(3), 217-234. doi:10.1007/s10805-011-9141-4
- Breslow, L., & Tervalon, C. D. (2005). Strengthening TA training. *Faculty Newsletter*, 27(5), 5.
- Calkins, S., & Kelley, M. R. (2005). Mentoring and the faculty-TA relationship: Faculty perceptions and practices. *Mentoring and Tutoring*, 13(2), 259-280. doi:10.1080/13611260500105915
- Coalter, T., Lim, C. L., & Wanorie, T. (2007). Factors that influence faculty actions: A study on faculty responses to academic dishonesty. *Institutional Journal for the Scholarship of Teaching and Learning*, 1(1), 1-21.
- Harvey, P., & Martinko, M. J. (2009). Attribution theory and motivation. In N. Borkowski (Ed.), *Organizational behavior, theory, and design in health care* (pp. 143-158). Sudbury, MA: Jones & Bartlett.
- Higbee, J. L., & Thomas, P. V. (2002). Student and faculty perceptions of behaviors that constitute cheating. *NASPA Journal*, 40(1), 39-52. doi:10.2202/1949-6605.1187
- Levy, E. S., & Rakovski, C. C. (2006). Academic dishonesty: A zero tolerance professor and student registration choices. *Research in Higher Education*, 47(6), 735-754. doi:10.1007/s11162-006-9013-8
- McCabe, D. L. (2001). Cheating: Why students do it and how we can help them stop. *American Educator*, 25(4), 38-43.
- McCabe, D. L. (2005). It takes a village: Academic dishonesty and educational opportunity. *Liberal Education*, 91(3-4), 26-31. Retrieved from <http://www.aacu.org/liberaleducation/le-sufa05/le-sufa05feature2.cfm>
- McCabe, D. L., & Trevino, L. K. (1996). What we know about cheating in college: Longitudinal trends and recent developments. *Change*, 28(1), 28-33.

- Pulvers, K., & Diekhoff, G. M. (1999). The relationship between academic dishonesty and college classroom environment. *Research in Higher Education*, 40(4), 487-498.
- Ruderman, J. (2004). Faculty play a crucial academic integrity role. *Academic Leader*, 20(3), 8-9.
- Scanlon, P. M. (2003). Student online plagiarism: How do we respond? *College Teaching*, 51(4), 161-165. doi:10.1080/87567550309596432
- Schneider, A. (1999). Why professors don't do more to stop students who cheat. *Chronicle of Higher Education*, 45(20), A8-A10.
- Shipley, L. J. (2009). Academic and professional dishonesty: Student views of cheating in the classroom and on the job. *Journalism & Mass Communication Educator*, 64(1), 39-53. doi:10.1177/107769580906400104
- Sterngold, A. (2004). Confronting plagiarism: How conventional teaching invites cyber-cheating. *Change*, 36(3), 16-21. doi:10.1080/00091380409605575
- Vandahey, M. A., Diekhoff, G. M., & LaBeff, E. E. (2007). College cheating: A twenty-year follow-up and the addition of an honor code. *Journal of College Student Development*, 48(4), 468-480. doi:10.1353/csd.2007.0043
- Walker, M., & Townley, C. (2012). Contract cheating: A new challenge for academic dishonesty? *Journal of Academic Ethics*, 10(1), 27-44.

MICHAEL SEALS is an Associate Director of Residential Learning at Purdue University. His research interests include residential learning environments, academic integrity, and co-curricular learning.

JAMES O. HAMMONS is a Senior Professor of Higher Education in the College of Education and Health Professions at the University of Arkansas-Fayetteville. He is a frequent invited speaker and consultant in his areas of teaching expertise, which are improving management and leadership in colleges and universities, improving student learning, and changing negative cultural norms.

KETEVAN MAMISEISHVILI is an Associate Professor of Higher Education in the College of Education and Health Professions at the University of Arkansas. She currently also serves as the Head of the Department of Rehabilitation, Human Resources, and Communication Disorders. Her research interests focus on faculty productivity, job satisfaction, and work life issues.

Enhancing Educators' Skills for Promoting Critical Thinking in Their Classroom Discourses: A Randomized Control Trial

Raisa B. Gul, Shehla Khan, Azra Ahmed, Shanaz Cassum,
Tanveer Saeed, and Yasmin Parpio
Aga Khan University

Joanne Profetto-McGrath and
Donald Schopflocher
The University of Texas at Austin

The literature reveals that educators find it challenging to foster critical thinking (CT) in their students if they have not learned how to use CT in their educational system or training. This paper reports findings from a national research project that was undertaken to enhance the educators' ability to promote CT in their teaching practices. Using a randomized control trial design with a pre- and post-test, 91 educators from 14 of the 17 schools of nursing in Pakistan consented to enroll in the study and 72 completed the study. The intervention included 40 hours of learning experience during two workshops that focused on CT. Data were collected, pre- and post-intervention, via observations and audiotaping of the participants teaching sessions for 60-90 minutes. The data obtained was assessed for the educators' level of questioning, teaching strategies, and facilitation skills. Data were analyzed using descriptive and inferential statistics. Compared with the pre-intervention data, findings from the post-intervention data in the experimental group revealed positive changes in their pedagogical skills, including a significant increase in the number of higher order questions that are considered important for developing students' CT skills. This study affirms that educators must have structured training to use and foster CT in their teaching practices.

As critical thinking (CT) is an important attribute in intellectual development, knowledge acquisition, and knowledge utilization in individuals, teachers are expected to nurture students' critical thinking skills (Kong, 2006; Loving & Wilson, 2000; Wangenstein, Johansson, Bjorkstrom, & Nordstrom, 2010). It is assumed that teachers know what CT is and how it can be promoted in their teaching practices, but this may not be true (Choy & Cheah, 2009; Mangena & Chabeli, 2005) unless they have learned it in their pre-service or in-service training (Kong, 2006). This is particularly true for a country like Pakistan where the focus of education for students is predominantly rote learning rather than acquiring CT skills, and for teachers as the givers of knowledge rather than facilitators of students' knowledge development (Davies & Iqbal, 1997; Dean, 2005; Gul et al., 2010; Siddiqui, 2007). Teachers must emulate CT if they expect their students to do so. In addition to having a command over the subject to be taught, teachers should understand the "conceptual, strategic, epistemological, and educational ramifications of critical thinking" (Mangena & Chabeli, 2005, p. 293). To promote students' CT, teachers need to select appropriate content and instructional strategies to address the learning objectives, and they should facilitate teacher-student interaction, encourage students to ask thought-provoking questions, and respond to their questions without bias (Ijaiya, Alabi, & Fasasi, 2010; Zygmunt & Schaeffer, 2006).

The literature on higher education reveals an increasing interest in investigating faculty understanding of CT (Cassum, Profetto-McGrath, Gul, Ashraf, & Kauser, 2013; Moore, 2011) or their dispositions towards CT (Choy & Cheah, 2009; Duron, Limbach, & Waugh, 2006; Emir, 2009; Hsu, 2007; Mangena & Chabeli,

2005; Ovais, 2007; Profetto-McGrath, Smith, Hugo, Patel, & Dussault, 2009; Zygmunt & Schaeffer, 2006). Several researchers have also investigated the questioning skills of teaching faculty. Findings from most of the studies suggest that faculty members need to improve their pedagogical skills (Ball & Garton, 2005; Choy & Cheah, 2009; Mundy & Denham, 2008; Nicholl & Tracey, 2007; Zygmunt & Schaeffer, 2006). However, limited research is available detailing how to improve the teachers' pedagogical skills to foster the students' CT.

This paper reports findings from a research project that was undertaken in Pakistan at the national level to enhance the CT skills of educators in the planning and delivery of their curriculum. This paper focuses on the results pertinent to the following questions:

1. Do educators, after attending the intervention as part of the experimental group, ask higher level questions in their classroom discourses than those who are in the control group?
2. Do educators, after attending the intervention as part of the experimental group, use more active teaching methods compared to educators in the control group?
3. Is there any difference in the educators' facilitation skills before and after the intervention?

Literature Review

Description and Significance of Critical Thinking

Literature is replete with various descriptions of CT because it can be explained from different

paradigms such as analytical philosophy and logic, scientific method (testing hypothesis), pragmatism, psychoanalysis, and critical theory (Brookfield, 2012). Moreover, CT is a multidimensional concept that can be viewed as a tool, set of skills, process or outcome (Cassum et al., 2013; Moore, 2011). However, CT is generally considered a subset of the reflective process that helps individuals make sound judgments because it involves thorough assessment and scrutiny of information before arriving at conclusions (Daly, 1998; Dewey, 1916). Critical thinking helps the individual to identify and check one's own assumptions and those of others (Brookfield, 2012; Paul, 1993) and thus "represents a major qualification for people in deciding what to do or believe" (Yang & Chou, 2008, p. 683). Similarly, CT is useful to analyze complex data, evaluate situations and actions, and implement the most appropriate actions; hence, it is a must have skills for effective problem-solving and decision-making in all walks of life—social, clinical, ethical, managerial, or political (Simpson & Courtney, 2002).

Because of its importance in knowledge development, assessment and utilization (Paul, 1993), CT is considered vital in modern education especially in higher education (Brookfield, 2012; Kong, 2010). Moreover, CT is expected to be an integral component of teaching pedagogies in every discipline, particularly the health care disciplines (Behar-Horenstein & Niu, 2011; Cassum et al., 2013; Daly, 1998; Paul, 1993; Velde, Wittman, & Vos, 2006). Ethical, efficient and effective care requires sound clinical judgment that is not only grounded in thorough knowledge, but also requires one's ability for critical thinking, analytical reasoning, decision-making, and reflective practice (Moeti, van Niekerk, & van Velden, 2004).

Development and Facilitation of Critical Thinking

Although there is no one right way to teach or assess critical thinking, literature suggests that teaching approaches requiring active students' involvement instead of didactic teaching practices are critical to promote and facilitate CT (Simpson & Courtney, 2002; Velde et al., 2006). Teaching approaches that focus on content instead of process (Sellappah, Hussey, Blackmore, & McMurray, 1998) or, in other words, on *what* to think instead of *how* to think, do not facilitate CT. Teaching strategies such as problem-based learning, writing reflective journals, role-playing, concept-mapping, and debates are reported to help (Simpson & Courtney; Velde et al., 2006; Yang & Chou, 2008) because these strategies help engage students in their learning process and can foster their CT dispositions (e.g., inquisitiveness, analytical abilities, reasoning skills, self-confidence, and open-mindedness; Chan, 2012; Ennis, 1993; Paul, 1993; Vacek, 2009; Velde et al., 2006).

Clasen and Bonk (1990) posited that although there are many strategies that can impact students' thinking, it is the teachers' questions that have the greatest impact. Research evidence consistently suggests a direct relationship between the types of questions posed by faculty and the students' ability to develop CT (Redfield & Rousseau, 1981; Rossignol, 2000; Shim & Walczak, 2012). Higher level cognitive questions require learners to manipulate information to create and support responses, while lower level cognitive questions are answered through recall, recognition, and simple application of information. Therefore, the former is considered congruent with CT (Redfield & Rousseau, 1981). Several descriptive studies in nursing suggest that many teachers use factual and lower level questioning which does not promote CT (Myrick & Cpsych, 2002; Nicholl & Tracey, 2007; Phillips & Duke, 2001; Profetto-McGrath, Bulmer, Day, & Yonge, 2004; Sellappah et al., 1998). However, there is some evidence in the literature that a specific module pertinent to CT and questioning skills can enhance the educators' ability to ask higher level questions (Craig & Page, 1981; Wink, 1993).

Since CT is a social learning process, students can learn it from their peers and faculty modeling (Brookfield, 2012). However, the demonstration of CT necessitates intellectual discipline, self-evaluation, counter thinking, opposition, challenge, and support (Paul, 1993). Empirical evidence suggests that teacher-student interaction and interaction among students influence the students' cognitive and affective learning outcomes (Dorman, 2012; Gul, Barolia, & Moez, 2013). A learning environment that is affirmative, constructive and rewarding is likely to foster thinking (Billings & Halstead, 2009). Developing the students' ability to think critically is influenced by the teachers' competence and approach to teaching (Simpson & Courtney, 2002). A positive gain in students' CT is reported by Smith (1977) when "faculty members encouraged, praised, or used students' ideas" (Shim & Walczak, 2012, p. 16). The educators' own values, interest, and dispositions towards CT can also influence students' thinking and learning (Kong, 2006; Mangena & Chabeli, 2005; Ovais, 2007; Profetto-McGrath et al., 2009). If teachers aim to prepare students at a higher level of cognitive thinking, "they must first emulate higher level thinking in their instructional practices" (Ball & Garton, 2005, p. 59). Likewise, Facione and Facione (1996) asserted that CT needs to be demonstrated and that demands constant metacognitive reflection on "what one is doing and why" (p. 133). Thus, the educators' role modeling and mentoring are necessary to promote CT (Brookfield, 2012). Explanation of abstract concepts and well organized presentations are found to impact students' CT as well (Shim & Walczak, 2012).

Contrary to the required teaching practices, didactic teaching and rote learning are still prevalent in

most teaching institutions and disciplines in Pakistan, and nursing education is no exception (Davies & Iqbal, 1997; Kamal, 1999; Khalid & Khan, 2006). Moreover, considering the socio-cultural dimension of CT, Pakistani learners may be viewed as members of a culture that does not encourage questioning people who, by virtue of their age or position, are in authority. In their study on teacher education, Davies and Iqbal (1997) reported that the majority of teaching was lecture based, and notes were dictated to students. In certain cases, some students did not take any notes, but just listened to the lectures and then used the textbooks to prepare for the examinations. Similarly, in 1998, a nationwide study of nursing schools in Pakistan indicated that nursing students were not encouraged to think and question (Kamal, 1999). A comment made by a student reflects this state of affairs: “If I say, ‘I have not understood’, I am told, ‘No need to understand, just remember it’” (Kamal, 1999, p. 43).

In view of the above literature, the research intervention was proposed to enhance the educators’ pedagogical skills for promoting CT in their students. The following assumptions were identified as part of the design and implementation of this study:

- Critical thinking skills can be developed with practice.
- Educators can promote students’ CT if they know how to promote it.
- Students’ critical thinking can be developed if educators ask higher level questions, use active teaching strategies, and demonstrate good facilitation skills.
- Educators’ attitude and knowledge of CT are reflected in their teaching practices.

Methodology

Study Design

In pursuit of a better quality of evidence (Polit & Beck, 2008), we employed a randomized control trial

design with a pre- and post-test after the intervention. The independent variable was teachers’ training and the dependent variables were their level of questions, teaching strategies and facilitation skills. The study was completed over a 2-year period (February 2009 to March 2011) in three phases—pre-test, intervention, and the post-test—as illustrated in Figure 1.

Definition of Terms

For the purpose of this study, the term educators meant teachers or faculty members regardless of their disciplines, but who were teaching in Bachelor of Science in Nursing (BSN) programs in Pakistan. Based on the hierarchy of Bloom’s (1956) taxonomy of cognitive thinking, questions requiring knowledge recall, comprehension, and simple application were considered lower level questions while questions requiring complex thinking (e.g., analysis, synthesis, and evaluation skills) were considered as higher level questions. Based on the work done by Van Amburgh, Devlin, Kirwin, and Qualters (2007), “active teaching methods” referred to any teaching strategy that involved active engagement of students for a specific purpose; the activity began with some instructions by the teacher (context, process, and timings) and ended with students’ reflections on the learning from the activity. “Facilitation skills” referred to the teachers’ behavior that had the potential to affect students’ motivation for participation in the class (Van Amburgh et al., 2007).

Population and Sampling

The study population comprised all full-time nursing and non-nursing faculty members who taught in BSN programs in Pakistan. Following a universal sampling technique, the 148 faculty members who were eligible from 17 schools of nursing in the country were invited to participate in the study. Part-time teachers were excluded from the study to avoid envisaged complexities with regard to seeking permission and

Figure 1
Study Design

Experimental Group	Pre-test: Assessed level of questions, teaching strategies, and facilitation skills	Intervention				Post test: Assessed level of questions, teaching strategies, and facilitation skills
		Held 1 st workshop (3 days)	14 week interval	Held 2 nd workshop (2 days)	12 week interval	
Control Group		No intervention				

commitment from their institutions. Ninety-one teachers (61%) from 14 schools of nursing consented to participate; of these, 44 participants were randomly allocated to the intervention group and 47 to the control group. All 91 participants were available for the first observation. However, as illustrated in Figure 2, 19 participants (nearly 21%) were lost from both groups over the course of the study while 72 participants completed the study and were included in the analysis. The attrition rate and reasons did not differ between the intervention and control groups.

Recruitment of the Participants

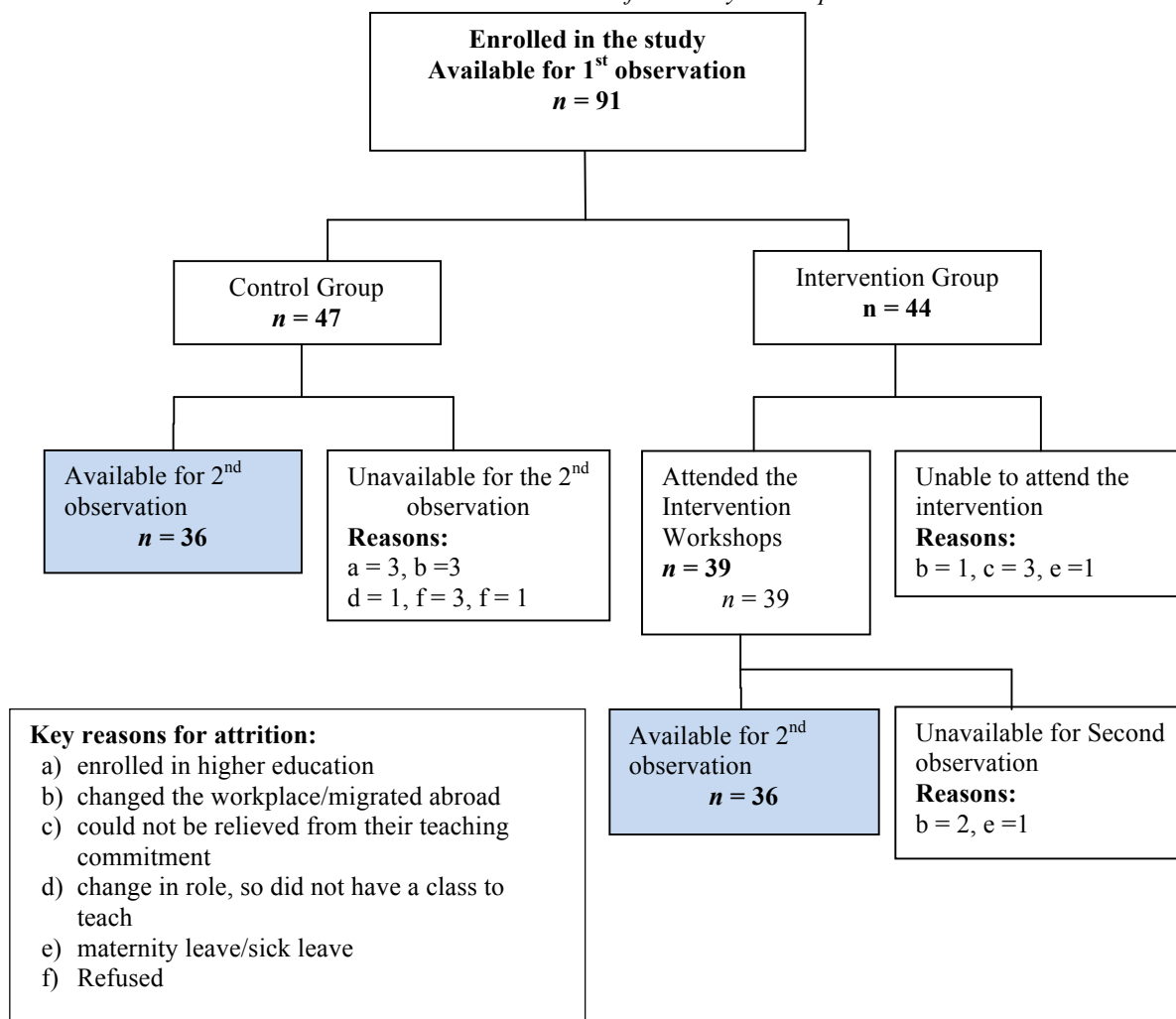
The list of schools offering a BSN was obtained from the Pakistan Nursing Council. After approval of the institutional review board (1064-SON-ERC-08), a

letter of information about the study was sent to the head or principal of each school. A written consent and a list of full-time faculty members were requested if the Head of the schools supported their faculty participation in the study. An informed consent was obtained from each participant before the first point (see Figure 1) of data collection.

Intervention

The intervention consisted of two learning workshops (total 40 hours of direct contact) that were conducted 14 weeks apart as illustrated in Figure 1. The intervention was developed and implemented by the research team, which consisted of three educators from nursing, two from basic sciences, and one from English Language. Although not identified at the outset

Figure 2
Recruitment and Retention of the Study Participants



of our study, our approach to intervention closely resembled the DASK (dispositions, attitudes, skills and knowledge) model of teaching thinking skills by Kong (2006, 2010). Guided by the three dimensions of critical thinking—knowledge, skills, and attitude (Paul, 1993; Rubenfeld & Scheffer, 2006; Staib, 2003)—the following learning outcomes were set for the intervention:

- Appreciate the significance of practicing and promoting CT in nursing.
- Identify skills and attitudes required of critical thinkers.
- Write instructional objectives for each level of Bloom's taxonomy.
- Differentiate between active and passive learning strategies.
- Identify characteristics of effective questioning in teaching.
- Generate questions at each level of Bloom's taxonomy.
- Convert lower order questions into higher order questions.
- Identify ways to mitigate the barriers to teaching critical thinking.
- Identify ways and strategies necessary to promote CT in students.

Teaching content and its delivery (Appendix A) to facilitate the above outcomes were selected based on a thorough literature review on critical thinking, the team members' experience as educators and the pedagogical skills of teachers observed in Phase I of the study (Gul et al., 2010). A folder including the learning objectives, teaching strategies and related readings was given to each participant on day one of the workshop. The focus of the first workshop was to explore the educators' understanding and attitude about CT, clarify misperceptions, and help them recognize the contextual factors that could affect one's ability to think in a learning environment. Moreover, types, levels, and effective questioning techniques were addressed. The importance of questioning by faculty and students was emphasized. Bloom's (1956) taxonomy of educational objectives was used to develop the participants' skills in writing behavioral objectives and in asking higher order questions. In addition, the concept of alignment between objectives, teaching strategies, and assessment strategies was included in the first workshop. Active teaching and learning strategies (Van Amburgh et al., 2007; Rubenfeld & Scheffer, 2006) including group work, games, concept maps, debate, and reflections were used to address the selected content.

At the end of the first workshop, the participants were instructed that during their regular work, they reflect on what they learned in the workshop and whether they could apply their learning in their teaching practice. They were asked to submit a one-page summary of their reflections to the primary investigator two weeks prior to the second workshop. Information obtained from the participants' reflections, especially the obstacles they may have faced in promoting CT, were addressed in the second workshop. In addition, they were asked to bring a course syllabus/grid of any course they had recently taught or were currently teaching. After removal of the institutions and instructors' identifying information, these course grids were critiqued to understand/learn curriculum alignment: the objectives, teaching strategies, and assessment strategies. At the end of the workshop, the participants were asked to evaluate the intervention workshops based on the identified learning outcomes. The post-intervention data were collected 12 weeks after the second workshop. Considering the nature of our research questions, we did not aim to follow teachers in a specific course, or for them to be with the same students as at the first point of data collection (pre-intervention), but teaching a course in the same program was the criteria.

No training was offered to the control group until the second set of data was collected. A three day condensed workshop of similar content as was offered to the experimental group was held for the participants in the control group in order to provide them with necessary knowledge and skills pertaining to CT. Considering the expected number of participants (more than 40) in each workshop (both in the experimental and control groups), each workshop was offered twice. Based on the logistic consideration and the number of participants from different cities, one set of workshops was conducted at a nursing college in Islamabad, and another set of workshops was offered at a nursing school in Karachi. Therefore, the total number of participants was almost equally divided between the two venues.

Data Collection

Data were collected pre- and post-intervention through classroom observation of the participants' teaching sessions, which lasted from 60 to 90 minutes. Moreover, proceedings of their classes were audiotaped to obtain data on the teachers' questions. A structured checklist was used to record contextual information on the class (e.g., class size, duration, and physical environment), types of teaching strategies, and the teachers' facilitation skills (see Appendix B). Field notes were recorded to substantiate the ratings on the structured list and anything that could have impacted the

students' thinking. The field notes were helpful in capturing the teacher-student interaction and other behaviors related to questioning, for example, several questions were self-answered by the teachers (see Gul et al., 2010 for more details). Demographic information of each participant was obtained at the time of their consent.

The research team developed the observation checklist based on the literature about teachers' pedagogical skills affecting students' thinking and class participation. The facilitation skills included five items: (a) teacher-student interaction (e.g., eye contact, listening), (b) attitude of mutual respect (e.g., language, interaction tone), (c) responsiveness to students' concerns (e.g., clarifying a concept, identifying a resource), (d) encouragement given to students for asking questions (e.g., acknowledgement, appreciation), (e) and dictation of notes to students. The first four items were considered desirable for promoting students' thinking and participation, while the last item was considered undesirable for developing students' CT skills. The items were in question format and were measured using an ordinal scale from *not at all* to *some extent* to *a great extent*. The research team members established content validity of the checklist. The observation process was pilot tested before the actual data collection. Some tweaking of the checklist, including identification of behaviors for each item of facilitation skills and issues that related to clarity of the recordings, was done based on the pilot testing.

Data Analysis

The recorded participants' data on questioning was transcribed verbatim and verified with the recordings by the research assistant. Based on Bloom's (1956) taxonomy for cognitive thinking and the questioning framework offered by Profetto-McGrath et al. (2004), the teachers' questions were coded for types and levels of thinking (i.e., knowledge, comprehension, application, analysis, synthesis, and evaluation; see Appendix C). Questions that lacked clarity or had multiple interpretations were coded as vague. Rhetorical questions or those that posed for probing, facilitation, or determining students' reactions to a situation were categorized as "other types." A question posed and then instantly answered by the teachers without giving any chance to the students to respond, or questions with answers written on the same slide of a PowerPoint presentation were coded as rhetoric questions. If for any reason, the teacher repeated a question, it was counted only once.

After coding, data were entered into an SPSS database. For each participant, we entered the number of questions in each of the categories: high order, low order, other types, and vague. The coded data from the observation checklists were also entered.

Descriptive statistics were computed for participants' characteristics, data obtained through the structured checklist on classroom observation and the teachers' questioning. Pearson product moment correlations were used to examine the relationships between the variables. To control for the effect of class duration on the number of questions, the number-of-questions variables were re-expressed by dividing questions on the duration. To test for finding differences between pre-and post-intervention and between the intervention and control group, we conducted a mixed-between-within analysis of variance (ANOVA), $\alpha = 0.05$.

Results

Characteristics of the Participants

As shown in Table 1, most (67%) of the participants were females. Their ages ranged between 20 to 55 years; however, the majority was between 26 and 30 years of age. Their teaching experience ranged from .5 to 16 years with a mean of 4.5 and a median of 2.6 years. As expected, most (83%) of the participants were nurse educators, and 61% had a BSN degree, while 30% were prepared at the master's level. Although all 12 non-nurse participants had a master's degree, only 10 (13.9%) of the nurse participants had a master's degree. There were no significant differences between the participants in the intervention and control groups on any of these variables.

Contextual Factors

As shown in Tables 2 and 3, the distribution of the class sizes and their physical environment were almost identical on the first and second observation; however, the mean time for class duration was 65 ($SD = 24$) and 59 ($SD = 21$) minutes, respectively. To control the effect of the class time on the number of questions asked pre- and post-intervention, the number of questions variables were re-expressed by dividing questions on the duration.

Intervention Outcome

An ANOVA for the total number of questions showed no overall difference from the first to the second observation period (pre-post main effect $F_{1,70} = .055$, $p > 0.05$), and there was no overall difference between the intervention and control groups (between group main effect $F_{1,70} = .005$, $p > 0.05$). As depicted in Table 4, the mean for the total number of questions in the intervention group increased from the first (25.91) to second (32.45) observation, but decreased in the control group (33.17 to 24.43). However, this

Table 1
Characteristics of Participants

Variables		<i>n</i>	%
Gender	Female	48	66.7
	Male	24	33.3
Age in years	Up to 25	5	7.0
	26-30	27	38.0
	31-35	17	23.6
	36-40	17	23.9
	41-50	6	8.4
Professional qualification	Master's	22	30.6
	BSN	44	61.1
	Diploma in nursing and midwifery with post-basic teaching diploma	4	5.6
	Diploma in nursing specialty diploma	2	2.8
Faculty type	Nursing	60	83.3
	Non nursing	12	16.7
Teaching experience in years	1-1.5	8	11.1
	2-4	8	11.1
	5-10	32	44.4
	11-16	12	16.9
	>16	8	11.2
Formal training in CT	Yes	0	0.0
	No	72	100.0

Table 2
Contextual Information of Observed Classes: Duration

Variables	1 st observation				2 nd observation			
	Intervention group		Control group		Intervention group		Control group	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Duration of the Class (Hour: minutes)	1:04	0:25	1:07	0:24	0:56	0:20	1:02	0:23
Overall	1:05				0:55			

Note. Group *n* = 36 for all four observations.

Table 3
Contextual Information of the Observed Classes: Number of Students and Conduciveness of the Physical Environment

Variables	1 st observation		2 nd observation	
	Intervention group <i>n</i> (%)	Control group <i>n</i> (%)	Intervention group <i>n</i> (%)	Control group <i>n</i> (%)
Number of Students in the Class				
< 20	11 (30.6)	9 (25.0)	13 (36.1)	12 (33.4)
21-30	10 (27.8)	12 (33.3)	5 (13.9)	10 (27.8)
31-40	7 (19.4)	8 (22.2)	10 (27.8)	5 (13.9)
> 40	8 (22.2)	7 (19.4)	8 (22.2)	9 (25)
Conduciveness of the Physical Environment				
Not at all	2 (5.6)	1 (2.8)	3 (8.3)	1 (2.8)
To some extent	14 (38.9)	19 (52.8)	15 (41.7)	16 (44.4)
To great extent	20 (55.6)	16 (44.4)	18 (50)	19 (52.8)

Note. Group *n* = 36 for all four observations.

Table 4
Descriptive Statistics: Types and Levels of Questions (Per Hour)

Variables	Group	1 st observation (pre-intervention)			2 nd observation (post-intervention)		
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Total number of questions	Intervention	36	25.9	29.5	36	32.5	29.4
	Control	36	33.2	33.2	36	24.4	30.3
	Total	72	29.5	31.4	72	28.4	29.9
Higher order questions	Intervention	36	2.8	2.9	36	6.0	5.2
	Control	36	2.1	2.8	36	2.0	2.3
	Total	72	2.4	2.9	72	4.0	4.5
Lower order questions	Intervention	36	18.4	23.4	36	19.8	19.7
	Control	36	22.7	19.2	36	16.5	22.0
	Total	72	20.5	21.3	72	18.2	20.8
Other types (e.g., facilitative: probing, clarifying, rhetoric)	Intervention	36	3.4	4.7	36	4.9	7.5
	Control	36	6.5	9.7	36	4.3	5.8
	Total	72	4.9	7.7	72	4.6	6.7
Vague questions	Intervention	36	1.5	2.2	36	1.4	3.4
	Control	36	2.3	6.5	36	1.5	2.3
	Total	72	1.9	4.8	72	1.4	2.9

interaction effect was not statistically significant (interaction effect $F_{1,70} = 2.656, p = >0.05$).

In an ANOVA for the number of higher-order questions, the number increased from the first to the second observation period (pre-post main effect $F_{1,70} = 7.874, p = 0.006$). However, that increase occurred only in the intervention group (interaction effect $F_{1,70} = 8.265, p = 0.005$), though this resulted in an overall difference between the intervention and control groups (between group main effect $F_{1,70} = 15.173, p < 0.001$).

As depicted in Table 5, the means for the educators' teaching strategies reflect a positive change from the first to second observation in both the groups. The ANOVA for the use of lecturing with a slide presentation indicated that the overall difference from the first to second observation was statistically significant (pre-post main effect $F_{1,70} = 8.294, p = 0.005$). Although the overall difference between the intervention and control groups was not significant (between group main effect $F_{1,70} = 0.674, p > .05$), there was an interaction indicating that the increase from the first to the second observation period was statistically higher in the intervention group (interaction effect $F_{1,70} = 5.308, p = 0.042$). Field notes supported that most teachers, who used a PowerPoint presentation, identified objectives for their class and were better organized to address the required content of their topic. However, those teachers who did not use a PowerPoint presentation usually began with the topic of the class and used personal notes to elaborate on the content relevant to the topic. Consequently, the teacher-student interaction was affected because the students had to concentrate more on listening and

taking notes than on reflecting and internalizing the content.

In the ANOVA for teachers' use of active teaching strategies, the overall number of strategies increased from the first to the second observation period (pre-post main effect $F_{1,70} = 4.310, p = .042$). However, there was no overall difference between the intervention and control groups (between group main effect $F_{1,70} = .464, p > 0.05$). Likewise, the use of active teaching strategies by the intervention group in the second observation was not significantly higher than the control group (interaction effect $F_{1,70} = .172, p > 0.05$).

The mean scores with standard deviations and frequencies for each item on the educators' facilitation skills have been provided in Table 6. Accordingly, the mean score for teacher-student interaction in the intervention group increased slightly from the first to the second observation as compared to that of the control group. Similarly, the mean for the teachers' attitude for mutual respect increased from the first to the second observation. However, these differences were not statistically significant. Moreover, the mean for the teachers' response to the students' needs or concerns did not change from the first to the second observation.

Unlike the first three items, an ANOVA for teachers' encouragement to students for asking questions showed a significant interaction (interaction effect $F_{1,66} = 4.554, p = .037$) such that the increase from the first to the second observation period occurred only in the intervention group.

The dictation of notes was significantly reduced in the intervention group at the second (post intervention)

Table 5
Descriptive Statistics: Teaching Strategies

Teaching strategies	1 st observation		2 nd observation	
	Intervention group	Control group	Intervention group	Control group
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Lecture with slides presentation	20 (55.6) 0.56 (0.50)	21 (58.3) 0.58 (0.50)	29 (80.6) 0.81 (0.40)	22 (61.41) 0.61 (0.49)
Lecture without slides presentation	16 (44.4)	15 (41.7)	7 (19.4)	14 (38.9)
Use active teaching strategies*	6 (16.7) 0.17 (0.37)	3 (11.1) 0.14 (0.42)	10 (27.8) 0.33 (0.54)	9 (25.0) 0.25 (0.45)
Did not use active teaching strategies	30 (83.3)	33 (88.9)	26 (72.2)	27 (75.0)

Note. Group $n = 36$ for all four observations. *Only one teacher (2.8) in the first observation (control group) and another teacher (intervention group) in the second observation used two active teaching strategies.

Table 6
Descriptive Statistics: Educators' Facilitation Skills

Variables	1 st observation		2 nd observation	
	Intervention group	Control group	Intervention group	Control group
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Promote teacher-student interaction	1.44 (0.56)	1.50 (0.56)	1.61 (0.49)	1.47 (0.65)
Demonstrates attitude of mutual respect	1.69 (0.47)	1.67 (0.53)	1.72 (0.51)	1.56 (0.61)
Responsive to students' needs and concern	1.41 (0.50)	1.44 (0.56)	1.41 (0.62)	1.34 (0.65)
Encourages students when they ask questions	1.44 (0.61)	1.53 (0.58)	1.61 (0.49)	1.31 (0.64)
Instructor dictate notes	0.25 (0.55)	0.28 (0.62)	0.03 (0.17)	0.31 (0.62)

Note. Group $n = 36$ for all four observations.

observation. Similarly, an ANOVA yielded a significant interaction (interaction effect $F_{1,70} = 4.103$, $p = .047$) for teachers' behavior of dictating notes to their students. This behavior decreased from the first to the second observation period only in the intervention group.

Discussion

This study was conducted to determine whether teachers' pedagogical skills for the promotion of students' CT could be enhanced by providing them with formal training about the ontology and epistemology of CT. The results of this study are very encouraging as several positive changes were noted in the educators' classroom teaching practices post intervention. Similar to the existing literature (Craig & Page, 1981; Hsu, 2007; Ijaiya et al., 2010; Phillips & Duke, 2001; Profetto-McGrath et al., 2004; Sellappah et al., 1998;

Wink, 1993), pre-intervention findings in this study also indicate that on average the educators' asked fewer high level questions than lower level questions. However, a statistically significant increase was noted in the educators' ability to pose higher order cognitive questions after they had completed the intervention. These findings coupled with the results from some previous studies (e.g., Craig & Page, 1981; Wink, 1993) affirm that educators need to improve their questioning skills. Formal training and coaching sessions can help them improve these skills. Though the level of questions has to be appropriate with the learners' level of familiarity with the content (Phillips & Duke, 2001), it is the higher level questions that promote students' CT (Redfield & Rousseau, 1981).

In a recent study focusing on the impact of teaching practices on students' CT skills, Shim and Walczak (2012) reported that in addition to asking challenging questions, well-organized presentations by

faculty were also associated with the students' gain in CT. In our study, we observed a significant increase in the teachers' use of a PowerPoint presentation by the intervention group during their second observation. Moreover, some increase, albeit not statistically significant, was observed in their use of active teaching strategies compared with that of the control group. The inability to reach a significant level of difference could have resulted from several factors. Many participants in our workshop had highlighted that their students and administration expected faculty to teach extensive amounts of content in a given time. Moreover, except for one school, 70% of the students' assessments in the nursing degree programs in Pakistan are centralized by their respective universities. The centralized assessments usually consist of paper and pencil examinations. Therefore, teachers may be reluctant to increasingly rely on active teaching strategies, but may be more inclined to cover the content through interactive lectures. Faculty workload may well be another reason because in addition to the knowledge of active teaching strategies, faculty need time to plan, prepare and use such strategies (Shell, 2001). Concurrent with the recommendation of other researchers (Cassum et al., 2013; Mangena & Chabeli, 2005; Zygmunt & Schaeffer, 2006), a shared philosophy with coordinated efforts among faculty, students and administration would be required to change the entire culture of higher education in Pakistani universities.

Shim and Walczak (2012) asserted that the development of CT in students requires the teachers to balance the cognitive challenges with support, which necessitates good facilitation skills. With regards to change in the educators' facilitation skills after the intervention, we noted a desirable change in four items (Table 6). However, when compared with the control group, the change was statistically significant for two items: "encouragement to students for asking question" and "reduction in dictation of notes."

Most study participants were fairly young and had limited teaching experience ($M = 4.4$, $SD = 4.07$). It was disconcerting to learn that none of the participants had any formal preparation (course, seminar, or workshop) in CT before their participation in the current study. In their assessment of faculty CT in the USA, Zygmunt and Schaeffer (2006) also noted that most (78.4 %) of their participants had no education in CT while their average teaching experience was 14.47 years.

As noted in the standard deviation of items scores (Table 4), data for both groups and points of measurement indicate extensive variability in the teachers' questioning skills, which is not a new phenomenon or surprising. What is important to note is that the desired skills, albeit at varying levels, can be

enhanced in most teachers. Empirical evidence consistently suggests that learning skills develop faster if they are taught explicitly along with the relevant content (Weimer, 2002). In agreement with the recommendations of other scholars and researchers from different parts of the world (Behar-Horenstein & Niu, 2011; Choy & Cheah, 2009; Zygmunt & Schaeffer, 2006), findings from this study affirm the need for a formal and structured training for teachers' CT, so that they can develop, appreciate and apply teaching practices that are known to promote students' critical thinking.

Drawing on the work of renowned scholars (e.g., Broofield, Lipman), Behar-Horenstein and Niu (2011) maintained that to emulate CT in their teaching practices, teachers must be able to differentiate ordinary thinking from critical thinking, and they must be able to "understand process that constitute critical thinking" (p. 27), and employ instructional strategies aimed at developing these processes. In addition to the knowledge and skills about CT, our intervention with the teachers in this study suggests that teachers must be given the opportunity to explore/externalize their own attitude about CT and address the myths that may preclude them from changing their practices. For instance, a number of participants in our interventional workshops identified several cultural and institutional barriers, such as limited resources (e.g., books, space, budget for teaching and learning material) and the expectations to just complete the content, which generally prevented them from using more active teaching strategies. However, with deeper reflections and discussion on those barriers and the demonstration of several active teaching strategies, the participants were able to realize and dispel such myths. Zygmunt and Schaeffer (2006) maintained that "the transition from being inclined to thinking critically and actually having the skill" (p. 260) requires a combination of time, experience and mentorship.

Limitations

This study has several limitations. Block randomization would have been a better option to prevent contamination of the participants in the control group, but block randomization was not implemented for two reasons. First, the faculty size in one school was four times larger than other schools. Second, it would have been very difficult for any school to allow all of their enrolled faculty members to attend the intervention workshops at the same time. To minimize the risk of contamination, participants in the intervention group were briefed about the study design, and they were asked not to share what they learned with colleagues assigned to the control group at their institution. Although the possibility of the Hawthorne

effect during the second observation could not be ruled out as the participants were not blinded to their assignment, they were not aware of the assessment parameters. Another limitation was that data from various cities were collected by different members of the research team or by a local data collector. However, to control the variations among data collectors, members of the team were involved in a detailed discussion about the data collection process before and after the pilot testing, and the data collectors were properly trained for the same process. Moreover, all the recorded questions were transcribed and coded by the research assistant; the coding was verified by a member of the team. Although Bloom's (1956) taxonomy for six levels is well established, in our experience, the differentiation between the last three levels (i.e., analysis, synthesis, and evaluation) was found challenging, especially when we had hundreds of questions to evaluate. To overcome this issue, we analyzed the questions for high and low order, which was appropriate for our study question.

Conclusion

This study adds to the knowledge of faculty development to foster CT in their teaching discourses. Previous research on this topic was more focused on the teachers' ability to ask higher order questions after an educational intervention. This study offers an example of extending training efforts beyond the teachers' questioning skills and the need for exploring contextual factors that may be inhibiting students' thinking. Moreover, training endeavors to enhance CT could be more beneficial when a multidisciplinary approach is employed. Although further research is needed, this study affirms the plea that some formal training is necessary to enhance educators' CT skills if they are expected to enhance CT in their teaching practices.

References

- Ball, A. L., & Garton, B. L. (2005). Modeling higher order thinking: The alignment between objectives, classroom discourses, and assessment. *Journal of Agricultural Education*, 46, 58-69. doi:10.5032/jae.2005.02058
- Behar-Horenstein, L. S., & Niu, L. (2011). Teaching critical thinking skills in higher education: A review of the literature. *Journal of College Teaching & Learning*, 8(2), 25-42.
- Billings, D., & Halstead, J. (2009). *Teaching in nursing: A guide for faculty* (2nd ed.). St. Louis, MO: Elsevier Saunders.
- Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals: Handbook 1 cognitive domain*. New York, NY: Longmans.
- Brookfield, S. D. (2012). *Teaching for critical thinking: Tools and techniques to help students question their assumptions*. San Francisco, CA: Jossey-Bass.
- Cassum, S. H., Profetto-McGrath, J., Gul, R. B., Ashraf, D., & Kauser, S. (2013). Multidimensionality of critical thinking: A holistic perspective from multidisciplinary educators in Karachi, Pakistan. *Journal of Nursing Education and Practice*, 3(7), 9-23. doi:10.5430/jnep.v3n7p9
- Chan, Z. C. Y. (2012). Role playing in problem-based learning class. *Nurse Education in Practice*, 12(1), 21-27. doi:10.1016/j.nepr.2011.04.008
- Choy, S. C., & Cheah, P. K. (2009). Teacher perceptions of critical thinking among students and its influence on higher education. *International Journal of Teaching and Learning in Higher Education*, 20(2), 198-206. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE3336.pdf>
- Clasen, D. R., & Bonk, C. (1990). *Teachers tackle thinking*. Madison, WI: Wisconsin Education Extension Program.
- Craig, J. L., & Page, G. (1981). The questioning skills of nursing instructors. *Journal of Nursing Education*, 20, 18-23.
- Daly, W. M. (1998). Critical thinking as an outcome of nursing education. What is it? Why is it important to nursing practice? *Journal of Advanced Nursing*, 28(2), 323-331.
- Davies, L., & Iqbal, Z. (1997). Tensions in teacher training for school effectiveness: The case of Pakistan. *School Effectiveness and School Improvement*, 8(2), 254-266. doi:10.1080/0924345970080205
- Dean, B. (2005). Citizenship education in Pakistani schools: Problems and possibilities. *International Journal of Citizenship and Teacher Education*, 2, 35-55.
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York, NY: McMillan.
- Dorman, J. P. (2012). Classroom psychosocial environment and course experiences in pre-service teacher education courses at an Australian university. *Studies in Higher Education*, 39(1), 34-47. doi:10.1080/03075079.2012.674936
- Duron, R., Limbach, B., & Waugh, W. (2006). Critical thinking framework for any discipline. *International Journal of Teaching and Learning in Higher Education*, 17(2), 160-166. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE55.pdf>
- Emir, S. (2009). Education faculty students' critical thinking disposition according to academic achievement. *Social and Behavioral Sciences*, 1(1), 2466-2469. doi:10.1016/j.sbspro.2009.01.433

- Ennis, R. H. (1993). Critical thinking assessment. *Theory Into Practice, 32*(3), 179-186. doi:10.1080/00405849309543594
- Facione, N. C., & Facione, P. A. (1996). Externalizing the critical thinking in knowledge development and clinical judgment. *Nursing Outlook, 44*(3), 129-136. doi:10.1016/S0029-6554(06)80005-9
- Gul, R. B., Cassum, S., Ahmed, A., Khan, S., Saeed, T., & Parpio, Y. (2010). Enhancement of critical thinking in curriculum design and delivery: A randomized controlled trial for educators. *Social and Behavioral Sciences, 2*, 3219-3225. doi:10.1016/j.sbspro.2010.03.491
- Gul, R. B., Barolia, R., & Moez, S. (2013). Faculty members as students in the same institution: Implications on the learning environment. *Journal of Nursing Education, 52*(3), 157-163. doi:10.3928/01484834-20130215-02
- Hsu, L. L. (2007). Conducting clinical post-conference in clinical teaching: A qualitative study. *Journal of Clinical Nursing, 16*(8), 1525-1533. doi:10.1111/j.1365-2702.2006.01751.x
- Ijaiya, N. Y. S., Alabi, A. T., & Fasasi, Y. A. (2010). Teacher education in Africa and critical thinking skills: Needs and strategies. *Social Sciences, 5*(4), 380-385. doi:10.3923/sscience.2010.380.385
- Kamal, I. (1999). *Report on the evaluation of implementation of the revised nursing curriculum in Pakistan*. Karachi, Pakistan: Rahnuma.
- Khalid, S. M., & Khan, M. F. (2006). Pakistan: The state of education. *Muslim World, 96*, 305-322. doi:10.1080/0924345970080205
- Kong, S. L. (2006, November). *Effects of cognitive-infusion intervention on critical thinking skills and dispositions of pre-service teachers*. Paper presented at the Australian Association for Research in Education Annual Conference, Adelaide, Australia. Retrieved from <http://www.aare.edu.au/data/publications/2006/kon06852.pdf>
- Kong, S. L. (2010). *Critical thinking for effective teaching and learning*. Republic of Singapore: Research Publishing Services.
- Loving, G. L., & Wilson, J. S. (2000). Infusing critical thinking into the nursing curriculum through faculty development. *Nurse Educator, 25*(2), 70-75. doi:10.1097/00006223-200003000-00008
- Mangena, A., & Chabeli, M. M. (2005). Strategies to overcome obstacles in the facilitation of critical thinking in nursing education. *Nurse Education Today, 25*, 291-298. doi:10.1016/j.nedt.2005.01.012
- Moeti, M. R., van Niekerk, S. E., & van Velden, C. E. (2004). Perceptions of the clinical competence of newly registered nurses in the North West province. *Curationis, 27*(3), 72-84. doi:10.4102/curationis.v27i3.1003
- Moore, T. (2011). Critical thinking: Seven definitions in search of a concept. *Studies in Higher Education, 38*(4), 506-522. doi:10.1080/03075079.2011.586995
- Mundy, K., & Denham, S. A. (2008). Nurse educators—Still challenged by critical thinking. *Teaching and Learning in Nursing Education, 3*(3), 94-99. doi:10.1016/j.teln.2008.02.007
- Myrick, F., & Cpsych, O. Y. (2002). Preceptor questioning and student critical thinking. *Journal of Professional Nursing, 18*(3), 176-181. doi:10.1053/jpnu.2002.124485
- Nicholl, H. M., & Tracey, C. A. (2007). Questioning: A tool in the nurse educator's kit. *Nurse Education in Practice, 7*(5), 285-292. doi:10.1016/j.nepr.2006.09.002
- Ovais, R. (2007). *Facilitating teachers' understanding and teaching of critical thinking as a way to develop students' political literacy* (Unpublished master's thesis). Aga Khan University, Karachi, Pakistan.
- Paul, R. (1993). *Critical thinking: What every person needs to survive in a rapidly changing world* (3rd ed.). Rohnert Park, CA: Foundation for Critical Thinking.
- Phillips, N., & Duke, M. (2001). The questioning skills of clinical teachers and preceptors: A comparative study. *Journal of Advanced Nursing, 33*, 523-529. doi:10.1046/j.1365-2648.2001.01682.x
- Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice* (8th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.
- Profetto-McGrath, J., Bulmer, S. K., Day, R. A., & Yonge, O. (2004). The questioning skills of tutors and students in a context based baccalaureate nursing program. *Nurse Education Today, 24*(5), 363-372. doi:10.1016/j.nedt.2004.03.004
- Profetto-McGrath, J., Smith, K. B., Hugo, K., Patel, A., & Dussault, B. (2009). Nurse educators' critical thinking dispositions and research utilization. *Nurse Education in Practice, 9*(3), 199-208. doi:10.1016/j.nepr.2008.06.003
- Redfield, D. L., & Rousseau, E. W. (1981) A meta-analysis of experimental research on teacher questioning behavior. *Review of Educational Research, 51*(2), 237-245. doi:10.3102/00346543051002237
- Rossignol, M. (2000). Verbal and cognitive activities between and among students and faculty in clinical conferences. *Journal of Nursing Education, 39*, 245-250.
- Rubenfeld, M. G., & Scheffer, B. K. (2006). *Critical thinking TACTICS for nurses*. Boston, MA: Jones & Bartlett.

- Sellappah, S., Hussey, T., Blackmore, A. M., & McMurray, A. (1998). The use of questioning strategies by clinical teachers. *Journal of Advanced Nursing*, 28(1), 142-148. doi:10.1046/j.1365-2648.1998.00776.x
- Shell, R. (2001). Perceived barriers to teaching for critical thinking by BSN nursing faculty. *Nursing and Health care Perspectives*, 22(6), 286-291.
- Shim, W., & Walczak, K. (2012). The impact of faculty teaching practices on the development of students' critical thinking skills. *International Journal of Teaching and Learning in Higher Education*, 24(1), 16-30. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE1128.pdf>
- Siddiqui, S. (2007). *Rethinking education in Pakistan: Perceptions, practices and possibilities*. Karachi, Pakistan: Paramount.
- Simpson, E., & Courtney, M. (2002). Critical thinking in nursing education: Literature review. *International Journal of Nursing Practice*, 8, 89-98. doi:10.1046/j.1440-172x.2002.00340.x
- Smith, D. G. (1977). College classroom interactions and critical thinking. *Journal of Educational Psychology*, 69(2), 180-190. doi:10.1037/0022-0663.69.2.180
- Staib, S. (2003). Teaching and measuring critical thinking. *Journal of Nursing Education*, 42, 498-508.
- Velde, B. P., Wittman, P. P., & Vos, P. (2006). Development of critical thinking in occupational therapy students. *Occupational Therapy International*, 13(1), 49-60. doi:10.1002/oti.20
- Vacek, J. E. (2009). Using a conceptual approach with concept mapping to promote critical thinking. *Educational Innovations*, 48(1), 45-48. doi:10.3928/01484834-20090101-11
- Van Amburgh, J. A., Devlin, J. W., Kirwin, J. L., & Qualters, D. M. (2007). A tool for measuring active learning in the classroom. *American Journal of Pharmaceutical Education*, 71(5), 1-8. doi:10.5688/aj710585
- Wangenstein, S., Johansson, I. S., Bjorkstrom, M. E., & Nordstrom G. (2010). Critical thinking dispositions among newly graduated nurses. *Journal of Advanced Nursing*, 66(10), 2170-2181. doi:10.1111/j.1365-2648.2010.05282.x
- Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice by Maryellen Weimer*. San Francisco, CA: Jossey-Bass.
- Wink, D. M. (1993). Effect of a program to increase the cognitive level of questions asked in clinical post conferences. *Journal of Nursing Education*, 32(8), 357-363.
- Yang, Y. C., & Chou, H. (2008). Beyond critical thinking skills: Investigating the relationship between critical thinking skills and disposition through different online instructional strategies. *British Journal of Educational Technology*, 39(4), 666-684. doi:10.1111/j.1467-8535.2007.00767.x
- Zygmunt, D. M., & Schaeffer, K. M. (2006). Assessing the critical thinking skills of faculty: What do the findings mean for nursing education? *Nursing Education Perspectives*, 27(5), 260-268.

RAISA B. GUL, PhD, is a professor at Aga Khan University School of Nursing and Midwifery, Karachi. She is a registered nurse and midwife, and holds a PhD in Nursing from the University of Alberta. She also completed a post-doctoral fellowship at the same University. She teaches courses in the education and research track. She is interested in educational research including critical thinking, assessment, and evaluation. She has presented her work at national and international fora and has several publications to her account.

SHEHLA KHAN is an assistant professor at AKU-SoNaM and holds a Master's degree in science with specialization in organic chemistry from Karachi University, Pakistan. She teaches life sciences subjects to the BSN and BScM students. She has participated in a number of research projects related to education and curriculum development, and has received university grants as well. She has presented her work at the national and international levels.

AZRA AHMED is an assistant professor at the Aga Khan University Institute for Educational Development, Centre of English Language. She holds a Masters in TEFL from Allama Iqbal Open University, Islamabad, and a MSc in Digital Education from the University of Edinburgh. She has co-edited three books: *English and Empowerment in the Developing World*, *Teaching English in Multi-lingual Contexts: Current Challenges and Future Directions*, and *ELT in a Changing World: Innovative Approaches to New Challenges*. She has presented at national and international fora. Her area of specialization is online learning for English in the context of Pakistan.

SHANAZ CASSUM is an assistant professor at the Aga Khan University School of Nursing and Midwifery. She holds a Master's of Science in Nursing from Aga Khan University, Karachi, Pakistan. Her areas of expertise are nursing education, nursing assessment clinical supervision, active learning strategies, health education and counseling. Her proficiency lies in developing, designing, teaching, and facilitating nursing courses, both theory- and clinical-based, for baccalaureate nursing students. Her current research projects focus on use of critical thinking skills in transforming a

traditional course into blended format to promote learners' engagement.

TANVEER SAEED is an assistant professor at the Aga Khan University School of Nursing and Midwifery. She holds MS degree in Biological Sciences and MP degree in Reproductive Endocrinology from the Quaid-e-Azam University, Islamabad. Her expertise is in designing, developing, and teaching Anatomy Physiology and Pathophysiology to BSN nursing students. She has presented her work at national and international conferences. She has conducted workshops on critical thinking and has published paper on questioning skills with her team. She is an active member of Curriculum and Appointment Promotion committees and Professional Licensure Examination of the school.

JOANNE PROFETTO-MCGRATH, PhD, is a professor and Vice Dean at the University of Alberta in Canada. She holds a Master degree in Educational Administration. She holds a PhD in Nursing from the University of Alberta, and completed a Post-Doctoral Fellowship funded by CHSRF. She is an award-winning author, nurse, and nurse educator. Dr. Profetto-McGrath has published over 35 manuscripts, and several books and chapters in edited books,

including *Canadian Essentials of Nursing Research*. She has presented her work at peer-reviewed national and international conferences. Her area of research and expertise is critical thinking, research utilization, and questioning.

DONALD SCHOPFLOCHER, PhD, is a statistician-methodologist specializing in population health and public health surveillance. Trained as a research Psychologist focusing on personality and psychological measurement, he obtained a PhD from the University of Alberta in 1993. Starting in 1995, he worked as a biostatistician for Alberta Ministry of Health and Wellness. In 2006, he became Director of Research at the Institute of Health Economics. He is currently an associate professor at the University of Alberta, jointly appointed to the Centre for Health Promotion, School of Public Health, and to the Faculty of Nursing.

Acknowledgments

We would like to thank the Aga Khan University Research Council for funding this study, and the participants for their contribution to the project. We also acknowledge the administrative and technical support of Ms. Zia Sultana to the project.

Appendix-A
Intervention Workshops on Critical Thinking

Topic/Content	Strategies
<ul style="list-style-type: none"> Definitions and descriptions of CT Multidimensionality of CT as an attitude, skill, art, outcome, process, reflection Characteristics of a critical thinker: Knowledge, skills, and attitudes/disposition Clarifying of perceptions, and accepting diverse opinions, avoiding stereotypes CT/problem-solving/decision-making/creative thinking 	<ul style="list-style-type: none"> PowerPoint interactive presentation Reflections on pictures & images to explore varied perceptions, thoughts, and ideas about concepts related to thinking and CT. Questioning Debate on CT skills vs. CT dispositions Small group exercise (e.g., fish bowl) Large group discussion
<ul style="list-style-type: none"> Importance of critical thinking in nursing practice and education Challenges and barriers in teaching CT Difference between active and passive strategies Learning environment and student engagement Teaching strategies to promote critical thinking in students 	<ul style="list-style-type: none"> Role play depicting traditional classroom where teacher does one way teaching and overload content on slides, passive learning, poor questioning followed by reflection on the role play Reflection: Think of past and recall your favorite teacher Small groups activity for development of concept map on barriers to CT Development of Pros/Cons Grid by Think pair & share activity Jigsaw for active teaching strategies
<ul style="list-style-type: none"> Importance of questioning in nursing Bloom's taxonomy Types, Quality, and levels of questions Research findings on questioning skills amongst educators Instructional objectives for each level of blooms taxonomy Writing instructional objectives; Cognitive domains ladder (6 levels) 	<ul style="list-style-type: none"> Interactive discussion using PowerPoint presentation; Questioning Muddiest point; clarification of major points related to Blooms taxonomy Develop questions in small groups, present and critique in large group. Modify the given questions (closed to open, low to high order) Think pair & share; Activity on identifying correct or incorrect objectives and modifying the latter
<ul style="list-style-type: none"> Importance and Purpose of a course grid and its components The concept of alignment in class plan, course, and curriculum Steps and skills for identifying coherence in various component of a course Curricular alignment Triangle framework (Article by Lorin Anderson) Take home assignment briefing and expectations Participants experience of the workshop 	<ul style="list-style-type: none"> Interactive discussion using PowerPoint presentation; Planned and unplanned questions Application of alignment exercise in small group activity- participants required to develop a class plan including objectives, content and teaching strategies. Critique of class plan in large group for alignment CT Survey questionnaire; workshop evaluation
The learners returned after 14 weeks for the second workshop	
<ul style="list-style-type: none"> Share experiences and challenges of completing assigned task Sharing of personal experience in application of knowledge and skills in learned in the first workshop. Barriers to application and ways to overcome the identified barriers Facilitators of CT Reflections and reflective Evaluate selective course grid for alignment Conclusion & Workshop Evaluation 	<ul style="list-style-type: none"> Interactive discussion using PowerPoint presentation Sharing synopsis of the experience Planned and unplanned questions Synthesis of literature on Reflection and presentation of synthesis in a concept map Discussion on the presentation of concept maps. Reflections on the quality of discussion Small group exercise to critique for alignment and presentation of the finding

Appendix B
Checklist for Classroom Observations

Code: _____

Topic of the Class: _____
 Code of the school: _____; City: _____
 Duration of the class: Start time: _____ End time: _____
 Break: ☐ Yes ☐ No ; Total class duration excluding break time: _____
 Observed class is of which programme: 4-year BSN ☐ Post-RN BSN ☐

Note: circle the appropriate response and write comments in the field notes as appropriate.

1.	What was number of students in the class?	1. < 20 2. 21-30 3. 31-40 4. > 50
2.	Was the Physical Environment of the class conducive to learning? Descriptors: seating arrangement, comfortable seating, adequate light and ventilation, free of distractions (noise)	1. Not at all 2. To some extent 3. To great extent
3.	Did the instructor promote teacher-student interaction? Descriptors: verbal and non-verbal: level of distance between teacher and students, attentive (eye contact, listening, nodding) when students are talking, approachable, non-threatening, but welcoming approach to students, invites questions or participations.	1. Not at all 2. To some extent 3. To great extent
4.	Did the instructor demonstrate an attitude of mutual respect towards the students? Descriptors: Verbal (language and tone of communication) and non-verbal gestures reflecting respect, open mindedness-acceptance of different views. Students appears to feel safe to express their feelings, as their ideas and opinions are valued	1. Not at all 2. To some extent 3. To great extent
5.	Was the instructor responsive to students' needs and concerns? Descriptors: Teacher responds to student's questions; provides clarification, explanation as needed; demonstrates flexibility- make changes on the students' request, e.g. need for a break.	1. Not at all 2. To some extent 3. To great extent 4. Not applicable
6.	Did the instructor encourage students if they asked questions? Descriptors: Compliment students for asking questions e.g. good question! Thanks for asking/raising this issue. When the question is not clear, doesn't ridicule, but probe to understand the question.	1. Not at all 2. To some extent 3. To great extent 4. Not Applicable
7.	Did the instructor dictate notes to the students? Descriptors: Teacher's emphasizes on noting down of content, e.g. copy/note what is on the board/slide; write it...	1. Not at all 2. To some extent 3. To great extent
9.	Did the instructor use any teaching aids/resources? Descriptors: Board (white/black), Models, Charts, video etc.	1. Multi Media (PP-slides) 2. Others:

10.	<p>Did the instructor use any active teaching strategies? (circle all that are appropriate)</p> <p>Descriptors: Teachers direct students for an activity, explains the context and process, make the student reflect on what they did and learn.</p>	<ol style="list-style-type: none"> 1. Group work 2. Role Play 3. Debate 4. Concept mapping 5. Others
-----	--	---

Field Notes: (any observation that may facilitate or inhibit students thinking)

Recorder name and signature: _____ Date: _____

Appendix C
The Types and Levels of Questions

Types of Questions	Levels of Questions: Required Cognitive Activity	Examples
Lower order	Knowledge: the lowest level of cognitive thinking that entails remembering or recalling factual information, it includes memorization of definitions, formulae or procedures.	Which organ in the body produces insulin? What is peritonitis?
	Comprehension: understanding of information, usually restating the information with some reorganizing, but without relating it to other concepts.	How conduction system of the heart works? What is done to a patient blood in plasmapheresis?
	Application: Problem solving or application of learned material in new situations with minimal prompting of the appropriate rules, principles, or concepts.	What are some possible Nursing diagnoses for patient with Acute renal failure?
Higher order	Analysis: Breaking an idea into its component or parts for logical analysis or reasoning to support a conclusion.	How would you confirm that whether it is respiratory or metabolic acidosis?
	Synthesis: Combining ideas into a statement, plan, product, etc.	What is the role of diet and exercise in health?
	Evaluation: Evaluating or making a judgment about something using some criteria or standard.	Which is the most appropriate nursing management for an elderly patient having stroke?
Vague	Questions that are difficult to interpret, because the given information is incomplete or asked in an illogical order.	What is the intake of a normal person? What do you think about personal development?

Experiences of College Students with Psychological Disabilities: The Impact of Perceptions of Faculty Characteristics on Academic Achievement

Kathleen F. Stein
Towson University

Despite the increase of individuals with psychological disabilities (PD) attending college and universities, students with PD are less likely to complete their college programs than their non-disabled peers and peers with other disabilities. This qualitative study examined the perceptions and beliefs of individuals with PD attending a four year university regarding faculty characteristics and behaviors that promote academic achievement, as well as faculty behavior and characteristics that encourage disclosure and requests for accommodations or other supports. The researcher conducted in-depth interviews with 16 participants and utilized grounded theory research methods to collect and analyze data. Various themes emerged from the study, including participants' considerations when asking for accommodations, faculty characteristics and behaviors identified as impacting academic achievement, and suggestions for faculty members to help students succeed in their coursework.

Psychological disabilities, including mood and anxiety disorders, represent one of the fastest growing populations at institutes in higher education (Belch, 2011). Furthermore, the prevalence rate of college students with psychological disabilities is beginning to surpass the rates of those of learning disability and attention deficit disorder combined (Kiuahara & Huefner, 2008). Research examining post-secondary outcomes found of the 73% of students with disabilities who enrolled in college, only 28% completed their programs, compared to 54% of their peers without disabilities (Wolanin & Steele, 2004). Furthermore, individuals with psychological disabilities withdraw from their programs at an even greater rate as compared to individuals with other disabilities or non-disabled students (Salzer, 2012). Failure to pursue or attain educational and vocational goals may lead to unemployment, underemployment, or underachievement. These poor outcomes result “not only into untapped talent and potential and unfulfilled dreams, but severely limits America’s preparation of today’s youth for full participation in tomorrow’s society” (National Council on Disability, 2000, p. 1).

There are multiple reasons for these challenges, including lack of support from colleges and community mental health systems, cognitive skill problems, perceived stigma, lack of opportunities, and the nature of the illness itself (Belch, 2011; Blacklock, Benson, & Johnson, 2003; Kiuahara & Huefner, 2008). Stigma and the fear of stigma is arguably the most difficult barrier for individuals with psychological disabilities to overcome: “Perhaps the greatest barrier for persons with a psychiatric disability to achieving psychosocial adaptation is not the disability, but rather the stigma attached to it by members of society” (McReynolds & Garske, 2003, p. 14). Moreover, professors may believe individuals with psychological disabilities may be

trying to manipulate them or the university system, particularly when it comes to excessive absences (Kiuahara & Huefner, 2008; Mowbray, Bybee, & Collins, 2001).

There is a growing body of literature examining issues related to students with psychological disabilities attending institutes of higher education. However, there is much more known regarding college students with learning disabilities or other disabilities. Furthermore, much of the research focusing on individuals with psychological disabilities attending college is quantitative, examining perceptions or attitudes of faculty members regarding psychological disabilities, as well as outcomes of this population. The purpose of this study was to examine the perceptions and beliefs of individuals with psychological disabilities attending a four year university regarding faculty characteristics and behaviors that promote academic achievement, as well as faculty behavior and characteristics that encourage disclosure and requests for accommodations or other supports. Moreover, this study may give voice to individuals who have not had the opportunity to share their experiences and beliefs.

Method

The researcher utilized grounded theory research methods and followed systematic methods of recruiting participants, data collection, and data analysis, as delineated by Charmaz (2006). Grounded theory methods “consist of systematic, yet flexible guidelines for collecting and analyzing data to construct theories grounded in the data themselves” (Charmaz, 2006, p. 2). A study using grounded theory examines a process or action that occurs or develops over time, with the goal of developing a theory of the identified process (Creswell, 2013). According to Creswell (2013), a theory is “an explanation of

something or an understanding that the researcher develops” (p. 85). He further noted the goal of grounded theory methods is not to develop a “grand” theory, but a “substantive” level theory (p. 290), that is “a low-level theory applicable to immediate situations” (Creswell, 2013, p. 290) emerging from the examination of a phenomenon situated in a specific context (Creswell, 2013; Strauss & Corbin, 1998). The researcher chose grounded theory methods because she is interested in the process of individuals with psychological disabilities working towards their postsecondary goals and how their perceptions regarding faculty members impact their success.

Participants

The researcher used purposeful sampling procedures for this study. Specifically, participants were selected based on certain criteria rather than availability or willingness to participate (Sandelowski, 1995). Participants were registered with the Disability Support Services (DSS) office at their university and were identified as having a psychological disability as either their primary or secondary disability; were receiving accommodations through DSS, or other supports provided by DSS, at the time of the study; and were currently enrolled in full time course work at their university, maintaining a 2.5 GPA or higher. All participants were enrolled at a regional public university in the Mid-Atlantic area of the United States, which served approximately 21,000 students.

The participants were undergraduate students, including one freshman, two sophomores, seven juniors, and six seniors. One student was earning a second bachelor’s degree. Ages ranged from 19 to 34, with a mean age of 25.6. The majority of participants were female ($n = 13$). Fourteen were Caucasian and two African-American. A variety of majors were represented; two students were double majors and two were undecided. Of the 16 participants, four had IEPs in elementary, middle, or high school, and three additional participants received accommodations through a Section 504 plan. Four students attended small private schools because they needed extra support, and they received accommodations without an IEP or Section 504 plan. Psychological disabilities included panic disorder, anxiety, bipolar 1 and 2, non-specified mood disorder, major depressive disorder, obsessive compulsive disorder (OCD), agoraphobia, and post-traumatic stress disorder (PTSD). Several participants identified themselves as having multiple diagnoses, including non-psychological disabilities such as dyslexia, processing disorders, and ADHD. Anxiety and mood disorders were the most common disabilities represented.

Data Collection

Intensive interviews, ranging from 45 to 125 minutes, were conducted with each participant. This method of collection was chosen because intensive interviewing allows for an in-depth exploration of a particular topic or experience and thus is a useful method for interpretive inquiry (Charmaz, 2006). The researcher used an interview protocol; however, questions sometimes varied depending on the responses of the participant. Follow-up interviews, which allowed for member checking and theme verification, ranged from 10 to 35 minutes, and they took place no later than two weeks after the initial interview. Consistent with grounded theory methods, the researcher collected data until saturation was reached (Strauss & Corbin, 1998). Theoretical saturation occurs when no new or relevant data seem to emerge regarding a category, the category is well developed in terms of its properties and dimensions demonstrating variation, and the relationships among categories are well established and validated (Strauss & Corbin, 1998). The researcher utilized a zigzag approach, going back and forth between data collection and analysis until categories emerged and reached saturation (Creswell, 2013).

Data Analysis

The researcher was guided by Charmaz’s (2006) framework for grounded theory analysis, engaging in three levels of coding: open, focused, and theoretical. Coding allows the researcher to stop and consider analytic questions of the gathered data (Charmaz, 2006). Initial or open coding involves studying segments of data for “analytic import” (Charmaz, 2006, p. 42). The second major phase, focused coding, requires the researcher to select the most useful initial codes and test them against the data. During the theoretical coding process, the researcher “weaves the fractured story back together” (Glaser, 1978, p. 72) by integrating the focused codes to form a coherent narrative. The researcher used N-VIVO 9 software throughout the coding process.

Results

Several core categories emerged from the participants’ descriptions of their experiences with faculty members and perceptions regarding how those experiences—including the characteristics and behaviors of their professors—impacted their academic achievement. Specifically, participants discussed considerations when asking for accommodations, specific faculty characteristics and behaviors identified as affecting student achievement, and suggestions for faculty members to help students succeed in their coursework.

Considerations Regarding Accommodations

In order to receive accommodations at their university, participants are required to present a letter from the DSS office to their professor. The letter states the student has a disability, but not the specific diagnosis, and identifies which accommodations the student is eligible to receive. Although participants stated they are eligible to receive accommodations in their courses, they do not always ask for accommodations or other assistance. Participants discussed many factors that influenced their decision to ask for accommodations or assistance in a course. Some said it depended on the course content and/or requirements. However, many stated the professor was a key element in determining whether to disclose they have a disability and seek assistance. When asked what encourages them to request accommodations, participant responses indicated instructor behavior and interactions made a difference. For instance, one student stated,

When a teacher syllabus puts more in the syllabus than what is required about accommodations, or just words it differently. I also found that teachers willing to talk after class than office hours are more helpful and have more commitment.

Many participants discussed not only how the professor treated them, but how they treated all students as a determining factor on whether to disclose they have a disability and request accommodations: "Most professors I've had have shown a great deal of respect towards students. I feel like I can disclose my issues to them and everything will be on a professional level, and that's very good." Several students suggested they also considered the professor's non-verbal cues, which they believed conveyed whether or not the professor would be understanding, such as one student noted in the following:

I'm huge on eye contact and body language because it tells me if people understand. If they stop what they are doing, and look at me, that definitely helps. Sometimes they blow you off a bit, which is not a good thing.

The majority of participants reported most of their professors are receptive when they do ask for accommodations. For example, "I've definitely had teachers that are very helpful in that regard," and, "Most professors are encouraging and want to help."

Although participants reported most professors are amenable to providing accommodations and other assistance, they do not always ask for their accommodations, even if they think they will need them for that course. Sometimes, the perception or fear of

how the professor will react discourages them. One student explained, "I'm afraid they'll judge, like one teacher I had who made me feel stupid." Another student stated, "I don't ask when there is a professor that I don't think would have a good response." Participants also described negative experiences when they requested accommodations:

Another negative thing is if I were to walk up to a professor and try to get their attention, and they say "go sit down," and don't even give me a chance. Also, a lot of professors don't get there on time, and that's not good either.

Even when students did ask for accommodations, they were at times discouraged from seeking additional assistance or did not receive their accommodations consistently throughout the semester: "One of them is kind of harsh with students and says he doesn't have patience to wait for the slow ones. So I'm discouraged from asking for help from him." According to another participant,

To some, it's an excuse to get out of work. They take longer to get notes, respond to requests. One professor had the phrase when it came to absences, "If I have to be there, you have to be there, there is no excuse."

Faculty Characteristics and Behaviors

When asked to describe classes in which they did well and how professors may have contributed to that success, participants discussed a variety of faculty behaviors, including providing accommodations in an efficient and confidential manner, effective teaching behaviors, availability, and personality characteristics. Conversely, participants described experiences with their instructors that they believed had a negative impact on their achievement. These included not receiving accommodations even when presented with official documentation, professors lacking knowledge regarding DSS and disabilities, lack of communication, and negative interactions with their professors. Not surprisingly, participants stated that they typically performed well when professors ensured they received the appropriate accommodations, particularly in an efficient and confidential manner. For instance, one student explained:

The ones who understand are actually very good about it. They give you the option of talking with confidentiality in their office if you need additional help and make sure you get the accommodations you need. E-mailing has also been helpful because it's confidential.

In addition to providing accommodations in a timely and efficient manner, participants also identified specific instructional approaches that assisted them in their coursework. These teaching behaviors included providing clear expectations, demonstrating knowledge of the subject, explaining material clearly or in a variety of ways, and allowing students to interact and engage with each other and the material. Most participants preferred discussion-based courses in which they and other students could actively engage in the material:

If I had any questions, he really answered them. He also let other students explain, so they'd explain it to me. Multiple explanations helped. And I was able to explain things sometimes too, so I was able to practice.

Participants also stated they were most successful in courses in which the instructor was enthusiastic about the course and "really wanted to be there."

The most frequently mentioned characteristic that promoted achievement was instructor availability and communication. One participant explained, "What helps the most was being available if I had questions, explaining things well, putting up a lot of things on Blackboard." Another participant stated they did the best in classes where instructors "are available and willing to help students. Some teachers just come in, lecture, and good bye. Some encourage you to come see them during office hours or e-mail; they're quick to get back to you. That works better." Being able to see professors during office hours made a difference to many participants, as it gave them an opportunity to ask questions and get further explanations in a confidential manner (e.g., "Being able to go in during office hours really helps").

In addition to specific behaviors such as teaching approaches and availability, participants identified personality characteristics such as approachability, understanding, and professionalism as contributing to their success. For example, "The teacher cared and was really understanding. He was very patient and never seemed annoyed or frustrated when I kept raising my hand, asking questions." Another participant described a professor who contributed to her success as "approachable and very funny. She was also very knowledgeable, about the subject and disabilities." Students reported that they performed better when the professor was "professional," and they defined professionalism as being prepared for class, knowing the content area, and interacting with all students positively and fairly.

Participants also reported performing well in courses in which they felt the professor cared about their academic achievement (e.g., "He was just very kind, and trying to help me succeed. And doing

everything he could to help me succeed"). Many participants described professors who provided additional academic help. For instance, one participant noted, "I e-mailed the teacher about my disability and met with him, and he offered to meet with me once a week to go over the material, which helped a lot in class so I fully understood it." Participants also shared experiences in which professors went above and beyond their expected roles in order to assist students. For instance:

Actually at the end of the semester was when I was getting manic and was off the medication for a while. One day I just didn't feel comfortable leaving the class, so we just sat there and he talked to me until I calmed down, which was really nice because not a lot of professors would stay past their class time and help the student calm down.

It was clear by the participants' responses that establishing positive relationships with their instructors and believing their instructors wanted students to be successful were influential factors in the students' academic performance.

All participants stated that the majority of their professors were helpful and provided the appropriate accommodations as well as additional assistance when requested. However, all had at least one or two negative experiences with their instructors. The most frequently mentioned challenge involved professors not providing accommodations, even when students provided the appropriate documentation. One student explained, "I had one professor that just never could get the test [at the testing center] for some reason. I'd tell him a week ahead of time, call him; he couldn't remember." Many participants described difficulty with testing accommodations in particular, such as the instructor losing the testing form, not faxing the test correctly, or forgetting to send the test, "no matter how many times I would remind him." Some participants believed the professors thought they just wanted "an excuse" or did not want to provide the accommodations, such as one student's response indicates:

He kind of gave me an attitude. He was very difficult about letting me do [take the exam] in the testing center. He had to curve that test because everyone did so bad on it. He was very difficult about the whole thing.

In addition to testing accommodations, participants expressed difficulty obtaining adequate notes (e.g., "There were many times I [would] have to remind [professors] 20 times to get the notes"). Participants described the note taking process as "confusing" to their instructors and classmates. For instance, "They

don't understand how the process works, . . . maybe they need more information."

Another common concern focused on faculty knowledge regarding DSS rules and procedures as well as disabilities, particularly psychological disabilities. In regards to DSS and accommodations, many participants stated their professors did not understand the procedures or what was expected of them: "Some aren't really knowledgeable. Like someone will look at the [DSS] letter and try to hand it back, and I'm like, 'no you really have to keep that.' Or they won't look at it or they lose it." Several students believed the instructors may not follow through with providing accommodations because they did not understand the process or requirements, for example:

I had one professor that seemed really confused. She was convinced that it wasn't the real memo, and in my geography class, I gave the paper to the teacher and nothing happened. She didn't even know what to do with [the letter from DSS].

Not all participants disclosed the specific nature of their disabilities, but those that did reported many professors did not have adequate knowledge regarding psychological disabilities. For instance, one participant noted, "Some faculty don't understand or have misconceptions about mental illness." Another participant stated, "Some seem to have a clue about a mood disorder and how that might impact learning, but I've had difficulty with others. One professor told me, 'everybody has problems.' It was really frustrating." Many students felt the professor's lack of knowledge or understanding regarding disabilities affected their performance in the course:

The teacher was so close-minded to the idea of a mental illness, I couldn't make a bridge. Another teacher, . . . she didn't understand what was going on. She was struggling to understand me as much as I was trying to understand the class.

Several participants felt they were treated like they were "dumb" or "slow." When discussing these instructors, participants used words such as "unprofessional," "sarcastic," and "uncaring." They also stated the professors displayed these behaviors with most of the class. Several stated that they withdrew because of these interactions (e.g., "His philosophy was you get with it or you withdraw. I don't know if it was because I gave up or what, but I withdrew pretty quickly").

Suggestions

Participants made several suggestions regarding how faculty and staff could assist them as they work

towards their academic goals, including professional development for faculty regarding disabilities, more communication between DSS and professors, and providing accommodations when requested.

As stated previously, many participants felt their instructors possessed inadequate knowledge of DSS and the accommodations process. For example, "I just feel there should be more awareness because I feel like all the teachers aren't really aware of what's going on; they just get the papers. So I would just provide more information about the whole program." Furthermore, participants believed professors needed more awareness regarding psychological disabilities. One student explained, "I think the education of faculty could help a lot. They should be able to say, 'I've got a student with this issue, this is what I need to do.'" According to another participant, "professional development would be helpful for all faculty members, to learn how to work with students with disabilities, especially hidden disabilities; just requiring them to put a sentence in their syllabus isn't enough."

A closely related recommendation was increased communication between faculty and DSS staff. Like faculty development, this recommendation is in response to concerns regarding faculty knowledge, "Having an advocate, someone who can be more articulate would be helpful. Someone who knows how to deal with it when somebody looks at me, and says 'oh, wow,' that would be really helpful." Most participants agreed that even if the professor did not meet the DSS counselor in person, it would be beneficial if there were more communication between DSS staff and instructors. A student noted, "I just wish they could be more connected to the specialist and understand what my needs are as a student."

Participants also offered suggestions regarding faculty attitudes and behaviors, such as being more understanding and following through with accommodations. As previously discussed, students stated they performed better when they believed the teacher cared and treated them with respect:

The teachers need to be more willing to work with us, really just to be more understanding and more respectful. We're humans too. A lot of times they downgrade us or reject us because we have a disability. It's hurtful and I'm just like "okay, I'm trying here."

Participants also expressed the need for professors to be consistent with providing accommodations throughout the semester: "They need to remember that we have that form because I think throughout the semester they teach so many people I think they forget who has disabilities."

Discussion

This study explored the perceptions and beliefs of individuals with psychological disabilities attending a four year university regarding faculty characteristics and behaviors that promote academic achievement, as well as faculty behavior and characteristics that encourage disclosure and requests for accommodations or other supports. Although students with a psychological disability complete their postsecondary academic programs at a lower rate than their non-disabled peers or peers with other disabilities (Salzer, 2012), the participants in this study are working towards their academic goals and maintaining at least a 2.5 GPA. Furthermore, many of them were close to completing their programs at the time of this study. The pertinent categories or themes that emerged from the data of this study are consistent with, and expand on, much of the literature examining issues regarding students with disabilities attending institutes of higher education. Specifically, this study illuminated the perceptions of individuals with psychological disabilities, which extends the research focused on learning disabilities and other disabilities.

The participants' narratives revealed the impact of faculty members on their academic achievement. When asked to describe courses in which they were or were not successful, the responses often involved the instructor. Faculty behaviors such as availability, having knowledge regarding disabilities, and being understanding or supportive were factors listed as beneficial to student success. Participants were less successful in courses when they felt the instructors were not knowledgeable regarding disabilities or were not understanding. This is consistent with research that has found an identified relationship between the perception of students with learning disabilities regarding faculty support and their academic achievement (Allsopp, Minskoff, & Bolt, 2005; Erten, 2003; Troiano, 2003). According to Hong and Himmel (2009), numerous students have "identified faculty attitudes as the key contributor to the success of students with disabilities" (p. 6). Wilson (2006), in a study involving students with or without disabilities, found that students' perceptions of their instructors' attitudes towards them, such as showing concern and a desire for students to achieve success, positively affected student motivation and course appreciation. It is clear that participants felt professors had a major impact on their academic performance, whether it was positive or negative.

Furthermore, a significant number of participants reported being reluctant to ask for accommodations when they felt they would not get a positive response from their instructor. According to Murray, Wren, and Keys (2008), "negative attitudes and perceptions among faculty can have detrimental effects on students'

motivation to seek additional support for their disability" (p. 88). Hartman-Hall and Haaga (2002) also found that faculty reactions to requests for accommodations influenced student decisions to ask for assistance in the future. When asked what encouraged them to seek assistance, participant responses indicated the need for some type of reassurance of an encouraging reaction to the request, such as positive interactions with other students, additional information regarding disabilities in the syllabus, eye contact, or other encouraging interactions.

Although the majority of these studies focused on learning disabilities or non-specified disabilities (e.g., Allsopp et al., 2005; Benson, Cohen, & Buskist, 2005; Erten, 2003; Hartman-Hall & Haaga, 2002; Hong & Himmel, 2009; Murray et al., 2008), the impact of faculty attitudes and support may be even more significant for individuals with psychological disabilities, as there is often greater stigma attached to this population (Belch, 2011). A University of Utah survey of students identified as having psychological disabilities revealed participant fears and concerns regarding stigma associated with psychological disabilities in university settings (University of Utah Survey, 2006). Furthermore, stigma and negative stereotypes are perhaps the most frequently cited barrier in the literature (Becker, Martin, Wajeeh, Ward, & Shern, 2002; Cleary, Walter, & Jackson, 2011; Sharpe, Bruininks, Blacklock, Benson, & Johnson, 2004). Belch (2011) summarized research regarding faculty perceptions of students with psychological disabilities accordingly: "[S]ome faculty reported a willingness to accommodate students, yet others refused to acknowledge the disability, harbored feelings of anger toward them, viewed these students as less competent, and believed they should not be on campus" (p. 83). Participants in the current study revealed fears and concerns regarding stigma and being "judged." Several students reported feeling that some of their professors thought they were "lazy" or were looking for "an easy way out." They reported feeling more comfortable and experiencing more success with professors who were understanding and "don't have a judgment about it."

Much of the stigma regarding psychological disabilities stems from a lack of training and awareness (Belch & Marshak, 2006; Collins & Mowbray, 2008; Olney & Brockelman, 2003). Indeed, the need for increased faculty knowledge regarding psychological disabilities was another salient theme in the participants' descriptions of their experiences and interactions with professors. According to participants, instructors who were knowledgeable and understanding were more likely to provide assistance and follow through with accommodations, and conversely, professors who were less knowledgeable were less likely to be supportive or provide accommodations. Many participants believed

their professors did not have adequate knowledge of DSS, the accommodations process or psychological disabilities, and that this lack of knowledge adversely affected their educational performance. In addition, faculty members have also reported having inadequate knowledge regarding the needs of students with psychological disabilities and have identified the need for more resources and information (Brockelman, Chadsey, & Loeb, 2006). Furthermore, professors with personal experience with psychological disabilities are less likely to support discrimination and stigma, and they are more likely to feel comfortable working with this population (Belch, 2011; Brockelman et al., 2006). Throughout their interviews, participants expressed frustration regarding the lack of knowledge of faculty regarding accommodations and psychological disabilities. Many felt professors “just don’t know what to do” when they have students with disabilities, particularly students with psychological disabilities. Clearly, more faculty training and education is needed regarding psychological disabilities specifically, as these students may experience different stressors and may require different accommodations and supports. As previously stated, individuals with psychological disabilities are attending institutes of higher education in increasing rates, and the ability to achieve postsecondary goals is crucial to post-secondary success.

Although the need for faculty education and increased knowledge regarding psychological disabilities is significant, the ability for students to advocate for themselves is also important to academic success. Unfortunately, some individuals will continue to hold on to negative attitudes and perceptions regarding psychological disabilities despite increased awareness and knowledge. Test, Fowler, Wood, Brewer, and Eddy (2005) defined self-advocacy as knowing one’s self and one’s rights, leadership, and communication. It also involves the ability to speak on one’s own behalf. In college, this is manifested in students knowing their legal rights regarding accommodations, requesting accommodations for which they are eligible from their professors, and following up with professors when they do not receive these supports. The participants’ descriptions revealed two issues related to self-advocacy. First, they sometimes did not disclose their disability and request accommodations when they felt they would not receive a positive response from the instructor. Second, many suggested the need for an advocate, such as a DSS staff member, who could explain their disability to their professors and help them get their accommodations. Although DSS staff do often act as advocates, it is important for students to be able to articulate their needs and rights and advocate for themselves, as they will not always have access to someone who can intercede for them.

Finally, the notion of care in the classroom is another pertinent issue to this study. When asked to describe the characteristics of professors who they felt contributed to their academic achievement, a prevalent descriptor was “caring,” or “knowing the professor cared.” They operationalized caring with behaviors such as providing encouraging statements, responding to e-mails and requests for assistance in a timely manner, availability during office hours, and providing accommodations with or without reminders. They also provided examples of instructors going above and beyond their roles. Defining care, and what it looks like in a classroom, is a complicated task, as “caring is one of those elusive notions that is difficult to give shape” (McBee, 2007, p. 33). McBee (2007) surveyed 144 teacher candidates, experienced K-12 teachers, and college teacher educators to “uncover how it is that teachers in different contexts and at different stages of their careers conceptualize and actualize caring” (p. 34). The most frequently cited examples were offering help, showing compassion, showing interest, caring about the individual, giving time, listening, and getting to know students (McBee, 2007).

Although many discussions of care in the classroom focus on K-12 settings, it is also an important concept in higher education. Jones’s (2009) MUSIC Model of Academic Motivation reinforces the importance of caring in higher education, particularly as it relates to motivation and engagement. His model encompasses five components to help guide instructors as they design and carry out instruction: empowerment, usefulness, success, interest, and caring (Jones, 2009). Jones (2009) asserted that caring is manifested when students believe their instructor cares about their well-being and their learning, rather than being “buddies” with their students (p. 279). He further stated that well-being “usually becomes relevant only when an issue related to a student’s personal life interferes with course requirements” (Jones, 2009, p. 279). This notion is particularly relevant to the findings of this study, as participants’ functional limitations due to their psychological disabilities often affect their ability to perform in their courses. As previously stated, the majority of participants believed they performed better in classes where the instructor demonstrated they cared about the students’ academic success and well-being.

Other research has also emphasized the importance of interpersonal relationships in the college classroom as an integral part of teaching and learning (e.g., Benson et al., 2005; Wilson, 2006; Witt, Wheelless, & Allen, 2004). Meyers (2009) addressed caring as an “important dimension of effective college teaching” (p. 205) that enhances individual relationships between students and faculty and reduces classroom conflicts.

Although students appear to value caring in the college classroom, some professors do not prioritize caring in the same manner; they may feel it is difficult to create caring relationships, that it is not part of their job, or that students will view them as too easy or permissive (Meyers, 2009). However, given the importance students place on care, and the impact of student perceptions of faculty support, it may be beneficial for institutes of higher education to consider the notion of care and seek ways to promote it in the classroom. According to Schmier (1997), “professors must persist despite frustrations and setbacks, tolerate feelings of vulnerability that sometimes occur when emotion is evident or addressed, and focus more on students than on subject matter at times” (as cited in Meyers, 2009, p. 209). As previously stated, this may be of even more significance for individuals with psychological disabilities, given the stigma surrounding their disabilities and the nature of the disability itself.

The findings of this study are also consistent with Chickering and Gamson’s (1987) seven principles of effective practice in undergraduate education: (a) encouraging contact between students and faculty, (b) developing reciprocity and cooperation among students, (c) encouraging active learning, (d) providing prompt feedback, (e) emphasizing time on task, (f) communicating high expectations, and (g) respecting diverse talents and ways of learning. Wilson (2004) revisited these principles and applied them to teaching the millennial generation, asserting these practices will enhance teaching effectiveness with this new group of students. The participants’ narratives are also consistent with Umbach and Wawrzynski’s (2005) findings suggesting students reported higher levels of learning when their instructors utilize collaborative and active learning techniques, interact with students and engage students in the learning process.

Implications for Teaching

The participants’ narratives indicate several implications for supporting college students with psychological disabilities. Specifically, this study indicated the need for increased knowledge and awareness regarding accommodations and the needs and characteristics of college students with psychological disabilities, the import of faculty interactions and effective teaching behaviors, and the significance of the notion of care in higher education settings.

This study clearly indicated the need for increased faculty awareness regarding the challenges and needs of students with psychological disabilities. Faculty need to understand, if they do not already, that the vast majority of individuals with psychological disabilities do not pose a threat to them or other students, and these

individuals have the ability to be successful, and thrive, in postsecondary educational settings when given the appropriate supports. It is also important for faculty and students to recognize that psychological disabilities are real and students with these disabilities are not merely providing excuses when they have difficulties. Furthermore, faculty members need to be aware of federal requirements regarding accommodations, as well as their university’s DSS office policies and procedures regarding the accommodations process. Many faculty members could benefit from professional development regarding accommodations, characteristics of individuals with psychological disabilities, and ways to assist this population. Furthermore, utilizing technology such as wikis, online platforms such as Blackboard, and online training modules may be an effective way to disseminate this information.

The significance of effective teaching behaviors and interactions with students on academic achievement was another salient theme. Therefore, it is important that faculty members are knowledgeable of, and implement, effective teaching practices, such as providing clear expectations, demonstrating knowledge of the subject, and explaining material. Because not all college instructors receive training in pedagogy, it would be beneficial for colleges and universities to provide education regarding effective teaching methods and best practices through forums such as online training modules, teaching excellence centers, and faculty orientation, or other professional development opportunities (Belch, 2011).

This study also revealed that students felt they were more academically successful in courses where instructors not only utilized effective teaching methods, but also interacted with students in a positive and caring manner. Many individuals in higher education believe their sole responsibility is to impart academic knowledge. However, this study, as well as additional research, has demonstrated the importance of developing relationships with students, interacting with students in a positive manner, and showing students they care about their academic achievement. This issue may require a paradigm shift for many faculty members, and others may need more guidance regarding how to establish a positive learning environment. Therefore, increased awareness and education regarding the importance of care and positive relationships in the college classroom is needed.

Further Research

There are several implications for further research. For example, it would be beneficial to explore the experiences of individuals with psychological disabilities attending postsecondary institutions that do not seek formal accommodations or other assistance

from DSS. Do they seek accommodations informally, and if so, how do their professors respond? It may also be beneficial to conduct additional studies—particularly qualitative studies—examining the beliefs and attitudes of faculty members regarding students with psychological disabilities. Much of the research on faculty attitudes and perceptions regarding disabilities is quantitative in nature and/or does not specifically address psychological disabilities. Also, several key studies are fairly dated (e.g., Becker et al., 2002; Preece, Beecher, Martinelli, & Roberts, 2005; Rickerson, Souma, & Burgstahler, 2004; Unger & Pardee, 2002; Weiner, 1999). It may be informative to explore how attitudes regarding psychological disabilities, and the presence of individuals with this disability, have changed over time. Furthermore, more studies examining the concept of care in higher education settings may reveal ways college faculty can enhance academic achievement for all students.

Conclusion

Despite the increase of individuals with psychological disabilities attending institutes of higher education, these students are still completing their academic programs at a much lower rate than individuals with other disabilities or their non-disabled peers. The participants' discussion illuminated the impact of faculty behaviors, such as availability, caring and understanding, on academic achievement.

In addition to the behaviors that promoted their academic achievement, participants also described instances in which they did not do as well as expected or withdrew from the class because they were failing the course. These findings suggest a need for increased awareness regarding psychological disabilities and legal requirements regarding accommodations, as well as the need for self-advocacy training for students with psychological disabilities.

References

- Allsopp, D. H., Minskoff, E. H., & Bolt, L. (2005). Individualized course-specific strategy instruction for college students with learning and ADHD: Lessons learned from a model demonstration project. *Learning Disabilities Research & Practice, 20*(2), 103-118. doi:10.1111/j.1540-5826.2005.00126.x
- Becker, M., Martin, L., Wajeheh, E., Ward, J., & Shern, D. (2002). Students with mental illnesses in a university setting: Faculty and student attitudes, beliefs, knowledge and experiences. *Psychiatric Rehabilitation Journal, 25*(4), 359-368. doi:10.1037/h0095001
- Belch, H. (2011). Understanding the experiences of students with psychiatric disabilities: A foundation for creating conditions of support and success. *New Directions for Student Services, 134*, 73-94. doi:10.1002/ss.396
- Belch, H. A., & Marshak, L. E. (2006). Critical incidents involving students with psychiatric disabilities: The gap between state of the art and campus practice. *NASPA Journal, 43*(3), 464-483. doi:10.2202/1949-6605.1679
- Benson, T. A., Cohen, A. L., & Buskist, W. (2005). Rapport: Its relation to student attitudes and behaviors toward teachers and classes. *Teaching of Psychology, 32*, 236-238.
- Blacklock, B., Benson, B., & Johnson, D. (2003). *Needs assessment project: Exploring barriers and opportunities for college students with psychiatric disabilities*. Unpublished manuscript, Disability Services, University of Minnesota, Minneapolis, MN.
- Brockelman, K. F., Chadsey, J. G., & Loeb, J. W. (2006). Faculty perceptions of university students with psychiatric disabilities. *Psychiatric Rehabilitation Journal, 30*(1), 23-30. doi:10.2975/30.2006.23.30
- Charmaz, K. (2006). *Constructing grounded theory*. Thousand Oaks, CA: Sage.
- Chickering, A. W., & Gamson, Z. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin, 40*(7), 3-7.
- Cleary, M., Walter, G., & Jackson, D. (2011). Not always smooth sailing: Mental health issues associated with the transition from high school to college. *Issues in Mental Health Nursing, 32*(4), 250-254. doi:10.3109/01612840.2010.548906
- Collins, M. E., & Mowbray, C. T. (2008). Students with psychiatric disabilities on campus: Determining predictors of enrollment with disability support services. *Journal of Postsecondary Education and Disability, 21*(2), 91-104.
- Creswell, J. W. (2013) *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.
- Erten, O. (2003). Facing challenges: Experiences of young women with disabilities attending a Canadian university. *Journal of Postsecondary Education and Disability, 24*(2), 101-114.
- Glaser, B. G. (1978). *Theoretical sensitivity*. Mill Valley, CA: The Sociology Press.
- Hartman-Hall, H. M., & Haaga, D. A. (2002). College students' willingness to seek help for their learning disabilities. *Learning Disability Quarterly, 25*(4), 263-274. doi:10.2307/1511357
- Hong, B. S., & Himmel, J. (2009). Faculty attitudes and perceptions toward college students with disabilities. *College Quarterly, 12*(3), 6-20. Retrieved from

- <http://www.collegequarterly.ca/2009-vol12-num03-summer/hong-himmel.html>
- Jones, B. D. (2009). Motivating students to engage in learning: The MUSIC model of academic motivation. *International Journal of Teaching and Learning in Higher Education*, 21(2), 272-285. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE774.pdf>
- Kiuhara, S. A., & Huefner, D. S. (2008). Students with psychiatric disabilities in higher education settings: The Americans with Disabilities Act and beyond. *Journal of Disability Policy Studies*, 19(2), 103-113. doi:10.1177/1044207308315277
- McBee, R. H. (2007). What it means to care: How educators conceptualize and actualize caring. *Action in Teacher Education*, 29(3), 33-42. doi:10.1080/01626620.2007.10463458
- McReynolds, C. J., & Garske, G. G. (2003). Psychiatric disabilities: Challenges and training issues for rehabilitation professionals. *Journal of Rehabilitation*, 69(4), 13-18.
- Meyers, S. A. (2009). Do your students care whether you care about them? *College Teaching*, 57(4), 205-209. doi:10.3200/CTCH.57.4.205-210
- Mowbray, C. T., Bybee, D., & Collins, M. (2001). Follow-up client satisfaction in a supported education program. *Psychiatric Rehabilitation Journal*, 24(3), 237-247. doi:10.1037/h0095088
- Morrow, M., & Chappell, M. (1999). *Hearing voices: Mental health care for women*. Vancouver, Canada: British Columbia Centre of Excellence for Women's Health.
- Murray, C., Wren, C. T., & Keys, C. (2008). University faculty perceptions of students with learning disabilities: Correlates and group differences. *Learning Disability Quarterly*, 31(3), 95-113.
- National Council on Disability. (2000). *Transition and post-school outcomes for youth with disabilities: Closing the gaps to postsecondary education and employment*. Washington, DC: Social Security Administration.
- Olney, M. F., & Brockelman, K. F. (2003). Out of the disability closet: Strategic use of perception management by select university students with disabilities. *Disability and Society*, 18(1), 35-50. doi:10.1080/713662200
- Preece, J. E., Beecher, M. E., Martinelli, E. A., & Roberts, N. L. (2005). Students with emotional disabilities: Responding to advisors' concerns and questions. *NACADA Journal*, 25(1), 42-46. doi:10.12930/0271-9517-25.1.42
- Rickerson, N., Souma, A., & Burgstahler, S. (2004). *Psychiatric disabilities in postsecondary education: Universal design, accommodations, and supported education*. Retrieved from http://www.ncset.hawaii.edu/institutes/mar2004/papers/txt/Souma_revised.txt
- Salzer, M. S. (2012). A comparative study of campus experiences of college students with mental illnesses versus a general college sample. *Journal of American College Health*, 60(1), 1-7. doi:10.1080/07448481.2011.552537
- Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing & Health*, 18(2), 179-183. doi:10.1002/nur.4770180211
- Schmier, L. (1997). *Random thoughts II: Teaching from the heart*. Madison, WI: Magna.
- Sharpe, M. N., Bruininks, B. D., Blacklock, B. A., Benson, B., & Johnson, D. M. (2004). The emergence of psychiatric disabilities in postsecondary education. *Examining Current Challenges in Secondary Education and Transition*, 3(1), 1-5.
- Strauss, A. S., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.
- Test, D. W., Fowler, C. H., Wood, W. M., Brewer, D. M., & Eddy, S. (2005). A conceptual framework of self-advocacy for students with disabilities. *Remedial and Special Education*, 26(1), 43-54. doi:10.1177/07419325050260010601
- Troiano, P. F. (2003). College students and learning disability: Elements of self-style. *Journal of College Student Development*, 44(3), 404-419. doi:10.1353/csd.2003.0033
- Umbach, P. D., & Wawrzynski, M. R. (2005). Faculty do matter: The role of college faculty in student learning and engagement. *Research in Higher Education*, 46(2), 153-184. doi:10.1007/s11162-004-1598-1
- Unger, K. V., & Pardee, R. (2002). Outcome measures across program sites for postsecondary supported education programs. *Psychiatric Rehabilitation Journal*, 25(3), 299-303. doi:10.1037/h0095012
- University of Utah Survey. (2006). *What are the barriers in higher education settings for students with psychiatric disabilities?* Salt Lake City, UT: University of Utah, Center for Disability Services.
- Weiner, E. (1999). The meaning of education for university students with a psychiatric disability. *Psychiatric Rehabilitation Journal*, 22(4), 403-409.
- Wilson, M. (2004). Teaching, learning, and millennial students. *New Directions for Student Services*, 106, 59-71. doi:10.1002/ss.125
- Wilson, J. H. (2006). Predicting student attitudes and grades from perceptions of instructors' attitudes. *Teaching of Psychology*, 33(2), 91-95. doi:10.1207/s15328023top3302_2
- Witt, P. L., Wheelless, L. R., & Allen, M. (2004). A meta-analytical review of the relationship between teacher immediacy and student learning. *Communication Studies*, 71(2), 184-207. doi:10.1080/036452042000228054

Wolanin, T. R., & Steele, P. E. (2004). *New report: Higher education opportunities for students with disabilities: A primer for policymakers*. Retrieved from <http://www.ihep.org/press-room/news%5frelease-detail.cfm?id=100>

KATHLEEN F. STEIN is an associate professor in the Department of Special Education at Towson

University. She holds a PhD in Curriculum and Instruction with an emphasis in special education and urban education from the University of South Florida. Prior to her doctoral studies, she worked as a special educator and general educator. Her research interests include promoting successful transition of young adults with emotional and behavioral difficulties. She can be reached by e-mail at: kstein@towson.edu

Free and Open Source Tools (FOSTs): An Empirical Investigation of Pre-Service Teachers' Competencies, Attitudes, and Pedagogical Intentions

Joyce G. Asing-Cashman and Binod Gurung
New Mexico State University

Yam B. Limbu
Montclair State University

David Rutledge
New Mexico State University

This study examines the digital native pre-service teachers' (DNPSTs) perceptions of their competency, attitude, and pedagogical intention to use free and open source tools (FOSTs) in their future teaching. Participants were 294 PSTs who responded to pre-course surveys at the beginning of an educational technology course. Using the structural equation modeling, the data obtained from the Likert-type questionnaire were analyzed. Results showed that computer competency was a significant predictor of attitude toward using technology. Although PSTs scored high on their computer competency, this did not mean that they have strong stances towards using FOSTs in the classroom. However, the more skilled PSTs with FOSTs, the possibilities of using FOSTs in the classroom were higher. The results also suggested that DNPST's attitude toward using technology was a significant determinant of their attitude toward using FOSTs.

Today's pre-service teachers were born and grew up in the digital era (Lei, 2009), and they are considered to be the digital learners (Warschauer, 2006), who are often termed as the "digital natives" (Prensky, 2009). Although it is contentious whether this new generation of pre-service teachers is the digital native pre-service teachers (DNPSTs), they are adept at using technological tools and have the potential to adopt technology more quickly and dynamically (Levin & Arafeh, 2002). DNPSTs are comfortable using various technology tools on a day-to-day basis for communication, interaction, and socialization. They engage in using technology for texting, "Facebooking," and multimedia creating and sharing. Thus, based on the notion mentioned above (i.e., the digital nativity), the DNPSTs are sought to develop competencies—substantial knowledge and skills—about integrating emerging technologies into their future teaching (National Council for Accreditation of Teacher Education, 2007; International Society for Technology in Education [ISTE], 2008).

With the pervasive use of technology in teaching and learning (Arnone, Small, Chauncey, & McKenna, 2011; Dede, 2008), it is essential for DNPSTs to have the ability to access, evaluate, process, produce, share, and communicate information, ideas, and knowledge using a variety of media tools so that they can communicate and connect with their future students (ISTE, 2008; Schrum & Levin, 2009). However, pre-service teachers' technological knowledge and skills alone do not guarantee the effective integration of technology in classrooms. Along with competencies, equally important factors are the teachers' self-efficacy beliefs including their own beliefs and attitudes toward their technological competencies and the perceived effectiveness of technology use in classrooms (Bai & Ertmer, 2008). Teachers' existing beliefs and attitudes influence the development of technology beliefs about both potential technology

integration and related practices. Studies show that the teachers' technology beliefs and attitudes determine their pedagogic intention, including the likelihood of using technology in their future classrooms (Anderson & Maninger, 2007; Choy, Wong, & Gao, 2009; Teo, Lee, Chai, & Wong, 2009).

Technology self-efficacy beliefs and attitudes are considered to be even more important when teachers have to use new and emerging technologies such as free and open source tools (Kumar, 2005; Pan & Bonk, 2007; Pfaffman, 2008; van Rooij, 2009), Web 2.0 (Greenhow, Robelia, & Hughes, 2009; O'Reilly, 2005) and social media. This study examines how computer and free and open source tools (FOSTs) competencies and attitudes of pre-service teachers (PSTs) determine their pedagogic intention to use FOSTs in their future teaching. Briefly, the FOSTs are the web-based, end-user tools that are made available as free or open-source software and tools to download, study, use, or modify by the users for individual, educational, and commercial purposes. However, FOSTs are not always available for free: only the basic functions are free, but a fee is incurred if the users want to use the advanced features and functions of the FOSTs. FOSTs, also the foundations of Web 2.0 and social media, are emerging, pervasive, and user-friendly, and they offer new affordances such as creating, publishing, and sharing capabilities that are suitable for harnessing for teaching and learning purposes (Gurung & Chávez, 2011; Richardson, 2007; Solomon & Schrum, 2007).

Technology integration into teaching is still a "messy" process (Zhao, Pugh, Sheldon, & Byers, 2002), but at the same time, technology, if used wisely and effectively, has the potential to offer an array of meaningful learning activities (Howland, Jonassen, & Marra, 2012). Meaningful learning activities are activities designed to be intentional, active, constructive, cooperative, and provide authentic

learning (Howland et al., 2012). Technology has the potential to transform teaching and learning (National Educational Technology Plan, 2010).

Technology can be used as devices for communicating with people, as tools to create instructional materials, or as presentation devices to provide information. Many successful users of technology-based materials say that students find strong motivation in the feeling that they are in control of their own learning (Neo, 2005). Current learning theories suggest that students need to construct their own knowledge (Driscoll, 1994; Newby, Stepich, Lehman, & Russell, 2000), and technology could assist in accomplishing this. Technology provides learning opportunities that support a highly interactive environment. This type of environment emphasizes reflection and discussion with peers that aid in the construction of knowledge (Goodson & Skillen, 2010; Sinclair, 2010). Dwyer (1996) stated that “significant and mounting evidence shows that technology improves students’ mastery of basic skills, test scores, writing, and engagement in school” (p. 24). Goldberg, Russell, and Cook (2003) found a stronger relationship between computers and quality of writing. Students who use computers during writing instruction produce written work that is about 0.4 deviations better than students who develop writing skills on paper.

Technology also helps teachers address the issue of different learning styles by providing different types of software to enhance different learning environments. For instance, the Internet is a tool with the potential to transform traditional teacher-directed instruction into powerful, student-led, inquiry-based learning (Jonassen, Howland, Moore, & Marra, 2003; Marri, 2005).

Therefore, in an effort to prepare tomorrow’s teachers to effectively integrate technology into teaching practices, it is a goal of teacher preparation programs to facilitate positive beliefs and attitudes toward technology. Future teachers’ awareness of FOSTs could shape the integration of FOSTs in the classroom. This study is significant to the planning and implementation of the teacher education course—the Educational Learning Technology (EDLT 368) course and similar courses—and to modeling the usage of FOSTs that PSTs will later emulate in their own K-12 classroom.

Literature Review

Technology Competencies

Teachers’ knowledge of technology is “a critical factor determining the level of success for any

technology-based project” (Groff & Mouza, 2008, p. 29). Feiman-Nemser (2001) explained:

What students learn depends on what and how teachers teach; and what and how teachers teach depends on the knowledge, skills, and commitments they bring to their teaching and the opportunities they have to continue learning in and from their practice. (p. 1015)

Therefore, a teacher’s computer competency—substantial knowledge and skills—is essential in the process of integrating technology in classrooms. Thus, any study into teachers’ practices should involve an investigation into teacher technology competency, as competency greatly influences teacher technology use (Hew & Brush, 2007).

This study examines the role computer and FOST competencies have on attitudes toward FOST and the intention to use FOST. FOST competency is defined as the ability to locate, use, and integrate FOSTs into teaching by harnessing their features and affordances.

Technology Beliefs and Attitudes

Teachers’ existing beliefs can influence the development of beliefs about both technology integration and related practices. Richardson (1996) noted, “attitudes and beliefs are a subset of a group of constructs that name, define, and describe the structure and content of mental states that are thought to drive a person’s actions” (p. 102).

However, it is not always the case that teachers’ technology use in classrooms is necessarily aligned with their reported beliefs. Teachers can hold conflicting educational beliefs about how to integrate technology into instruction. One study suggested that despite the strong positive beliefs in technology of digital-native pre-service teachers, there is a reserved attitude in using technology (Lei, 2009). Therefore, it is important that we further examine how the digital native pre-service teachers’ existing technology attitudes and beliefs influence their learning of new technologies such as FOSTs and their potential use in classrooms.

Pedagogical Intention

In social psychology, intention is a planned behavior, as a part of self-prediction caused by current ongoing behaviors and changes, to perform a certain action in future (Ajzen, 1991; Ajzen & Madden, 1986). Pedagogically, it is the teachers’ attitudes toward implementing competence-oriented teaching as they are expected from professional training and education (Jones & Carter, 2007). In this study, FOST intention is

defined as the thoughts and plans of digital native pre-service teachers to operationalize their FOSTs competencies and attitudes toward the potential integration of these tools in their future teaching.

Free and Open Source Tools (FOSTs) in Teaching and Learning

The proliferating production of free and open source tools—including the Web 2.0 tools and applications such as blogs, wikis, and many other Web content creating and sharing tools—around the world by millions of open source software developers and users on an everyday basis is expanding (O'Reilly, 2007; Solomon & Schrum, 2007). Despite the prevailing concerns about the instability and unreliability of FOSTs, there is enough evidence to indicate that many FOST projects can produce high quality and sustainable open software and tools, sometimes surpassing the affordances of rival propriety or commercial software, for instance, Firefox Mozilla, OpenOffice, and Moodle (Chao, 2008; Mockus, Fielding, & Herbsleb, 2002; Pfaffman, 2008; Stallman, 2002). Currently, there is a significant emergence of Web 2.0 tools and applications based on the open source movement that can be used for classroom purposes (Solomon & Schrum, 2007). As end-user tools, the Web 2.0 tools and applications have offered vast opportunities in the field of education while requiring minimal or no additional expertise to use these tools (Asselin & Doiron, 2008; Gurung & Chávez, 2011; Richardson, 2007). Much research has shown that Moodle (Beatty & Ulasewicz, 2006), blogs (Churchill, 2009; Lankshear & Knobel, 2006), YouTube (Mullen & Wedwick, 2008), wikis (Wheeler, Yeomans, & Wheeler, 2008), social bookmarking such as delicious.com (Oliver, 2007), and concept mapping and collaboration tools such as Cmap (Oliver, 2007) have been successfully used for teaching and learning purposes (Churchill, 2009).

Along with the computer competencies as stated by Bai and Ertmer (2008), it is also necessary to examine and develop positive attitudes toward the use of emerging technologies such as FOSTs. Among these technologies, the examination of FOST related competencies, attitudes, and beliefs are important in several ways. First, FOSTs are available for free with the basic but essential features. Second, FOSTs are user-friendly, and they offer new affordances such as creating, publishing, and sharing capabilities that are suitable for harnessing for teaching and learning purposes. Third, FOSTs are the foundations of pervasive and emerging Web 2.0 and social media. Finally, today's PSTs are digital natives who have the potential to adopt technology more quickly simply because they grew up in the digital era (Iding, Crosby,

& Speitel, 2002; Lei, 2009). Thus, these PSTs can effectively harness the features and affordances of FOSTs to teach in their future classrooms. A review of literature shows many studies have been conducted focusing on PSTs beliefs and attitudes towards using technology, but not FOSTs specifically. Therefore, we feel that there is a need to examine PSTs' beliefs and attitudes towards using FOSTs in their future classroom.

This study sought to examine how DNPSTs, based on their technology self-efficacy beliefs and computer competency, build their pedagogic intention of using emerging technologies such as FOSTs in their future teaching. The research question for this study was: How do the perceived technology competencies, beliefs, and attitudes of DNPSTs influence their pedagogic intention of integrating FOSTs in their future teaching?

Theoretical Framework

The technology acceptance model (TAM) developed by Davis, Bagozzi, and Warshaw (1989) was used in this study as a model to examine PSTs' perceptions of integrating technology and specifically integrating FOSTs in their future teaching. In this study, the TAM was adopted because it is a theoretical model designed to understand the user, the factors influencing the user's decisions, and the impact these has on the user acceptance to technology tools. It was, therefore, deemed the best fit to answer the study's research questions. The TAM has been used to understand and predict how users accept and use a technology within their perceived usefulness, ease of use, attitude towards technology use, and intention to use (Davis et al., 1989; Hubona & Kennick, 1996; Venkatesh & Davis, 2000). The TAM can also be used to evaluate how pre-and in-service teachers accept, use, and build perceptions about the usability and self-efficacy of a FOST, as well as how they develop a pedagogical intention to use a technology in their future classrooms within their perception of a FOST's usability (Holden & Rada, 2011; Teo, Lee, & Chai, 2008). Additionally, the theory of technology self-efficacy beliefs (Bandura, 2006) is used to examine how the DNPSTs transform their technology acceptance, perceptions, and attitudes into building their technology self-efficacy beliefs, which leads to a pedagogical intention of using technology in their future teaching.

Technology Self-Efficacy Beliefs

Bandura (2006) stated, "self-efficacy is concerned with people's beliefs in their capabilities to produce given attainments" (p. 2). Self-efficacy represents a performance capability of a person based on beliefs, values, and perceived abilities to do a certain task. It is

the teachers' "self-perception of capability [that is] instrumental to the goals they pursue" (Pajares & Shunk, 2002, p. 17) and a powerful determinant to indicate their future performance including making instructional decisions, as well as organizing and executing classroom practices (Bandura, 1986; Pajares, 1992). Teachers' technology self-efficacy can be described as perceived competencies, abilities, values, beliefs, and intentions to use technology tools and software in their future classrooms (Anderson & Maninger, 2007). Building positive self-efficacy beliefs are important, as Bai and Ertmer (2008) stated, "to better prepare pre-service teachers, it is necessary to examine their beliefs in relation to teaching and learning as well as their attitudes toward technology" (p. 94). Similarly, Abbitt and Klett (2007) suggested that perceived comfort with computer technology is a significant predictor of self-efficacy beliefs towards technology integration. The efficaciousness of integrating technology in classrooms comes along with one's comfort, beliefs, and attitudes towards using technology. Thus, teachers' self-efficacy beliefs are important factors to shape up their attitudes toward technology and influence their classroom use (Myers & Halpin, 2002; Yildirim, 2000).

Studies in the past show that pre-service teachers' technology self-efficacy beliefs are built with the psychological and behavioral components including their technology competencies, technology beliefs and attitudes, and intentions for use in future teaching (Anderson, Groulx, & Maninger, 2011; Angeli, 2005). Using the attributes derived from the TAM and the findings reported from the above literature, hypotheses listed below were constructed. These hypotheses were divided into three categories: (a) the influence of computer and FOST competency on attitudes toward technology and FOST, (b) the influence of attitude toward technology and attitude toward FOST, and (c) how PSTs' attitudes shape their intention to use FOSTs.

- Relationship between competency and attitudes:
H1: Computer competency is positively related to attitude toward using technology.
H2: Computer competency is positively related to attitude toward using FOSTs.
H3: FOSTs competency is positively related to attitude toward using FOSTs.
- Relationship between attitude toward technology and attitude toward FOSTs:
H4: Attitude toward technology is positively related to attitude toward FOSTs.
- Relationship between attitudes and intention to use FOSTs:
H5: Attitude toward FOSTs is positively related to intention to use FOSTs.

Method

Setting

Participants were enrolled in two sections of an Educational Technology course titled EDLT 368 (Integrating Technology into Teaching) during three consecutive semesters. This is the only course focusing on technology integration into teaching that is required in the teacher preparation program, and it is offered every semester. Activities in this course include completing assignments that utilized free and open source tools. For example, written assignments are completed using OpenOffice Writer, a digital learning portfolio is completed using OpenOffice Impress, a video project is completed utilizing video tools such as VideoThang, and manipulating and editing images is completed using GIMP. A major project for this course is developing a Webquest® of five lessons plans that includes content areas such as: mathematics, science, language arts, social studies, history, reading, writing, and physical education. The Webquest® project is completed using Google Sites. In these five lessons, students were required to create activities in each subject area incorporating free and open source tools introduced and used throughout this course.

Participants

The participants of this study consisted of undergraduate students enrolled in the EDLT 368. A survey instrument was administered to participants using a link to an online questionnaire created through the Survey Monkey website in the beginning of the three semesters. A total of 294 surveys were collected; out of which 282 were complete and used for the final analysis. The description of the participants is shown in Table 1.

Measures

In this study, a 48 item questionnaire was designed using multiple sources, namely the Technology Integration Confidence Scale (TCIS; Brown, 2008); Mankato Survey of Professional Technology Use, Ability and Accessibility (Mankato Public Schools, 2003); the National Technology Standards for Teachers (NETS-T; ISTE, 2008); and the Computer User Self-Efficacy Scale (Cassidy & Eachus, 2002). These sources were modified to suit the study; however, out of the 48 total questionnaire items, only 21 items were pertinent to this study and were utilized. The survey consisted of several sections: (1) Part 1 included questions that elicited demographic information, (2) Part 2 examined the respondents' access and general computer and Internet use, (3) Part 3 sought information about DNPSTs'

Table 1
Description of the Sample

Category	Attributes	Percent
Sex	Male	24.3
	Female	75.6
Age	Below 18 years	0.0
	18-23 years	76.0
	24-28 years	12.7
	29-33 years	6.3
	Above 33 years	5.0
Major or academic programs	Pre-k or Kindergarten	17.6
	Elementary	50.3
	Middle School	11.7
	High School	20.4
Computer and Internet access	Have a personal desktop or laptop computer	95.4
	Have shared access to computers at home	21.9
	Do not have computer access from home	2.1
	Have access to the internet from home	44.7
Frequency of computer use	More than 15 hours a week	29.1
	6 to 15 hours a week	50.4
	1 to 5 hours a week	12.4
	Less than 1 hour a week	1.1
Have been using the computer for	More than 10 years	39.0
	Between 6 and 10 years	47.1
	Between 1 and 5 years	14.2
	Less than 1 year	0.4

perceptions regarding the importance of integrating technology with teaching, and (4) in Part 4 DNPSTs were asked about their knowledge about, and experiences with, using FOSTs. Additionally, they were asked to indicate their perceptions in using FOSTs in their future teaching. The items were on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

The items with statistically poor (i.e., below the cut-off value of .5) and insignificant factor loadings ($p > .05$) were deleted. Table 2 shows final items and factor loadings. The factor loadings for the measures ranged from .54 to .88. The alpha coefficient was between .69 and .89. All measures demonstrated acceptable reliability above the recommended level of .70 (Bagozzi & Yi, 1988) and factor loadings above the cut-off value of .50 (Hair, Back, Babin, Anderson, & Tatham, 2005).

Analysis and Results

The following section provides the description of data analysis (i.e., measurement and structural models) and results. Data were analyzed within the hypotheses that were derived from the TAM and technology self-efficacy beliefs. The analysis was conducted to examine

the relationships between FOST competency, computer competency, attitude toward FOST, and attitude toward technology (see Figure 1). The examination of these relationships revealed the DNPSTs' pedagogical intention of using FOSTs.

Measurement Model

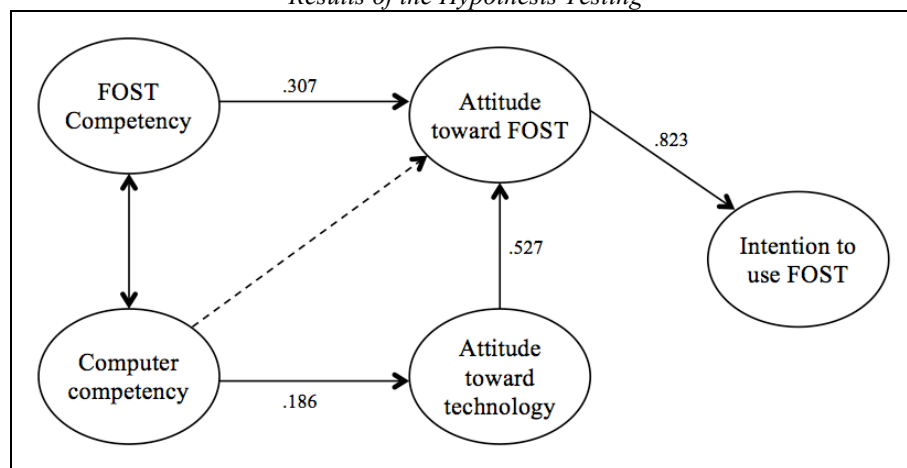
This study used AMOS 18 to test the theoretical model shown in the Figure 1. Based on Gerbing and Anderson (1988), this study used the two-step approach of structural equation modeling: first, a confirmatory factor analysis that provides the assessment of the measurement properties of the latent contrasts, and second, a structural model analysis that tests the hypothesized relationships.

The measurement model showed acceptable fit ($\chi^2_{(169)} = 219.88$, $p < .01$; GFI = .94; AGFI = .91; RMSEA = .033; TLI = .98; NFI = .94; CFI = .98). The normed chi-square value ($\chi^2/df = 1.301$) fell within the recommended value of three or below (Fornell & Larcker, 1981). The value of goodness-of-fit index (GFI) was higher than .90 (Hair et al., 2005). The values of Tucker-Lewis index (TLI) and comparative fit index (CFI) were above the cut-off value of .95 that was suggested by Hu and Bentler (1999). The root

Table 2
Measurement Items and Factor Loadings

Scale	Items	Factor Loading
Computer Competency	I would like to rate my computer proficiency in word processing skills (e.g., edit, copy, change color and fonts, insert pictures and tables, insert diagrams).	0.687
	I would like to rate my computer proficiency in preparing PowerPoint presentations.	0.768
	I would like to rate my computer proficiency in preparing multimedia presentations.	0.878
	I would like to rate my computer proficiency in computer troubleshooting.	0.777
	I would like to rate my computer proficiency in the familiarity with basic computer system parts and concepts (e.g., hard drive, RAM).	0.782
	I would like to rate my computer proficiency in installing computer software/programs.	0.843
	I would like to rate my computer proficiency in fixing hardware problems.	0.606
Attitude toward Technology	I believe computer technology is essential for increasing student achievement (e.g., grades).	0.638
	The use of computer motivates students more than the traditional classroom teaching does.	0.765
	Computer is an essential tool for today's classroom teaching.	0.758
	The use of computer increases students' interest in learning.	0.753
	Teaching with computer is more efficient.	0.686
	Computer technology is useful for students of all type of abilities and learning styles.	0.741
	I am interested in using technology in future teaching.	0.705
FOST Competency	Using the Internet is better than using the library for researching teaching materials/resources.	0.614
	I would like to rate my Free and Open Source Tools proficiency in creating websites and sharing or linking with the Social Networking Sites such as MySpace, Facebook, YouTube, or Twitter.	0.538
	I would like to rate my Free and Open Source Tools proficiency in using Web 2.0 tools such as wikis, blogs, podcasts, or Flickr.	0.881
Attitude toward FOST	I think Free and Open Source Tools and applications are easy to use and adaptable to my needs.	0.881
	For instructional purposes, schools should provide access to students with Free and Open Source Tools (e.g., social networking tools and applications such as blogs, wikis, YouTube, or Flickr, Facebook, Ning, MySpace, Twitter, or Second Life)	0.703
Intention of Using FOST	In my future teaching, I'm willing to use Free and Open Source Tools more often than the commercial software.	0.711
	There are plenty of Free and Open Source Learning Tools that I intend to use for my classroom teaching.	0.815

Figure 1
Results of the Hypothesis Testing



Note. Solid lines represent statistically significant paths. Dashed line indicates a non-significant path.

mean square error of approximation (RMSEA) was below the suggested cut-off value of .08 (MacCallum, Browne, & Sugawara, 1996).

As shown in Table 2, the standardized loading estimates were higher than .5 and thus provided initial support for the convergent validity (Gerbing & Anderson, 1988). Table 3 shows the inter-construct correlations, average variance extracted (AVE), construct reliabilities, and descriptive statistics. The AVE estimates were higher than .50 and construct reliabilities exceeded .60, satisfying the recommended cut-off values (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). On the whole, they provided a support for the convergent validity of the measurement model. The discriminant validity was also evident as the AVE by each latent variable's measures was larger than the squared inter-construct correlation (Fornell & Larcker, 1981).

Structural Model

The fit indices for the hypothesized structural model were acceptable: $df = 173$, $\chi^2 = 226.236$, $\chi^2_{(173)} = 226.236$, $\chi^2/df = 1.308$, GFI = .93, AGFI = .90, RMSEA = .033, TLI = .98, NFI = .94, CFI = .98, IFI = .98, normed chi-square = 1.308, $p < .00$. The values of fit indices were close to or above recommended levels. Table 4 and Figure 1 present results of the hypothesis

testing, including path coefficients and t values for each structural path. Hypothesis 1 predicted that computer competency would be positively related to attitude toward using technology. Results show that computer competency was a significant predictor of attitude toward using technology ($t = 3.178$, $p < .01$). Thus, Hypothesis 1 is supported. Contrary to the prediction in Hypothesis 2, computer competency was not positively related to attitude toward using FOST ($t = .637$, $p > .05$). However, providing a strong support for Hypothesis 3, FOST competency was positively related to attitude toward using FOST ($t = 2.133$, $p < .05$).

Hypothesis 4 predicted that attitude toward using technology would be positively related attitude toward using FOST. Results reveal that attitude toward using technology was a significant determinant of attitude toward using FOST ($t = 6.045$, $p < .001$). Thus, Hypothesis 4 is supported. As predicted in Hypothesis 5, attitude toward using FOST strongly influenced intention of using FOST ($t = 11.68$, $p < .001$).

Discussion and Recommendations

Results showed that DNPSTs' computer competency is a significant predictor to their attitude toward using technology. In other words, if DNPSTs perceived that they are skilled in using computers, they are more comfortable to use technology in their

Table 3
Interconstruct Correlations, Average Variance Extracted, Construct Reliabilities, Descriptive Statistics

	1	2	3	4	5
1. Intention to use FOST	1.00	--	--	--	--
2. Attitude toward FOST	0.74	1.00	--	--	--
3. Attitude toward technology	0.49	0.41	1.00	--	--
4. FOST competency	0.23	0.28	0.12	1.00	--
5. Computer proficiency	0.19	0.24	0.22	0.73	1.00
AVE	0.59	0.64	0.51	0.55	0.60
Construct reliability	0.74	0.75	0.89	0.69	0.91
<i>M</i>	4.246	3.871	4.676	2.255	2.766
<i>SD</i>	0.817	0.826	0.706	0.982	0.778

Note. All correlations were significant at the .05 level.

Table 4
Structural Parameter Estimates and Fit Indices

Structural path	Estimate	SE	CR	<i>p</i>
Attitude toward technology ← Computer proficiency	.186	.058	3.178	**
Attitude toward FOST ← Computer proficiency	.078	.123	.637	.524
Attitude toward FOST ← Attitude toward technology	.527	.087	6.045	***
Attitude toward FOST ← FOST competency	.307	.144	2.133	*
Intention to use FOST ← Attitude toward FOST	.823	.070	11.680	***

Note. *** $p < .001$. ** $p < .01$. * $p < .05$.

classroom. Similar results were reported in a study by Abbitt and Klett (2007). Abbitt and Klett (2007) suggested that perceived comfort with computer technology is a significant predictor of self-efficacy beliefs towards technology integration.

This study also investigated whether the level of perceived competency towards computer use could predict PSTs' attitudes in using FOSTs in the classroom. If DNPSTs are skillful in using computers, would this mean that they have positive orientation towards using FOSTs in their classroom? The results suggest that, although DNPSTs scored high on their computer competency, this does not mean that they have strong stance towards using FOSTs in the classroom. One possible reason for this could be that students, at the beginning of the semester (when the survey was conducted), were not yet exposed to FOSTs and their capabilities and possibilities when used in an educational setting. However, in terms of whether perceived competency with FOSTs would strengthen PSTs' attitudes toward using FOSTs, the results suggest that, as DNPSTs become more skilled with FOSTs, the possibilities of them using FOSTs in the classroom are higher.

Pedagogically, the teachers' attitudes toward implementing competence-oriented teaching, as they are expected from professional training and education, are important (Jones & Carter, 2007). The results suggest that PSTs' attitudes toward using technology are significant determinants of their attitudes toward using FOSTs. Similarly, DNPSTs' attitudes toward using FOSTs strongly influenced their intention of using FOSTs. In other words, what types of FOSTs and to what degree they will be integrated in the DNPSTs' classrooms depend on PSTs' beliefs. Teachers' technology self-efficacy can be described as perceived abilities, values, beliefs, and intentions to use technology tools and software in their future classrooms (Anderson & Maninger, 2007). Building positive self-efficacy beliefs is important because "to better prepare pre-service teachers, it is necessary to examine their beliefs in relation to teaching and learning as well as their attitudes toward technology" (Bai & Ertmer, 2008, p. 94). Further, teachers' self-efficacy beliefs are important factors to shape their attitudes toward technology and influence their classroom use of it (Myers & Halpin, 2002; Yildirim, 2000).

Pedagogical Implications

FOSTs are emerging technologies that could potentially cater meaningful learning projects and activities. FOSTs are also foundational to currently emerging Web 2.0, social media, and cloud computing. FOSTs, as the name suggests, are free and open source tools that are widely accessible, user-friendly, and both desktop- and web-based. FOSTs (e.g., blog, video

imaging tools, Google Drive) are widely used in schools and classrooms. Also, the new generation of digital learners are already using FOSTs (e.g., Facebook, Flickr, YouTube) in their everyday lives for communication and interaction purposes. Within the technology comfort zone of today's digital learners, schools can harness these freely available tools to meet their teaching and learning needs, often with no or minimal cost. Therefore, it is important that DNPSTs develop FOST related competencies and attitudes to better prepare themselves to integrate emerging technologies into their pedagogies.

This study highlights how technology beliefs and attitudes, computer competency, FOST competency, and pedagogical intention are intricately intertwined. When computer competency is positively related with attitude toward using technology in general, the computer competency alone does not foster a positive attitude toward using FOSTs. In other words, it is essential that DNPSTs need to develop specifically FOST competency in order to use the FOSTs in their future teaching. Given the user-friendly and collaborative features and affordances of FOSTs, it is imperative that we teach the DNPSTs to develop FOSTs related competencies and attitudes.

Pedagogically, teachers' attitudes toward implementing competence-oriented teaching, as they are expected from professional training and education, are important (Jones & Carter, 2007). In this study, FOST intention is defined as the thoughts and plans of DNPSTs to operationalize their FOSTs competencies and attitudes toward the potential integration of these tools in their future teaching.

The findings of this study indicate that, the more skilled DNPSTs are with FOSTs, the more likely they are to use FOSTs in the classroom. These findings are aligned with previous studies (Fleming, Motamedi, & May, 2007; Lever-Duffy, McDonald, & Mizell, 2005; Richardson, 1996). Fleming et al. (2007) surveyed 79 PSTs about their training experience and computer technology skills. They reported that the more extensively PSTs observe models, and the more hands-on experience they have with computer technology, the more proficient they perceived their skills to be. These PSTs observed models in virtually every training setting, and they applied their own skills in their student teaching environment.

The development of DNPSTs' FOST related competencies and attitudes can be cultivated in several ways. One way to develop substantial knowledge, skills, beliefs, and attitudes about FOSTs is by helping DNPSTs feel comfortable in using FOSTs as future K-12 teachers. In doing so, instructors should model technology in their teaching, specifically in educational technology courses, and help DNPSTs to construct positive learning experiences that can be emulated in

the their future classroom teaching. Instructors can also include a technology-related field experience assignment in their course that requires students to use FOSTs in completing the assignments, learning projects, and activities. The instructional modeling done by faculty provides the foundation, and DNPSTs use these same or similar teaching models when they become teachers (Lever-Duffy et al., 2005).

References

- Abbitt, J., & Klett, M. (2007). Identifying influences on attitudes and self-efficacy beliefs towards technology integration among pre-service educators. *Electronic Journal for the Integration of Technology in Education*, 6, 28-42.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour & Human Decision Processes*, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, I., & Madden, T. J. (1986). Prediction of goal directed behaviour: Attitudes, intentions, and perceived behavioural control. *Journal of Experimental Social Psychology*, 22(5), 453-474. doi:10.1016/0022-1031(86)90045-4
- Anderson, S. E., Groulx, G., & Maninger, R. M. (2011). Relationships among preservice teachers' technology-related abilities, beliefs, and intentions to use technology in their future classrooms. *Journal of Educational Computing Research*, 45(3), 321-338. doi:10.2190/EC.45.3.d
- Anderson, S. E., & Maninger, R. M. (2007). Preservice teachers' abilities, beliefs, and intention regarding technology integration. *Journal of Educational Computing Research*, 37(2), 151-172. doi:10.2190/H1M8-562W-18J1-634P
- Angeli, C. (2005). Transforming a teacher education method course through technology: Effects on preservice teachers technology competency. *Computers & Education*, 45(4), 383-398. doi:10.1016/j.compedu.2004.06.002
- Arnone, M. P., Small, R. V., Chauncey, S. A., & McKenna, H. P. (2011). Curiosity, interest and engagement in technology-pervasive learning environments: A new research agenda. *Educational Technology Research and Development*, 59(2), 181-198. doi:10.1007/s11423-011-9190-9
- Asselin, M., & Doiron, R. (2008). Towards a transformative pedagogy for school libraries 2.0. *School Libraries Worldwide*, 14(2), 1-18.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94. doi:10.1007/BF02723327
- Bai, H., & Ertmer, P. (2008). Teacher educators' beliefs and technology uses as predictors of preservice teachers' beliefs and technology attitudes. *Journal of Technology and Teacher Education*, 16(1), 93-112.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Adolescence and education: Vol. 4. Self-efficacy beliefs of adolescents* (pp. 307-338). Greenwich, CT: Information Age.
- Beatty, B., & Ulasewicz, C. (2006). Online teaching and learning in transition: Faculty perspectives on moving from Blackboard to the Moodle learning management system. *TechTrends*, 50(4), 36-45.
- Brown, J. (2008). *Technology integration confidence scale*. Retrieved from <http://www.brownelearning.org/tics/#9>
- Cassidy, S., & Eachus, P. (2002). Developing the computer user self-efficacy (CUSE) scale: Investigating the relationship between computer self-efficacy, gender and experience with computers. *Journal of Educational Computing Research*, 26(2), 133-153. doi:10.2190/JGJR-0KVL-HRF7-GCNV
- Chao, I. T. (2008). Moving to Moodle: Reflections after two years. *EDUCAUSE Quarterly*, 31(3), 46-52.
- Choy, D., Wong, A. F. L., & Gao, P. (2009). Student teachers' intentions and actions on integrating technology into their classrooms during student teaching: A Singapore study. *Journal of Research on Technology in Education*, 42(2), 175-195. doi:10.1080/15391523.2009.10782546
- Churchill, D. (2009). Educational applications of Web 2.0: Using blogs to support teaching and learning. *British Journal of Educational Technology*, 40(1), 179-183. doi:10.1111/j.1467-8535.2008.00865.x
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 928-1003. doi:10.1287/mnsc.35.8.982
- Dede, C. (2008). Theoretical perspectives influencing the use of information technology in teaching and learning. *International Handbook of Information Technology in Primary and Secondary Education*, 20, 43-62. doi:10.1007/978-0-387-73315-9_3
- Driscoll, M. P. (1994). *Psychology of learning for instruction*. Boston, MA: Allyn and Bacon.
- Dwyer, D. (1996). A response to Douglas Noble: We're in this together. *Educational Leadership*, 54(3), 24-25.
- Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103(6), 1013-1055. doi:10.1111/0161-4681.00141
- Fleming, L., Motamedi, V., & May, L. (2007). Predicting preservice teacher competence in computer technology: Modeling and application in

- training environments. *Journal of Technology and Teacher Education*, 15(2), 207-231.
- Fornell, C., & Larcker, D. (1981). Evaluating structural equations models with unobserved variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. doi:10.2307/3151312
- Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192. doi:10.2307/3172650
- Goldberg, A., Russell, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992 to 2002. *Journal of Technology, Learning and Assessment*, 2(1), 3-51. Retrieved from <http://ejournals.bc.edu/ojs/index.php/jtla/article/view/1661/1503>
- Goodson, L. A., & Skillen, M. (2010). Small-town perspectives, big-time motivation: Composing and producing place-based podcasts. *English Journal*, 100(1), 53-57.
- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now? *Educational Researcher*, 38(4), 246-259. doi:10.3102/0013189X09336671
- Groff, J., & Mouza, C. (2008). A framework for addressing challenges to classroom technology use. *AACE Journal*, 16(1), 21-46.
- Gurung, B., & Chávez, R. C. (2011). Transformative multicultural engagement on a Web 2.0 interface. In G. Kurubacak & T. V. Yuzer (Eds.), *Transformative online education and liberation: Models for social equality* (pp. 15-46). Hershey, PA: IGI Global.
- Hair, J. F., Back, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2005). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice Hall.
- Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, 55(3), 223-252. doi:10.1007/s11423-006-9022-5
- Holden, H., & Rada, R. (2011). Understanding the influence of perceived usability and technology self-efficacy on teachers' technology acceptance. *Journal of Research on Technology in Education*, 43(4), 343-367.
- Howland, J. L., Jonassen, D. H., & Marra, R. M. (2012). *Meaningful learning with technology* (4th ed.). Boston, MA: Pearson Education.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55. doi:10.1080/10705519909540118
- Hubona, G. S., & Kennick, E. (1996). The influence of external variables on information technology usage behavior. *Proceedings of the 29th Annual Hawaii International Conference on System Sciences, USA*, 4, 166-175. doi:10.1109/HICSS.1996.495323
- Iding, M., Crosby, M., & Speitel, T. (2002). Teachers and technology: Beliefs and practices. *International Journal of Instructional Media*, 29(2), 153-170.
- International Society for Technology in Education (ISTE). (2008). *ISTE standards: Teachers*. Retrieved from http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-T_PDF.pdf
- Jonassen, D. H., Howland, J., Moore, J., & Marra, R. M. (2003). *Learning to solve problems with technology: A constructivist perspective* (2nd ed.). Upper Saddle River, NJ: Allyn and Bacon.
- Jones, M. G., & Carter, G. (2007). Science teacher attitudes and beliefs. In S. K. Abell & N. G. Lederman (Eds.), *Handbook of research on science education* (pp. 1067-1104). Mahwah, NJ: Lawrence Erlbaum.
- Kumar, M. S. V. (2005). From open resources to educational opportunity. *Research in Learning Technology*, 13(3), 241-247. doi:10.1080/09687760500376512
- Lankshear, C., & Knobel, M. (2006, April). *Blogging as participation: The active sociality of a new literacy*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. Retrieved from <http://www.geocities.com/c.lankshear/bloggingparticipation.pdf>
- Lei, J. (2009). Digital natives as preservice teachers: What technology preparation is needed? *Journal of Computing in Teacher Education*, 25(3), 87-97.
- Lever-Duffy, J., McDonald, J. B., & Mizell A. P. (2005). *Teaching and learning with technology*. San Francisco, CA: Pearson.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1(2), 130-149. doi:10.1037/1082-989X.1.2.130
- Mankato Public Schools. (2003). *Information technology: Mankato survey of professional technology use, ability and accessibility*. Retrieved from <http://www.peje.org/docs/MankatoSurvey.pdf>
- Marri, A. R. (2005). Educational technology as a tool for multicultural democratic education: The case of one US history teacher in an under resourced high school. *Contemporary Issues in Technology and Teacher Education*, 4(4), 395-409.
- Mockus, A., Fielding, R., & Herbsleb, J. D. (2002). Two case studies of open source software development: Apache and Mozilla. *ACM Transactions on Software Engineering and Methodology*, 11(3), 309-346. doi:10.1145/567793.567795

- Mullen, R., & Wedwick, L. (2008). Avoiding the digital abyss: Getting started in the classroom with YouTube, Digital Stories, and Blogs. *Clearing House*, 82(2), 66-69. doi:10.3200/TCHS.82.2.66-69
- Myers, J. M., & Halpin, R. (2002). Teachers' attitudes and use of multimedia technology in the classroom. *Journal of Computing in Teacher Education*, 18, 133-140.
- National Council for Accreditation of Teacher Education. (2007). *Professional standards for the accreditation of schools, colleges, and departments of education*. Washington, DC: Author.
- National Educational Technology Plan. (2010). *Transforming American education: Learning powered by technology*. Washington, DC: Author.
- Neo, M. (2005). Web-enhanced learning: Engaging students in constructivist learning. *Campus-Wide Information Systems*, 22(1), 4-14. doi:10.1108/10650740510574375
- Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. (2000). *Instructional technology for teaching and learning*. Englewood Cliffs, NJ: Prentice-Hall.
- Oliver, K. (2007). Leveraging Web 2.0 in the redesign of a graduate-level technology integration course. *TechTrends*, 51(5), 55-61.
- O'Reilly, T. (2005). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications and Strategies*, 1, 17-37.
- O'Reilly, T. (2007). What is Web 2.0: Designs patterns and business model for the next generation of software. *Communications and Strategies*, 65, 17-37.
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332. doi:10.3102/00346543062003307
- Pajares, F., & Schunk, D. H. (2002). Self and self-belief in psychology and education: A historical perspective. In J. Aronson & D. Cordova (Eds.), *Psychology of education: Personal and interpersonal forces* (pp. 5-21). New York, NY: Academic Press.
- Pan, G., & Bonk, C. J. (2007). The emergence of open-source software in North America. *International Review of Research in Open and Distance Learning*, 8(3). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/496/938>
- Pfaffman, J. (2008). Transforming high school classrooms with free/open source software: It's time for an open source software revolution. *High School Journal*, 91(3), 25-31. doi:10.1353/hsj.2008.0006
- Prensky, M. (2009). H. Sapiens digital: From digital immigrants and digital natives to digital wisdom. *Innovate* 5(3). Retrieved from <http://www.wisdompage.com/Prensky01.html>
- Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sikula (Ed.), *Handbook of research in teacher education* (2nd ed., pp. 102-119). New York, NY: Macmillan.
- Richardson, W. (2007). Teaching in a Web 2.0 world. *Kappa Delta Pi Record*, 43(4), 150-151. doi:10.1080/00228958.2007.10516471
- Schrump, L., & Levin, B. B. (2009). *Leading 21st century schools: Harnessing technology for engagement and achievement*. Thousand Oaks, CA: Corwin Press.
- Sinclair, M. (2010). Technology in spherical geometry investigations: Reflections on spontaneous use and motivation. *Journal of Computers in Mathematics and Science Teaching*, 29(3), 269-288.
- Solomon, G., & Schrump, L. (2007). *Web 2.0: New tools, new schools*. Washington, DC: International Society for Technology in Education.
- Stallman, R. (2002). *Free software, free society: Selected essays of Richard M. Stallman*. Boston, MA: GNU Press.
- Teo, T., Lee, C. B., & Chai, C. S. (2008). Understanding pre-service teachers' computer attitudes: Applying and extending the technology acceptance model. *Journal of Computer Assisted Learning*, 24(2), 128-143. doi:10.1111/j.1365-2729.2007.00247.x
- Teo, T., Lee, C. B., Chai, C. S., & Wong, S. L. (2009). Assessing the intention to use technology among pre-service teachers in Singapore and Malaysia: A multigroup invariance analysis of the technology acceptance model. *Computers & Education*, 53(3), 1000-1009. doi:10.1016/j.compedu.2009.05.017
- van Rooij, S. W. (2009). Adopting open-source software applications in US higher education: A cross-disciplinary review of the literature. *Review of Educational Research*, 79(2), 682-701. doi:10.3102/0034654308325691
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Warschauer, M. (2006). *Laptops and literacy: Learning in the wireless classroom*. New York, NY: Teachers College Press.
- Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology*, 39(6), 987-995. doi:10.1111/j.1467-8535.2007.00799.x
- Yildirim, S. (2000). Effects of an educational computing course on preservice and inservice teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing in Education*, 32(4), 479-495.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. L. (2002). Conditions for classroom technology innovations. *Teachers College Record*, 104(3), 482-515. doi:10.1111/1467-9620.00170

JOYCE G. ASING-CASHMAN, PhD, is adjunct faculty at New Mexico State University and the University of Texas at El Paso. Her research interests include instructional technology modeling, technology in mathematics education, Free and Open Source Tools (FOSTs)/Web 2.0 tools, technology and active learning, and technology and preservice teachers. Her publications have appeared in the *Journal of Social Studies Research* and *Journal of Internet Banking and Commerce*. Dr. Asing-Cashman can be contacted by e-mail (jcashman@nmsu.edu) or mail: Department of Curriculum and Technology, New Mexico State University, P.O. Box 30001, Las Cruces, New Mexico 88003-8001.

BINOD GURUNG holds a PhD in Curriculum and Instruction with a specialization in Learning Technologies and Critical Pedagogy. His research interests include educational technologies—particularly free and open source tools including Web 2.0, social media, and cloud computing—and online multicultural education. His publications have appeared in the *National Social Science Technology Journal*, *Multicultural Education*, and a chapter in Kurubacak and Yuzer's (2010) book, *Handbook of Research on Transformative Online Education and Liberation: Models for Social Equality*. Dr. Binod Gurung can be

contacted by e-mail (binod@nmsu.edu) or mail: Department of Curriculum and Technology, New Mexico State University, P.O. Box 30001, Las Cruces, New Mexico 88003-8001.

YAM B. LIMBU, PhD (New Mexico State University), is Assistant Professor of Marketing at Montclair State University. His research interests include consumer behavior, Internet retailing and ethics, healthcare management, and instructional strategies and assessment. His publications have appeared in the *Journal of Entrepreneurship Education*, *Marketing Education Review*, *Journal of Research in Interactive Marketing*, and *Journal of Business to Business Marketing*. Dr. Limbu can be contacted by e-mail (limbuy@mail.montclair.edu) or mail: Marketing Department, Montclair State University, Montclair, New Jersey 07043.

DAVID RUTLEDGE is Associate Professor of Curriculum and Instruction at the College of Education, New Mexico State University. He is also the Interim Co-Chair of the Department of Curriculum & Instruction, and the Coordinator of Learning Technologies. His areas of specialization include learning technologies, ESL/Bilingual education, and international comparative education. His publications have appeared in the *AACE Journal* and numerous other national and international peer-reviewed journals. Dr. Rutledge can be contacted by e-mail (rutledge@nmsu.edu) or mail: Department of Curriculum and Technology, New Mexico State University, P.O. Box 30001, Las Cruces, New Mexico 88003-8001.

Talented Tertiary Students: A Largely “Forgotten” Group Within the Tertiary Sector?

Lynda Garrett and Christine Rubie-Davies
University of Auckland, New Zealand

The small-scale study reported here sought to ascertain the experiences of talented undergraduate students across four faculties within one university in New Zealand. Thirty-eight undergraduate participants from the four faculties were identified by 16 staff participants based on criteria used by the academic staff in their respective faculty, department, or school. Staff and students participated in separate focus groups so that their perceptions of talented students could be gained. Participant understandings of current identification methods and provision options for talented undergraduate students within the university environment were also sought. Talented undergraduate students identified existing practices that had enhanced, or in some instances had proved detrimental to, their learning. Students also shared ideas that they believed could be implemented to further enhance their experiences and learning. The implications of these findings are discussed with the intent of further enriching the future experiences of talented undergraduate students in the tertiary environment.

The limited research investigating education for “talented” students at the tertiary level suggests that they are a largely neglected group within the tertiary sector (Abeysekera, 2008; Moltzen, 2008; Rinn & Plucker, 2004). Universities seem keen to recruit more academically talented students, and yet little is known about the nature of tertiary-level programs for gifted and talented students (Rinn & Plucker, 2004). Recommendations within available research reports highlight the need for further investigations at the tertiary level to more effectively support and enhance talented learners’ experiences (Abeysekera, 2008; Moltzen, 2008; Rinn & Plucker, 2004).

Contemporary theory, research and literature in gifted education advocates a liberal, multi-categorical definition of giftedness and talent whereby giftedness is viewed as developing potential within one or more areas of aptitude (e.g., Gagné, 2005; Moltzen, 2008; Renzulli, 2005; Riley, Bevan-Brown, Bicknell, Carol-Lind, & Kearney, 2004). Developmental perspectives are indicative of a global shift away from a narrow IQ-based approach to conceptualizing giftedness and talent and toward one that values talent across a range of human endeavors (Moltzen, 2011b).

However, there is no universally agreed upon definition of “giftedness.” As Moltzen (2011b) argued, most writers in the area do not differentiate between the terms gifted and talented and the terms are often used interchangeably. The term *gifted* is still often associated with the historically narrow and elitist perception of aptitude as IQ-based and, therefore, applicable to only a few very able students. Consequently, in the current exploratory study, the more broadly based term *talented* was consciously used to recruit participants. While the term talented was used initially by the researchers, staff and student participants used the term gifted as well.

Moltzen (2008) asserted that while a number of talented tertiary students do achieve at a high level, it

seems clear that many do not. Underachievement or non-retention of talented students within the tertiary environment is a likely outcome of the frustration and boredom these students experience where little is done to nurture their talent and potential (Moltzen, 2008). Indeed, as Moltzen (2008) noted, “There seems to be a perception that at school it is important to differentiate the curriculum to meet diverse levels of ability . . . but at university a ‘one size fits all’ approach is appropriate” (p. 2). Moltzen (2008) advanced an apparent lack of differentiated learning opportunities within the tertiary sector as a major factor contributing to the underachievement and non-retention of talented students. Developing specific programs and/or differentiated learning opportunities within existing tertiary courses for talented undergraduate students is viewed as a potentially positive catalyst for student learning and the pursuit of postgraduate study (Moltzen, 2008).

There is a noted gap in current research relating to academically gifted students in the 17-22 age group (Rinn & Plucker, 2004). Therefore, the present study was designed to provide baseline data related to the current experiences of talented undergraduate students within one New Zealand University. It was hoped that the study would facilitate opportunities for the *personal voice* of a sample of talented undergraduate students and academic staff to be documented and considered. The following questions were designed to guide the research process:

- What are academic staff and undergraduate student perceptions of talented students and their characteristic behaviors?
- What do academic staff and undergraduate students believe to be the key considerations in identifying and effectively catering to the particular needs of talented students in the tertiary setting?

Method

Participants and Setting

The participants in the current study were 38 talented undergraduate students in one university in New Zealand. Four faculties within the university participated in the study. Two of these were science-based faculties, and two were humanities-based. The student participants from the four faculties were identified by 16 staff participants (four representatives from each faculty) based on criteria used by the academic staff in their respective faculty, department or school. Consent to conduct the study was gained from the University Human Participants Ethics committee, and all participants were required to sign consent forms agreeing to participate. The Dean of each faculty also completed a consent form to allow the research to take place within the respective faculties.

Data Collection Procedures

Two staff focus groups were conducted simultaneously at a central location. Representatives from one science-based faculty (FS1) and a humanities-based faculty (FH1) formed one focus group, while the second focus group was comprised of members of another science-based faculty (FS2) and humanities-based faculty (FH2). A successful initial approach was made to one staff member in each respective faculty who had previously won a teaching award. It was assumed that these staff members would be interested in a teaching-centered project. They then recruited other members of their faculties with an interest in teaching and student learning (though not necessarily in talented students). Staff participants in this study were four representatives from each of the four faculties with a total of 16 staff taking part in the focus groups.

Student focus groups were conducted in the respective faculties in a room where there would be no interruptions. The six to 12 talented student participants from each faculty were identified by academic staff participants according to criteria used within their own faculty, department, or school. Criteria for selection were deliberately left to the academic staff participants as student participants would necessarily be part of any undergraduate provision options for talented students offered in the respective faculties. A total of 38 students contributed to the student focus groups.

Each of the staff and student focus group discussions lasted for one hour. Three members of the project team conducted the staff focus groups with the first member acting as a facilitator, the second taking notes, and the third observing. Student focus groups

were carried out with two staff members. One staff member acted as a facilitator and the other as a note-taker. All focus groups were audio-recorded and later transcribed by a professional transcriber. Together, the discussion notes and the audio-recorded transcripts provided a complete record of each focus group.

The discussions in each focus group were guided by a common set of topics centered on gaining staff and student perceptions of talented students, as well as the characteristic behaviors, methods of identification, and program responses to such talented students within the one New Zealand University. Staff and student focus group discussions also utilized a similar set of prompts (see Appendix for focus group prompts).

Data Analysis

A grounded theory approach was taken to analyzing the data. All transcripts of focus group discussions were read several times to become familiar with participant responses and the associated discussion. Notes were made directly onto the transcripts related to common and core ideas emerging from the data. Relevant sections in the transcripts were highlighted. This process facilitated an understanding of the core ideas and enabled themes to be developed from the data as recommended by Strauss and Corbin (1998). Statements made by the participants were then systematically coded into sub-themes, within four emergent themes, by two of the original research team. Disagreements were highlighted and discussed. The researchers then re-coded the data such that the agreement rate was above 95%.

Results

The following four emergent themes are presented: (a) how talented undergraduate students are defined, (b) how talented undergraduate students are identified, (c) opportunities for talented undergraduates students that support their learning, (d) and issues for talented undergraduate students. Various sub-themes determined through the analyses are also integrated into the presentation of findings.

Defining the Talented Student

In every focus group staff and students mentioned achieving high grades and demonstrating high levels of academic motivation as indicative of student talent. One staff member (FS2) reflected commonly expressed staff and student perceptions by noting that talented undergraduate students would be those “who are just going to do well in their formal courses, get As, A+s, and be really involved and immersed in what they’re doing.” An associated conception was that talent was

innate. However, both staff and students mentioned this idea less frequently than was the idea that achievement of good grades represented talent.

While high levels of academic aptitude and excellent performance in coursework were the most common descriptors of talent, many staff and student participants recognized that talented undergraduate students possessed multiple abilities. Multi-talented tertiary students were variously described as being capable of studying conjoint degrees in different disciplines and being talented in multiple domains such as music, sport, or cultural endeavors. A student (FS2) emphasized the multi-factorial nature of talent by highlighting that someone might “be a wonderful dancer, but a ‘B-grade’ student.” However, others believed that being talented was domain specific. As one staff member (FS2) explained,

I think when you use “talent” it’s in a particular domain. You say he’s a talented pianist, talented research mathematician, or a talented rower. When I think of talent I think of very domain specific. With gifted I think of perhaps a multiplicity of things.

Defining Characteristics or Behaviors of the Talented Student

Staff and students generally shared common perceptions of the indicative characteristics or behaviors of talented undergraduate students. Staff and student participants identified a number of intrapersonal abilities and qualities as being indicative of talent in a tertiary setting.

Talented undergraduate students were commonly defined as possessing effective learning and study strategies and grasping concepts quickly and easily. One staff member (FS1) believed talented students to be “much better at thinking on their feet [and] coming up with a quick fire answer. They’re better at analyzing completely new and novel situations. They’re much better at understanding concepts.”

Characteristics that could be defined as relating to academic motivation were also mentioned in all focus groups as being indicative of talent: persistence, curiosity, enjoyment of challenge, love of learning, satisfaction from hard work, self-regulated learning, and an eagerness to learn. One student (FS1) explained such a personal “eagerness to learn” as being “eager to know, rather than you have to know.”

An aspect that was mentioned by staff in all focus groups, and by several students in one faculty, was that talented undergraduate students were creative thinkers, could problem-solve, or were innovative. One student (FS1) asserted the importance of innovation on the basis that “it is what pushes the field forward.”

The ability to ask searching questions was mentioned several times in all staff focus groups as an indicator of talent. One staff member (FH1) consciously looked for students who “seem to be deeply engaged in discussions and with going further than just the surface stuff. They challenge ideas, they ask questions, they sort of go beyond whatever it is that we are doing.”

Several staff and student participants viewed talented undergraduate students as also possessing distinctive personal qualities. Effective people skills was one such attribute mentioned by a student participant (FH1) who placed particular value on “the whole person. So it doesn’t matter if you’re academically smart . . . it’s interpersonal skills that matter and building relationships with [clients], staff, people.”

Leadership was a further quality identified by both staff and students as a marker of a talented undergraduate student. One humanities-based staff member (FH1) thought talented students were

often the ones who take on some leadership role and especially in tutorials when you’ve got them work-shopping certain ideas and doing activities, they step up and demonstrate whatever talent they have in those situations.

Staff, in particular, regarded initiative as another important quality. Several staff (FH2; FS2) believed that talented undergraduate students were more likely to put themselves forward, become known to lecturers, and thereby take advantage of opportunities such as summer scholarships or summer jobs (where students can work alongside a researcher on a research project).

Identifying the Talented Student

In a university environment where students can be anonymous to teachers and other students, the researchers were interested in the ways that talented undergraduate students were identified. Staff from one of the humanities-based faculties (FH1) admitted that there was no formal system in place for identifying talented students, particularly at the undergraduate level, where the situation was described as “a bit hit and miss.” It was felt that more tailored program options were available at the postgraduate level. Other staff from one of the science-based faculties (FS1) conceded that they tended to concentrate on struggling students more because retention was important in a “restricted entry faculty.” At times, recognition clearly related to students achieving high marks and grades. However, some differentiated program options and more informal methods of identifying talented students were also shared.

One obvious means of identifying students was through grades and marks achieved in examinations. In one faculty in particular (FS1), identification of talented

students began before they had entered the university. Secondary school students, in their final year of study, could apply for an accelerated pathway (AP) program on the basis of high school grades.

This program enables talented secondary school students to be accelerated into the second year of the Faculty program, thereby completing what is normally a 4-year program of study in three years. Students are expected to maintain a “first class honors” standard throughout their three years of study, and most students will complete a master’s degree in their fourth year. As one staff member noted,

Previously, before we had AP, I would find talented students would be a lot quieter and they wouldn’t speak out and I would say they were trying to hide their talent. But now there’s a crucial mass in each degree so there’s usually four to six in my degree of say 50 and they all know they’re talented students and so I think they feel safer. . . . They’re just unabashed, they don’t mind asking questions and showing they’re talented because everyone knows they’re the accelerated pathway students anyway so they’re out. It’s allowed them to take some freedom over the questions in class.

Another faculty (FS2) developed the MAX program, an acronym that stands for mathematical, acceleration and extension. The accelerated mathematical learning opportunity for talented students in their final year of secondary schooling enables students to complete a first year university paper in a dual or concurrent enrollment option. Students who pass the course are then eligible to enroll directly into any of three 2nd-year mathematics papers as first year students enrolled in full-time university studies.

Within the same faculty (FS2), another department identified “very talented” students in their second year of full-time university studies for their Honors program. The Honors program is a university-wide initiative designed to attract the best undergraduate students into postgraduate studies. The program consists of masters-level courses and a dissertation completed in one year of full-time study or 2 years part-time. In some disciplines, an Honors qualification is required as the first year of enrollment for a 2-year master’s degree program.

Staff participants from a science-related faculty (FS2) noted that talented students valued their selection into their faculty’s Honors program and became highly focused in working towards their goals. They were also “visible in the student body as people of academic standing” with the result that “the retention rate through into the postgraduate program was almost 100%.”

Students mostly believed they had been identified as talented because of marks or grades they had

achieved on assignments or examinations. However, students also realized that other factors could potentially be significant. As one student (FS2) acknowledged, it was “not just grades, they know that I might do sport . . . mentoring [of other students].”

Some staff identified their ability to differentiate talent and potential in tertiary students by observing and listening to student interactions, their questioning, and higher level thinking skills. A staff member from a science-based faculty (FS1), reported being

on the lookout for people with perceptive observations or asking lots of good questions. . . . There are those subtle linkages between the different fields in [my area] and early on in the degree these things looked like separate islands but as you go through the degree there’s a lot of powerful general concepts that link these things together and I look for the students who can identify those connections by themselves without having to be told.

Student participants were also aware that they could become noticed through in-class participation, particularly through their willingness to ask and answer questions more frequently than other students.

Catering for the talented student. Faculties varied in the ways in which they catered for talented undergraduate students. A common and cohesive system was clearly lacking. However, opportunities were provided to develop student talents in all four faculties within the current study. Apart from AP and MAX program options, talented students could also be employed as teaching assistants and tutors for other students in earlier years of their undergraduate degrees. They were also used to speak to secondary school students about pursuing tertiary studies. Some departments offered summer internships while others took advantage of the university summer scholarship program.

The summer scholarship program enables high achieving undergraduates to work with an academic on a research project over the summer, and they are given a stipend. It is specifically designed to encourage high achievers into postgraduate study. A student from a humanities-based faculty (FH1) valued the mentoring and consequent personal growth opportunities available within a summer scholarship option.

It appeared that enhanced program-level responses to the needs of talented undergraduate students had mostly been initiated by interested and enthusiastic lecturers. For example, in one of the humanities-based faculties (FH1), staff offered a choice in both of the designated assessment tasks for a semester course. Other students (FS1) valued having the option to choose to work on assessment tasks in a collegial

manner with like-minded peers. Staff in both humanities-based faculties and a science-based faculty spoke about providing extension questions for their talented students within assessment tasks. However, some staff members within a science-based faculty (FS1) cautioned about this practice. For example, one staff member explained,

The backlash from that was [that students protested] but we're good and we're not giving any trouble, why are you making us do extra things and the idea of it being not a substitute because of some perception of equity of assessment and all the rest, but actually a punishment for being good.

Some faculties or particular departments provided some kind of recognition of students' achievements. Overwhelmingly, students situated in one of these contexts (FS2) appreciated being acknowledged for their high achievement. Recognition of achievement included a congratulatory letter or certificate, a departmental invite to "an afternoon tea or sometimes lunch" or even "personal invitations to seminars." Students valued the personal invitations as opportunities to form friendships with like-minded peers and to form a "subject club" in one instance.

Issues for Talented Students

Some faculties and departments clearly appeared to be making considerable efforts to cater for their talented students. Conversely, there were aspects of some students' experiences at the university that were identified as being less positive. Student concerns spanned negative relationships with some course lecturers, a sense of missed opportunities when needs were not fully met, and a perceived lack of recognition of their abilities.

Several students identified lecturer behaviors that were viewed less favorably. Individual interactions between lecturers and talented students within a humanities-based faculty (FH1) were causes for multiple student concerns. For example, a student (FH1) expressed her frustration with lecturers who could not cope with being questioned and who consequently felt threatened. In another instance, expressing a personal opinion led an experienced lecturer to "shut me right down," causing the student (FH1) to feel "small in front of 60 people." One student (FH1) had been labeled as "an aggressive person" after sharing with a tutor that she had understood the introduced content within the first 5 minutes of the session. Publicly highlighting perceived lecturer errors caused a lecturer to tell yet another student (FH1) "that I shouldn't come to class if I know it all."

It appeared that several students believed their learning opportunities were limited at times within

undergraduate-level programs. Some students clearly felt that they were not being challenged sufficiently in their courses. It was particularly difficult for one student (FH1) to be in a class "having all these ideas," where the majority of students were still struggling to grasp a particular concept in "the fourth week" that this student had "got in week one." Another student (FH1) felt that course content was "dumbed down too much" and suggested "streamed tutorials" as an alternative form of provision.

Some students believed there were course assessments that did not appear to validly test their abilities. Others questioned the lack of challenge within particular assessments. Several students (FH1) felt that certain assessments required little more than an ability to "write exactly what the teacher wants to hear" using a mandated "writing frame." Such prescribed templates for writing were regarded by students in one humanities-based faculty (code) as being

irrelevant and it restricts your thinking in a way because you're following a prescribed way of thinking whereas your whole critical literacy is based on understanding the world and where you fit in the world . . . if your world is confined to a writing frame then you're not exploring what your talent is of thinking outside the square.

Some students appeared somewhat aggrieved where there was no recognition for outstanding levels of achievement. As one student (FH1) stated,

I like to think that if I get an A+ in most of my papers that it means something. Because it almost feels like I do my work and then, it's not that I want to be acknowledged for it, it's just that there has to be a next step as well . . . this guy has potential to do something more beyond this paper.

For another student (FH1), a lack of recognition had resulted in a loss of motivation:

I just can't be bothered doing a really good essay because it's like I know this is enough to give me a B so I'm not going to push myself any further if I'm not going to get acknowledged for it.

Discussion

A Multi-Dimensional Definition of the Talented Student

Staff and student conceptions of the talented student generally reflected a high level of shared perspectives.

The Talented Student as Academically Able and Motivated

Most staff and student participants defined talented students as those who demonstrated high levels of academic ability and motivation in achieving excellent grades in their undergraduate coursework. Specific intrapersonal characteristics, such as persistence, hard work, a demonstrated love of learning, and self-regulatory abilities were commonly mentioned. Such perceptions of talent and talented behaviors link to both the original and revised versions of François Gagné's Differentiated Model of Giftedness and Talent (DMGT; Gagné, 2000, 2003, 2007, 2008).

In the original version of Gagné's (2000, 2003) DMGT, talented individuals were regarded as those who successfully transform high levels of natural ability or gifts within one or more of four general domains (intellectual, creative, socioaffective, and sensorimotor), into outstanding performance in a particular field or fields. The model closely aligns with the notion of a talented student expressed within the present study as outstanding performance within one or more aptitude domains.

This is a theoretical model of giftedness that clearly distinguishes between giftedness and talent. The actualization of gifts as talents within the DMGT requires sustained commitment to learning, practice, and training in a particular skill or skills over time (Gagné, 2000, 2003). Various intrapersonal and environmental *catalysts* are also believed to enhance, restrict, or even curb the talent development process at different points in time (Gagné, 2003). The role of chance, in the form of unexpected encounters or opportunities, is regarded as a third potentially important catalyst (Gagné, 2000, 2003).

In the revised DMGT, natural abilities or gifts are regarded as the most influential factors overall. Intrapersonal attributes, inclusive of a high level of interest, will-power, and self-regulatory abilities within a talent domain were proposed as the most significant catalytic influences on the development of expertise over time (Gagné, 2008).

The Talented Student as Multi-Talented

Many staff and student participants in the current study also defined the talented student as multi-talented. Such students were described as being capable of demonstrating high-level abilities and personal qualities spanning multiple domains within and beyond academic performance areas. Participants also regarded outstanding people skills, personal initiative, and leadership abilities as definite indicators of talent in undergraduate students. The notion of talent as multiple abilities spanning several performance areas, and

encompassing both intrapersonal and interpersonal aptitudes, is reflected within Gardner's theory of multiple intelligences (Gardner, 1983, 1985, 1987, 1993, 1999).

Gardner (1983, 1985, 1987) initially proposed that all humans possessed at least seven intelligences described as (a) spatial, (b) musical, (c) bodily-kinesthetic, (d) interpersonal, (e) intrapersonal, (f) linguistic, and (g) logical-mathematical intelligence strength areas. In 1993, Gardner added an eighth naturalistic intelligence and has tentatively suggested the possible, but yet unconfirmed, existence of spiritual and existential intelligences (Gardner, 1999). Gardner believed that the intelligences generally developed unevenly in individuals. It was, therefore, more typical for someone to be highly capable in two or three areas and less capable in others. In this theory, giftedness can be defined as exceptional competence in one or more intelligences. Interestingly, Rinn and Plucker (2004) cautioned that talented tertiary students' knowledge of the potential for success within multiple areas of aptitude may serve to be counterproductive. They may ultimately fail to actualize their abilities in any particular field.

Creative abilities and innovative approaches to coursework were also regarded as indicators of a talented student by staff participants across all faculties and several students within one faculty. Creative aptitude is recognized as one of Gagné's four general aptitude domains with the potential to be actualized as outstanding creative achievement in a specific field or fields (Gagné, 2000, 2003, 2007, 2008). Sternberg (1985) similarly highlighted the valued role of creative abilities alongside analytical and practical thinking abilities within his triarchic theory of intelligence. Renzulli (1986) also prioritized the role of creativity as one of three sets of characteristics, along with above average intellectual ability, and task commitment, which intersect to produce gifted behavior. Giftedness, in this three-ring model of giftedness, equals creative productivity evidenced within any performance area of value. Valued creative performance is regarded as context and time-specific and, therefore, subject to change.

It is affirming to note that many staff participants in the current study were able to recognize and describe the multidimensional nature of talent within their undergraduate student cohort. It could be suggested that, within the current study, talented undergraduates' abilities were not forgotten. However, given the small-scale nature of this study, there is a definite need for more extensive research into the characteristics of academic staff working alongside talented students in undergraduate programs.

It could be particularly worthwhile to investigate the characteristics of academic staff that choose to work with

talented students in Honors programs. As Rinn and Plucker (2004) surmised, could academic staff possibly be drawn towards working in Honors programs because of “a genuine interest in gifted students, or do [they] end up in honors programs entirely out of chance?” (p. 63).

Key Factors Relating to Identifying and Providing for the Talented Undergraduate Student

Findings in the current study highlighted student, staff, and systemic factors inclusive of faculties and the wider university as being particularly influential in determining the experience of talented undergraduate students.

Faculty and/or University Related Factors and the Talented Student

There was significant variation in the degree of university and faculty wide responsiveness to the cognitive, social, and emotional needs of talented undergraduate students. At the university level, it was encouraging to note the commitment to a Young Scholars program option for talented students focused on accelerated learning practices. Accelerated learning can take one of two forms. Talented students are either (a) exposed to new content at an earlier age than their same-aged peers or (b) the pace of learning is accelerated (Townsend, 2011). In the latter instance, students master the same content in less time (Townsend, 2011). The Young Scholars program offers valuable opportunities for talented secondary school students to benefit from dual enrollment and subsequent curriculum acceleration opportunities.

Dual enrollment is described as a “form of subject-specific acceleration which allows gifted and talented students the opportunity to move beyond the curriculum of their expected age level in one or more areas” (Riley et al., 2004). In this university, high achieving students in their final year of secondary schooling are able to enroll in one university-level course per semester. Students who pass their course(s) are then able to enroll directly into second year courses when they become full-time students. The pace of delivery and exposure to content is consequently accelerated. The content of a four-year undergraduate degree is essentially “compacted” into three years of full-time study.

The Young Scholars Program presently offers around 12 course options. In the current study, it was only an option for those students who could select, and had passed, courses linked to the two science related faculties. (These two faculties referred to their offerings within the Young Scholars program as AP and MAX program options respectively). Given that talented students demonstrate advanced capabilities across multiple intelligence domains there would

appear to be scope for this positive program initiative to be further developed.

Braggett and Moltzen (2000) reported that dual enrollment opportunities appear to be less common within New Zealand universities. It is interesting to note that, from the mid-1980's in the United States, state-level legislation guaranteeing talented secondary school students early access to university-level courses has greatly increased the occurrence of dual enrollment opportunities (Gifted Child Today Magazine, 1999; McCarthy, 1999). The New Zealand Ministry of Education (2012) promoted dual enrollment as part of a continuum of programming options, but there is no existing legislation to formalize this practice.

Staff consciously identified the most talented second year undergraduates for a post-graduate Honors program within one faculty in the current study. Academic staff then undertook to provide on-going mentoring and support for these students throughout their undergraduate degrees. Staff regarded high levels of perceived student focus towards attaining their goals and increased retention rates as being potentially positive outcomes of their input. In other faculties there was no planned approach to identifying and mentoring talented undergraduate students for Honors programs. Rules relating to Honors programs also appeared to vary between faculties.

It would be interesting to research talented students' perceptions of the role of mentors in enhancing their learning experiences within the tertiary sector. Bisland (2001) cautioned that the teacher mentor role extends beyond having the required expertise to challenge a talented student in their ability strength area. Mentors also need to have a genuine interest in, and understanding of, talented students (Bisland, 2001).

Regardless of whether faculty members encouraged talented students towards Honors studies or not, students would ultimately need to apply themselves. In this instance, the self-nomination process would have been explained as an example of a deliberate act rather than a chance occurrence within Gagné's (2008) revised DMGT. In ranking environmental influences, such as the role of significant people, programs and chance opportunities below the structured process of learning and practice, Gagné (2008) contended that “the bulk of the environmental stimuli have to pass through the sieve of an individual's needs, interests or personality traits” (p. 4). He believed that individuals can determine the degree to which they will be influenced by particular environmental stimuli presented at any given point in time. However, like all gifted and talented individuals, talented tertiary students are not a homogenous group, and they may vary considerably in their degree of personal motivation.

Motivation is a complex concept, inclusive of such ideas as task commitment, the eagerness to learn, the

volition to succeed and intrinsic or extrinsic motivations (Friedman-Nimz & Skyba, 2009). In the current study, students from one faculty particularly valued receiving recognition for their achievements through a variety of extrinsic means, such as congratulatory letters, certificates, afternoon tea functions, and personal invitations to faculty events.

In this instance, extrinsic environmental motivation would appear to enhance and support an individual's intrinsic motivation in the development of expertise. Intrinsic motivation and personal identity are believed to be positively enhanced by positive teacher feedback and respect for effort, ability, and performance (e.g., Hunt & Seney, 2005; Rawlinson, 2004; Street, 2001). While both kinds of motivation have a value, intrinsic motivation is viewed as being particularly important and critical to the development of high levels of aptitude, creativity, and achievement (Lens & Rand, 2000).

Bloom (1985) acknowledged the important role of competition as a component in motivation. It is possible that faculties could consider formalizing annual awards initiatives for outstanding course achievement within their various course programs. Such awards could recognize the top achievers across programs at a special celebratory function. Awardees would receive appropriate recognition and acclaim for their abilities and skills from invited peers, family, friends, and academic staff.

Interestingly, some talented undergraduate students in other faculties who did not receive recognition for outstanding levels of achievement felt wronged. Other students felt that a similar lack of recognition for achievement was de-motivating. It would appear that these students could potentially be at risk of over-dependency on extrinsic forms of evaluation. Such dependency could ultimately lead to a loss of control over their own learning and possible underachievement (McNabb, 2003). It is also probable that these students may not have possessed the typically high levels of academic motivation and self-regulatory abilities indicative of highly gifted students.

Staff Related Factors and the Talented Student

Staff participants appeared to demonstrate high levels of awareness of the indicative abilities and characteristic behaviors of talented students. Staff perceptions of the talented student closely aligned with talented undergraduate students' self-perceptions. It is possible that the staff participants in the present study are highly effective practitioners who are more open to recognizing expressions of talent in their undergraduate student cohort. Four of the academic staff participants had been awarded teaching excellence awards at a faculty and/or university level in recognition of their

exemplary teaching abilities. All other staff participants had been approached to participate in the study by these four staff members on the basis of their evident interest in teaching and learning.

Staff participants may not have specific knowledge or qualifications related to gifted education. However, they may be very effective teachers with the necessary awareness and skill to successfully differentiate programs of work for the talented students in their classes. Teachers' abilities to know their students' needs and capabilities and to respond with a range of flexible instructional strategies are two quality indicators of effective differentiated teaching practice for talented students (Heacox, 2009).

Within the current study, staff participants were easily able to identify highly talented students through excellent in-class participation and outstanding grades within course assessments. In this respect, talented undergraduate students were clearly able to exert a positive influence on the tertiary learning environment. As Gagné (2008) asserted, an individual's high level of interest in a talent domain or sub-component of a domain is potentially the most powerful intrapersonal catalyst in the talent actualization process. Many writers regard enjoyment or passion for a particular talent area as the necessary personal energy to cope with challenging tasks, achieve personal goals, and attain higher levels of performance (e.g., Chan, 2002; Csikszentmihalyi, 1996; Gagné 2007).

However, it is also evident that the tertiary learning environment has the potential to impact positively on students in the form of support and stimulation from lecturing staff. Staff in the current study generally appeared to be adept at identifying potential and actual ability through more informal methods such as in-class observation, student questions, and classroom discussions. Most were also able to offer student choice and extra challenge within course assessment tasks. Although Gagné (2008) prioritized the catalytic potential of various intrapersonal influences over environmental influences in his revised DMGT, he was aware that "in most situations *all* components play an important role in the talent development process" (p. 6).

It is probable that many talented undergraduate students could set and pursue personal learning goals in an independent and highly successful manner while still selectively utilizing environmental supports to their advantage. Talented students are capable of incorporating extra challenge into their studies through self-initiated means such as reading beyond course readings, researching topics in greater depth, and forming study groups with like-minded peers. Undergraduate students in the current study did actively seek the support of like-minded peers to work alongside, both within and outside of class sessions. Such actions support Van Tassel-Baska's (1998)

assertion that “talented individuals do not make it on their own . . . the need for support from others is crucial for ultimate success” (p. 763).

Some students did report less positive experiences with certain staff members from the four faculties involved in the study. Some lecturers were perceived to lack empathy and understanding, particularly in their responses to student questions and comments about a lack of intellectual challenge within coursework and assessments.

Within the general literature relating to gifted education, mention is made of a lack of understanding of the particular cognitive, social, and emotional needs of gifted students by some teachers (e.g., Heacox, 2009; Tomlinson, 2003). Indeed, some teachers may lack the necessary skills and motivation to differentiate student learning appropriately, thereby validating Moltzen’s (2008) view of a “one size fits all approach” to tertiary education. There may also be a tendency for some staff to perpetuate the widely believed myth about gifted individuals of all ages: that they are capable of making it on their own (Rinn & Plucker, 2004).

Alternatively, while it is generally accepted that talented individuals possess high levels of self-belief in their own competencies, high self-concept does not always ensure prosocial behavior and may result in negative consequences (Dawes, 1998). While lecturers’ reactions to talented students’ questions and comments about unchallenging coursework and assessments may have been perceived negatively by students, a case could be made for greater understanding by both groups.

Self-determination characteristics of gifted and talented students include such indicators as skepticism towards authoritarian pronouncements, a tendency to question arbitrary decisions and ask searching questions, as well as forthrightly expressing ideas, preferences, and opinions (Moltzen, 2011a). While such behaviors are deemed to be characteristic of gifted and talented students, teachers often misinterpret these behaviors in their students and react negatively. It could be argued that what constitutes prosocial, egotistical, or arrogant behavior may depend on the “eye,” or the attitudes, of the beholder. Similarly, talented students often lack the personal awareness of these traits within themselves and the potential for such traits to impact negatively on teacher-student relationships.

Conclusion

The current study, while small-scale and exploratory in nature, provides several messages for educators working alongside talented undergraduate students within a tertiary learning environment. Findings highlight the critical importance of shared, university-wide understandings of the talented student,

and common cross-faculty methods for identifying talented tertiary students early in their undergraduate degree courses. Talented undergraduate students’ talents need to be fostered through appropriately challenging coursework, alternative assessment options and facilitative and leadership opportunities. There is also a perceived need to recognize and celebrate excellence in achievement. The current study has highlighted some positive staff, faculty, and university-level program responses to the needs of talented undergraduate students. Yet, there may presently be little cause for complacency within the tertiary sector. Talented undergraduate students may not be forgotten, but are they fully understood and catered to?

References

- Abeyskera, I. (2008, November). *Researching gifted and talented in tertiary education: Issues and directions*. Paper presented at the Australian Association for Research in Education International Education Research Conference, Brisbane, Australia.
- Bisland, A. (2001). Mentoring: An educational alternative for gifted students. *Gifted Child Today*, 24(4), 22-25, 64-65.
- Bloom, B. S. (1985). *Developing talent in young people* (1st ed.). New York, NY: Ballantine Books.
- Braggett, E. J., & Moltzen, R. I. (2000). Programs and practices for identifying and nurturing giftedness and talent in Australia and New Zealand. In K. A. Heller, F. S. Monks, & R. F. Subotnik (Eds.), *The international handbook of giftedness and talent* (2nd ed., pp. 779-797). Oxford, UK: Elsevier.
- Chan, L. K. S. (2002). Metacognition and the motivational orientations of intellectually gifted students. In W. Vialle & J. Geake (Eds.), *The gifted enigma: A collection of articles* (pp. 164-184). Cheltenham, VIC: Hawker Brownlow.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: Harper Perennial.
- Dawes, R. M. (1998). The social usefulness of self-esteem: A skeptical review. *Harvard Mental Health Letter*, 15, 4-5.
- Friedman-Nimz, R., & Skyba, O. (2009). Personality qualities that help or hinder gifted and talented individuals. In L. V. Shavinnia (Ed.), *International handbook on giftedness* (pp. 421-435). Quebec, Canada: Springer Science and Business Media.
- Gagné, F. (2000). Understanding the complex choreography of talent development through DMGT-based analysis. In K. A. Heller, F. S. Monks, & R. F. Subotnik (Eds.), *The international handbook of giftedness and talent* (2nd ed., pp. 67-79). Oxford, UK: Elsevier.

- Gagné, F. (2003). Transforming gifts into talents: The DMGT as a developmental theory. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (3rd ed., pp. 60-74). Boston, MA: Allyn and Bacon.
- Gagné, F. (2005). From gifts to talents: The DMGT as a developmental model. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (2nd ed., pp. 98-119). New York, NY: Cambridge University Press.
- Gagné, F. (2007). Ten commandments for academic talent development. *Gifted Child Quarterly*, 51(2), 93-118. doi:10.1177/0016986206296660
- Gagné, F. (2008). *Building gifts into talents: Brief overview of the DMGT 2.0*. Unpublished manuscript, Université du Québec à Montréal, Montreal, Canada.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books.
- Gardner, H. (1985). *Reintroducing frames of mind*. New York, NY: Basic Books.
- Gardner, H. (1987). The theory of multiple intelligence. *Annals of Dyslexia*, 37(1), 19-35. doi:10.1007/BF02648057
- Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York, NY: Basic Books.
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York, NY: Basic Books.
- Gifted Child Today Magazine. (1999). Dual enrollment programs increase. *Gifted Child Today Magazine*, 22(4), 6.
- Heacox, D. (2009). *Making differentiation a habit: How to ensure success in academically diverse classrooms*. Minneapolis, MN: Free Spirit.
- Hunt, B. G., & Seney, R. W. (2005). Planning the learning environment. In F. A. Karnes & S. M. Bean (Eds.), *Methods and materials for teaching the gifted* (2nd ed., pp. 37-74). Waco, TX: Prufrock Press.
- Lens, W., & Rand, P. (2000). Motivation and cognition: Their role in the development of giftedness. In K. A. Heller, F. S. Monks, & R. F. Subotnik (Eds.), *The international handbook of giftedness and talent* (2nd ed., pp. 193-202). Oxford, UK: Elsevier.
- McCarthy, C. R. (1999). Dual enrollment programs: Legislation helps high school students enroll in college courses. *Journal of Secondary Gifted Education*, 11, 24-33.
- McNabb, T. (2003). Motivational issues: Potential to performance. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (3rd ed., pp. 417-423). Boston, MA: Allyn and Bacon.
- Moltzen, R. (2008). *Tertiary teaching excellence profile*. Retrieved from <http://ako.aotearoa.ac.nz/community/ako-aotearoa-academy-tertiary-teaching-excellence/resources/pages/roger-moltzen-tertiary-t>
- Moltzen, R. (2011a). Characteristics of gifted children. In R. Moltzen (Ed.), *Gifted and talented: New Zealand perspectives* (3rd ed., pp. 71-72). Auckland, New Zealand: Pearson.
- Moltzen, R. (2011b). Conceptualising of giftedness and talent. In R. Moltzen (Ed.), *Gifted and talented: New Zealand perspectives* (3rd ed., pp. 31-53). Auckland, New Zealand: Pearson.
- New Zealand Ministry of Education. (2012). *Gifted and talented students: Meeting their needs in New Zealand schools*. Wellington, New Zealand: Learning Media.
- Rawlinson, C. (2004). Self concept, self efficacy and special abilities. In D. McAlpine & R. Moltzen (Eds.), *Gifted and talented New Zealand perspectives* (2nd ed., pp. 467-481). Palmerston North, New Zealand: Kanuka Grove Press.
- Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 51-92). New York, NY: Cambridge Press.
- Riley, T., Bevan-Brown, J., Bicknell, B., Carroll-Lind, J., & Kearney, A. (2004). *The extent, nature and effectiveness of planned approaches in New Zealand schools for providing for gifted and talented students*. Wellington, New Zealand: Ministry of Education.
- Rinn, A. N., & Plucker, J. A. (2004). We recruit them, but then what? The educational and psychological experiences of academically talented undergraduates. *Gifted Child Quarterly*, 48(1), 54-67. doi:10.1177/001698620404800106
- Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York, NY: Cambridge University Press.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques and procedures for developing grounded theory* (2nd ed.). London, UK: Sage.
- Street, P. (2001). The role of motivation to the academic achievement of gifted secondary school students. *Gifted Education International*, 15, 164-177.
- Tomlinson, C. A. (2005). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: ASCD.
- Townsend, M. (2011). The need to balance acceleration with enrichment in gifted education. In R. Moltzen (Ed.), *Gifted and talented: New Zealand perspectives* (3rd ed., pp. 252-275). Auckland, New Zealand: Pearson.

Van Tassel-Baska, J. (1998). The development of academic talent: A mandate for educational best practice. *Phi Delta Kappan*, 79(10), 760-763.

LYNDA GARRETT is a senior lecturer in the School of Learning Development and Professional Practice in the Faculty of Education at the University of Auckland. Her research has focused on motivation, social-emotional aspects of giftedness, the talent development process for young gifted and talented students in the verbal-linguistic domain, and the influence of teacher expectations on young gifted and talented readers. Lynda has presented at national and international conferences on gifted and talented education, and is currently building a publishing profile within journals such as *English Teaching: Practice and Critique*, and the *European Journal of Social and Behavioural Sciences*. Correspondence concerning this article should be addressed to: Lynda Garrett, School of Teaching, Learning and Professional Practice, University of Auckland, Private Bag 92601, Auckland 1150, New Zealand. Lynda's e-mail address is: l.garrett@auckland.ac.nz

CHRISTINE RUBIE-DAVIES is an associate professor and Head of School in the School of Learning Development and Professional Practice in the Faculty of

Education at the University of Auckland. Her research is mostly focused on teacher expectations at the whole class level and how various teacher beliefs and personality characteristics influence the instructional and socioemotional climate of classrooms. Christine also has interests in ethnic issues and gifted students. Christine is a Fellow of the Association for Psychological Science (US) and a recipient of a National Tertiary Teaching Excellent Award. Her work has been published in journals such as *Journal of Educational Psychology* and *British Journal of Educational Psychology*.

Acknowledgments

The authors wish to acknowledge the contribution of Christine Rubie-Davies, Sandy Farquhar, Catherine Rawlinson, Heather O'Neill, Paul Heyward, and Anne Sinclair, in completing an exploratory study, presented as a report: What About our Talented Students?: An Exploratory Study. The research team gave permission for the authors to publish from this original report. The exploratory study was supported by Ako Aotearoa through a Regional Hub Project Funding Scheme grant to the second author. The report was published as an Ako Aotearoa publication in August, 2010. The current article has been extensively revised and rewritten for publication.

Appendix
Staff and Student Focus Group Prompts

Staff focus group prompts:

1. What do you understand by the term “talented students”?
2. What are the characteristics, dispositions and /or behaviors of a “talented student”?
3. What do you consider to be the place of faculties or departments in fostering the learning and abilities of talented students?
4. How do you identify talented students?
5. What do you currently do to support and enhance the learning and experiences of talented students?
6. What does your faculty currently do to support and enhance the learning and experiences of talented students?
7. Are you aware of any other strategies or programs in place at this university, or others that are designed to support talented students?
8. Do you have any strategies that could be implemented within your faculty, or across the university, which might further enhance the learning and experiences of talented students?
9. If an overall plan or program was introduced within your university to support talented students, what do you see as the benefits?

Student focus group prompts:

1. Why do you think you were selected to participate in this focus group? How did the staff members know this, do you think?
2. Is your learning supported in any way? How?
3. What does your faculty do currently to enhance your learning and experiences at university?
4. How could your faculty or the teaching staff do more to make your learning at university more engaging or more challenging?
5. Is there anything about your learning experience at the university that has not been good?
6. Do you have any suggestions of strategies that could be implemented within your faculty or across the university that might further enhance the learning and experiences of talented students like yourself?
7. If an overall plan or program was introduced within your university to support talented students, what do you see as the benefits?

Exploring Students' Perspectives of College STEM: An Analysis of Course Rating Websites

YunJeong Chang and Seung Won Park
University of Georgia

One of the crucial goals of higher education is building a scientifically literate citizenry. The science, technology, engineering, and mathematics (STEM) subject areas are indicated as good domains to develop knowledge and skills for becoming future leaders. However, previous research has indicated a constant decline in the number of American college students enrolled in the STEM areas. Several studies have indicated that instructors play a critical role in promoting students' satisfaction that influences their learning. This study explores the teaching characteristics that influence student satisfaction in college STEM courses through document analysis. The data include students' comments reported on two college course-rating websites. Thematic analysis was used to analyze the data. Four identified instructional attributes pertinent to student satisfaction are as follows: (a) teaching styles, methods, or strategies; (b) teacher knowledge and preparation; (c) teacher attitude toward teaching, subject, and students; and (d) practical workload and expectations. We discuss implications of the study results and future research directions.

Given the fast growing technology in the current era, today's society places a high priority on the cultivation of a diverse science, technology, engineering, and mathematics (STEM) workforce (National Science Board, 2007). Also, all citizens are strongly encouraged to become science- and math-literate in order to maintain a good standard of living (Seymour, 2002). Accordingly, the importance of STEM in higher education has been recognized for a decade. The National Research Council (NRC, 2003) emphasized that undergraduate education is responsible for training future leaders in the STEM areas.

However, numerous reports have expressed concern over the small number of college students who graduate with degrees in the STEM areas. Many college students tend to choose a non-STEM field as their major when they first enter college (Chen & Weko, 2009). What is even worse is that a great portion of students who enter college with an intention to major in STEM areas either change their majors to a non-STEM field or drop out of school. For example, after analyzing data from the national survey of post-secondary students (e.g., NPSAS), Chen and Weko (2009) reported that only 28% of college students who entered in a STEM field continued and attained a bachelor's degree in a STEM field. Similarly, the work of the Higher Education Research Institute (HERI, 2010) has also reported 20% to 50% of student loss rates in college STEM disciplines. All of these studies imply that the current US society is experiencing a dearth of talent in the STEM field.

Although it seems that various issues are related to the loss of students in the STEM area, some studies indicated that the low quality of the college learning environment plays a significant role. For example, Seymour and Hewitt (1997) conducted an ethnographic study with college students across seven institutions and reported no remarkable differences in academic

performance or motivation between students who persisted in a STEM field and those who left the field. Rather, students repeatedly reported poor teaching and lack of academic support as a major problem in their STEM courses. Similarly, Smith, Douglas and Cox (2009) suggested that the student attrition rate is more likely to be influenced by students' perceptions of the quality and character of the classroom environment rather than students' abilities. Thus, college students may be leaving the college STEM classrooms due to the low quality of instruction.

Although numerous studies have identified various elements of high quality instruction, they have rarely looked at how the quality of instruction affects students' course satisfaction. Given that instruction should be context-specific (Schulman, 1987), it is likely that certain instructional strategies are more prominent in a college STEM classroom. Furthermore, students in a college STEM classroom probably have different instructional needs when compared to students in different grade-levels and/or in different content areas. Therefore, the current study aims to explore the elements of instruction that have a great influence on the academic experiences of college students in the STEM field. Because the focus of the study was to identify correlates of students' course satisfaction, we examined the quality of instruction particularly from college students' perspectives on their STEM courses. In the following, we summarize the characteristics of quality instruction of college STEM courses reported in the previous research.

Characteristics of Effective Undergraduate Teaching in STEM

With the goal of developing resources to help postsecondary STEM faculty and administrators evaluate teaching effectiveness, a NRC committee has

reviewed and synthesized the research literature on successful standards and practices in college teaching. Based on the review of the literature, the NRC (2003) articulated five characteristics of effective college teaching of STEM: (a) knowledge of subject matter; (b) skill, experience, and creativity with a range of appropriate pedagogies and technologies; (c) understanding of, and skill in using, appropriate assessment practices; (d) professional interactions with students within and beyond the classroom; and (e) involvement with and contributions to one's profession in enhancing teaching and learning. Details of each characteristic are described below.

Knowledge of Subject Matter

The first characteristic of high quality teaching of STEM is sufficient knowledge of the subject matter. College STEM involves more abstract, complex theories and concepts than STEM in K-12. In order to succeed in college STEM courses, students are also required to think more deeply and critically and develop skills of probing, questioning, and integrating information. Only with thorough understanding of the subject matter as well as the sub-disciplines, college instructors can help students develop not only general knowledge about the domain but also problem-solving and critical thinking skills.

Skill, Experience, and Creativity with a Range of Appropriate Pedagogies and Technologies

The NRC committee indicated rich skills, experiences, and creativity with appropriate pedagogies and technologies as another characteristic of effective teaching. Individual students have different learning needs (King & Kitchener, 1994). In order to serve students who are at different levels of understanding, instructors need to use a variety of learning strategies and contextually appropriate pedagogies. College students have demonstrated better learning when their instructors consider multiple instructional strategies (NRC, 2003). For example, combinations of inquiry-based, problem-solving, information-gathering, and didactic forms of instruction have promoted students' conceptual understanding and their abilities to apply knowledge in new situations (Stephans, Dyche, & Beiswenger, 1988). In addition to multiple instructional strategies, the appropriate use and application of information technologies is suggested as an important component of effective teaching of STEM (NRC, 2003). With the pervasive use of different technologies in the current era, the effective ways for technology to improve teaching and learning science has been increasingly discussed (e.g., Guzey & Roebrig, 2009; MacArthur & Jones, 2008; Yang & Tsai, 2010). While the role of information technology in undergraduate

classrooms, laboratories, and field environments is an area for continued investigation (e.g., American Association for Higher Education, 1996; Collis & Moonen, 2002; National Institute for Science Education, 1999), the NRC committee emphasized that college STEM instructors have to develop their capabilities to incorporate these technologies in their teaching so that the different needs of students can be better served.

Understanding of, and Skill in, Using Appropriate Assessment Practices

The third characteristic of high quality teaching is appropriate assessment practices. This includes instructors' ability to construct fair and accurate assessments. Assessments should be in accordance with the objectives of a course and longer-range curricular goals. Instructors should only analyze and assess what they have taught to students (Astin, Parrott, Korn, & Sax, 1997). Also, instructors should consistently evaluate students' progress and use these data to improve their teaching. For example, at the beginning of the semester, instructors may assess students' readiness for learning science. Instructors can use the Test of Scientific Literacy Skills (TOSLS; Gormally, Brickman, & Lutz, 2012) or the science motivation questionnaire (Glynn, Taasoobshirazi, & Brickman, 2009) to detect students' motivation for introductory science classes with quantitative results. Use of audience response system (ARS) or *clickers* can be considered as a way to understand students' learning progress during teaching (Caldwell, 2007).

Professional Interactions with Students Within and Beyond the Classroom

The role of instructors is not limited to dissemination of knowledge. Instructors are also responsible for advising and mentoring students. Students are encouraged when their instructors pay attention to their difficulties and willingly offer appropriate support. An important element of effective instruction involves building on students' preconceptions and prior beliefs in ways that help each student achieve a deeper understanding. If students' initial ideas and beliefs are ignored, students may fall far short of the goals of the instructor (Mestre, 1994; Minstrell, 1989; NRC, 2003). By extending instruction to building positive interactions with students, college instructors can demonstrate high quality teaching (NRC, 2003).

Involvement with and Contributions to One's Profession in Enhancing Teaching and Learning

Involvement with, and contribution to, the professional fields are also required to enhance

effective teaching in the STEM disciplines. Scholarly collaborations are increasing within and outside of the departments in science and engineering disciplines (Boyer, 1990; Glassick, Huber, Maeroff, & Boyer, 1997; Kennedy, 1997). As working with colleagues from various disciplines can broaden instructors' own perspectives, their teaching strategies are also likely to improve (Hutchings, 1996; NRC, 1999).

These five characteristics of effective teaching are suggested to provide a learning environment that can improve students' scientific thinking skills. However, scarce studies have explored needs of college students in STEM courses and examined teaching characteristics that are greatly critical for these students. Students' needs may vary depending on their personal learning attributions, learning environments, and majors. For instance, many STEM courses are delivered in large-enrollment classroom settings which force instructors to maintain lecture-driven classrooms and keeps them from providing students with appropriate support due to limited time. Some students may be comfortable with learning in such a large-enrollment classroom, while others prefer a small-size classroom. In particular, students who have less background in STEM may need more individual support and feedback from the instructor (Linn & Eylon, 2006). In terms of learning effectiveness, several studies have indicated that traditional lecture-driven classes, which are thought to be a way of promoting memorization of factual information, may be ineffective for students to learn complex concepts and ideas introduced in science courses (Honan, 2002; Loverude, Kautz, & Heron, 2002; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). Thus, without addressing students' distinct needs in STEM courses, lecture-based courses may rather hinder their learning (King, 1994; Loverude et al., 2002; Marchese, 2002; Mestre, 1994). To provide an appropriate learning environment to meet the needs of STEM education, the present study suggests instructors understand learning problems and difficulties that students encounter while learning STEM subjects.

Course Rating Websites as a Valid Channel of Student Perspectives

The five key characteristics of effective teaching described above have been identified in relation to enhanced student learning. However, improvement of student learning alone may not necessarily resolve the problem of student attrition from the STEM fields. Rather, student satisfaction may have a more direct connection with it (Seymour & Hewett, 1997). Nevertheless, only a few studies have examined college students' satisfaction with their STEM courses. In order to achieve a better understanding about student attrition in college STEM courses, it seems necessary to

examine students' perception about course instruction. By doing so, we can extract the critical elements of teaching that have a significant influence on students' attrition from STEM courses.

As a way to explore the effectiveness of teaching and learning from students' perspectives, previous research has relied on standard scales that assess students' experiences of the learning and teaching that they have received (Calvo, Markauskaite, & Trigwell, 2010). The National Survey of Student Engagement (NSSE) in North America (Kuh, 2001), the National Student Survey (NSS) in England (Surridge, 2008) and the Course Experience Questionnaire (CEQ) in Australia (Ramsden, 1991) are a few examples. Yet, these standard-scaled questionnaires focus on measuring the overall satisfaction level of students' learning experience rather than the sources of the satisfaction or impact from teaching (Lizzio, Wilson, & Simons, 2002). Also, the use of standardized questionnaires limits students' responses to the pre-defined constructs.

One study examined students' learning experiences in college engineering classes and quantified their satisfaction about teaching quality over 7 years using a standardized student feedback questionnaire (Calvo et al., 2010). According to this study, students' perceptions of their learning experiences correlated positively with their satisfaction with the quality of the course. For example, students were satisfied with the quality of their subjects in the following circumstances: (a) when the learning outcomes and expected standards were clear to them, (b) when instruction was helpful for them to learn, (c) when they learned valuable skills to be professionals when they graduate, (d) when the assessment allowed them to demonstrate what they have understood, (e) when they could see the relevance of their subject to their degree, (f) when staff were responsive to feedback, (g) when their prior learning prepared them well, (h) when they could understand their teacher, and (i) when the faculty infrastructure was viewed as supportive. However, previous studies used standardized questionnaires which were based on the predefined factors of effective teaching. Although the results were able to quantify the amount of satisfaction on the factors, the study did not address the nature of student satisfaction. Rather than quantifying students' perceptions on effective teaching from pre-defined factors, future research will need to address students' needs and perceptions on effective teaching.

Another study explored how undergraduate students defined excellence in engineering education to develop a better understanding of learners' views and perceptions about effective teaching (Pomales-Garcia & Liu, 2007). Forty-seven undergraduate engineering students responded to questions about excellence in engineering education and participated

in a focus group discussion. The study focused on examining students' perspectives on the roles of students and professor, goals of and challenges with teaching engineering, and effective methods of teaching engineering. The study results showed that students recognized the importance of their active involvement in learning and appreciated the use of instructional technology and authentic examples as a way to enhance engineering education. This study was meaningful in that it captured the nature of students' satisfaction with engineering teaching using the survey instrument as well as the open-ended focus group discussion. Still, the study results cannot be generalized since the study was conducted with only a small number of students. Also, since the survey and interview questions were concerned with engineering education in particular, the results cannot be generalized to all STEM subjects.

For this reason, we designed a qualitative research study to explore open-ended students' perspectives on course instruction in college STEM fields. In particular, we examined the data from course rating websites where students can freely leave personal thoughts about the course and instructor at any time in addition to traditional course evaluations that are often administered at the end of semester by a university. In the course rating websites, students can rate their course or course instructor in terms of helpfulness, easiness, and clarity on a 5-point Likert scale. In addition to Likert scale ratings, students can add rationales about their ratings in the commentary section. For example, students describe the reasons why they rated the instructor high or low and in what aspects instructor was helpful or not. They participate in this online community to share their learning experiences in class. In fact, many college students use the course rating websites to decide the courses they would like to take in the beginning of the semester.

While the growing number of college students use and rely on course rating websites, few studies have been conducted to examine the impact of the course rating websites (Silva et al., 2008). Some researchers are skeptical about considering students' opinions in course rating websites since their postings could be emotionally biased depending upon students' final grades. Yet studies reported that students tend to post more positive comments than negative ones, including compliments and concerns about instructors' competence as well as comments about their learning progress (Kindred & Mohammed, 2005; Silva et al., 2008; Strand, 2006). Also, given a significant correlation between traditional course evaluation and course rating websites (Brown, Baillie, & Fraser, 2009; Otto, Sanford, & Ross, 2008; Timmerman, 2008), students' perspectives reflected in the course rating websites are worth exploring.

Methods

As a way to explore students' perspectives on college STEM courses, we chose to gather document data from the commentary section of course rating websites. There are several reasons we focused on this particular type of data. First, the commentary section allows students to reflect their thoughts in open-ended conditions and to supply answers in their own words, and such qualitative data can provide a rich body of data that cover various aspects of college courses. Also, researchers can gather student feedback that have accumulated for many years in a shorter period of time rather than collecting other types of qualitative data such as interview or observation data. This allows researchers to collect data in a cost-effective way and to derive general patterns and common attributes across different STEM courses. In addition, since documents are non-reactive to researcher's subjectivity, researchers are able to collect data that are objective and unaffected by the research process (Bowen, 2009). For these reasons, this study used document analysis to obtain students' perception about college courses. Document analysis involves a deductive process that helps researchers explore the reality and uncover findings that the literature may have missed or have overlooked (Prior, 2003).

Data Collection

We collected student comments on college STEM courses and instructors from two course-rating websites: RateMyProfessor.com and Koofers.com. RateMyProfessor.com is the largest, most well-known professor-rating website in the US by far. In May 2003, 2.7 million ratings of 478,000 faculty members had occurred, and by August 2006 the numbers had risen to over 5.7 million ratings of about 770,000 professors in nearly 6,000 schools (Silva et al., 2008). Currently, RateMyProfessors.com contains over 14 million student comments of 1.7 million professors (RateMyProfessor.com, 2014). This website provides students' overall ratings and comments about a variety of courses offered at different colleges and universities in the United States. It allows individual students to rate a professor in terms of the four aspects: easiness, helpfulness, clarity, and rater interest.

Koofers.com is a social-learning website that provides free, open access to course-related materials. This website allows students not only to rate and evaluate their instructors, but also to share their class materials such as class notes and study guides. It also presents the grade point average that students have received in the class. Koofers adheres to honor codes and academic integrity policies at each university by regularly communicating with university personnel and

faculty and forbidding the distribution of prohibited materials such as exams, papers, and tests that have not been permanently returned. According to Koofers.com, in October 2012, 735,000 college students were registered to the website, and over 530,000 professor ratings were available (Koofers.com). Although there are several other websites where college students can rate their instructors (e.g., KnowYourProfessor.com, MyEdu.com, and RateMyTeachers.com), we chose these two based on their growing popularity among college students.

We focused on the courses offered in one institution located in the southeastern United States. This strategy ensured control of any influence on student satisfaction that may exist at the institutional level. We obtained student comments from the courses that met the following criteria: (a) courses offered in the STEM area; (b) courses that involved more than 50 students in a classroom (large lecture-format courses), (c) courses that are offered every year in order to obtain sufficient data for analysis, and (d) courses that were rated with four stars or above and courses that were rated with two stars or below for the purpose of comparing high-rated courses and low-rated courses. We identified the courses that met criteria two and three based on the registration information provided by the institution to which researchers had access. There were four courses with high ratings (i.e., four stars or above) and four courses with low ratings (i.e., two stars or below) that met the four criteria above. The high-rated courses included ones in physics, physiology, chemistry, and biology; the low-rated courses were ones in animal science, microbiology, entomology, and biology. Some of the courses were part of the core curriculum for the university, and others were offered as major/elective courses. A different instructor taught each of the eight courses. We collected student comments that were made for these courses from January 2005 to November 2011 (the first course ratings were made in 2003). After the data selection process, we obtained a total of 343 student comments.

Data Analysis

The data were analyzed through thematic analysis. Thematic analysis is a form of a pattern recognition technique by searching through the data for emerging themes (Fereday & Muir-Cochrane, 2006). Two researchers independently reviewed students' comments of the high-rated and low-rated courses line by line and identified recurring patterns in the data. The patterns identified by each researcher were compared to ensure validity of the codes. With the codes on which there was no consensus, the two researchers shared their perspectives and concerns and reached common codes. Through multiple reviews and an iterative

process, categories and codes were refined and grouped into themes.

Results

Four themes emerged from the data: (a) teaching styles, methods, or strategies; (b) teacher knowledge and preparation; (c) teacher attitude; and (d) practical workload and expectations. Themes and the examples are summarized in Table 1. These themes represent factors pertinent to student satisfaction with college STEM courses.

Teaching Styles, Methods, or Strategies

Students in the high-rated courses frequently reported that their instructors were able to explain materials in a manner they could easily understand. Some of them commented that use of good examples, analogies or stories was particularly helpful. They were also partial to the fact that the instructors applied the course materials to real life situations so that students were able to maintain their interest in the class. Moreover, the instructors of the high-rated courses tend to incorporate hands-on demonstrations or interactive activities rather than using lectures alone. For example, students in the poultry science course reported that the instructor brought in birds with which students could interact. In contrast, students in the low-rated courses often commented that lectures were not coherent or organized. They commented that many instructors read straight from their PowerPoints slides and did not elaborate on them, as these student comments illustrate: "All he does is read the PowerPoints and go off on tangents that DO NOT MATTER," and, "He just talks, so you have to be able to differentiate what is just jabber and what is important to know." They seemed annoyed by the instructors' off-topic lectures and inappropriate use of examples or analogies. In terms of teaching strategies, a large number of students also mentioned an instructor's ability to adjust the difficulty of the instruction based upon students' understanding. For example, when the instructor found that students were having hard time understanding a concept, the high-rated course instructors created extra examples or activities which were not stated in the syllabus. One student stated, "She explains something 10 times if the class needs her to." In contrast, the low-rated course instructors tended to adhere to a limited number of examples even when students had difficulties on understanding the concepts.

Teacher Knowledge and Preparation

Students in the high-rated courses often commented that their professors were knowledgeable

Table 1
Four Themes on College STEM Course Instruction from Students' Perspectives

Themes	Description	Example comments
Teaching styles, methods, or strategies	How teacher delivers contents in a manner students could easily understand	<p>High-rated courses:</p> <ul style="list-style-type: none"> • She makes the class interesting for non-interested people, relating it to everyday life and real situations so you can actually apply what you've learned. • Dr. X gives in class assignments that are helpful for understanding the concepts presented in lecture. • Amazing teacher. She really knows the subject and does a good job of clearly communicating it to the class. <p>Low-rated courses:</p> <ul style="list-style-type: none"> • Did not have good lectures and did not convey the material in a clear and explicit manner. • Worst class I've ever taken . . . his teaching style is to drop a bunch of slides with various lists that you have to memorize.
Teacher knowledge and preparation	Teachers' adequate knowledge and preparation to support students' knowledge gains and thinking skills	<p>High-rated courses:</p> <ul style="list-style-type: none"> • Great Professor who knows what's he's talking about. • She was always super prepared to teach. <p>Low-rated courses:</p> <ul style="list-style-type: none"> • She makes mistakes on simple concepts displayed on the PowerPoint slide and does not even correct herself. She teaches concepts incorrectly, occasionally, and does not emphasize the most important material.
Teacher attitude	Teachers' willingness to support students' learning and interact with students	<p>High-rated courses:</p> <ul style="list-style-type: none"> • AWESOME! Best teacher I've ever had. More than willing to help you out. • Easy to talk to and actually wants students to understand and do well. <p>Low-rated courses:</p> <ul style="list-style-type: none"> • It was as if he wanted to mock our class for not being chemist. He absolutely ignores students with questions. • He would get frustrated when people would ask questions and he often never answered them.
Practical workload and expectations	The alignment between the course objectives, lecture styles, and the assessment	<p>High-rated courses:</p> <ul style="list-style-type: none"> • Tests are fairly easy if you pay attention and go over the study guide that is given. • Tests are directly from the readings and notes, no trick questions. • A good amount of textbook reading, and attendance is necessary. <p>Low-rated courses:</p> <ul style="list-style-type: none"> • His tests have little to do with anything you read or heard. • His lectures were useless and his homework assignments were impossible to master and actually learn from.

and well-prepared to support students. For instance, students explicitly mentioned “knows the subject,” “knowledgeable about subject,” “displays an enormous amount of knowledge,” and “great professor who knows what he’s talking about.” In low-rated courses, conversely, students criticized the instructor with comments like “notes were straight from Wikipedia and the book,” and, “[My professor] does not seem to know more than the students about general anatomy and

physiology.” The usefulness of supplementary materials is addressed often in the high-rated courses as an indicator of the instructor’s preparation. For instance, one student reported that his/her instructor in an introductory biology course provided PowerPoint slides before class so that students could preview the lecture. Also, clicker questions the instructor asked to students in the class were offered to students after the class so that students could review what they had learned in the class.

Furthermore, students were satisfied when the instructor not only focused on knowledge transfer, but also on improving students' thinking skills by "providing hypothetical examples and case examples" so that students can apply the knowledge to their everyday lives. Comments about supplementary materials were also found in low-rated course comments; however, students doubted the usefulness of the materials. More specifically, although instructors in low-rated courses provided supplementary materials in a timely manner, students used their own notes to follow the lecture rather than using the materials, as the supplementary materials were disconnected from the instructors' lecture. In addition, students who were highly satisfied with the course mentioned the usefulness of the review session that the instructor provided. A number of students in high-rated courses mentioned their satisfaction with review sheets or practice tests before tests, while students in low-rated courses complained about not having review sessions or having useless review chances, such as practice tests without correct answers.

Teacher Attitude toward Teaching, Subject, and Students

Students seemed to like instructors who were willing to help students. Students in highly rated courses frequently commented about the instructors' willingness to help students' learning. For example, comments in the high-rated courses include, "She really wants everyone to do well," "She is always willing to help you with any question," "Never patronizing no matter how dumb your questions may be," and, "She always answers questions thoroughly in class and really makes sure everyone understands the material before moving on." Also, students tended to rate a course highly if the instructors were passionate about teaching or the subject: "Loves what he teaches. He is enthusiastic," and, "She loves what she does and makes you interested in it too." On the other hand, students in the low-rated courses reported that these instructors did not care about teaching or students: "If you ask questions, he looks personally offended"; "If you go to her for help she has an attitude and makes you feel like crap"; and "Don't try to disagree and or correct one of his points. He blatantly refuses to listen to students." The comments indicated that the instructors often neglected to respond to students' questions or treated them as unintelligent questions. Some students felt only inferior in front of those instructors. One comment on a low-rated course even said, "She seems like she wants all of her students to fail."

Practical Workload and Expectations

Some students in the low-rated courses complained that the level of materials was more advanced than the

course objectives. For example, one of the comments was, "He tried to fit all of his knowledge into a 1000-level class which just isn't feasible." Moreover, students expressed frustration when they were tested on materials that were not covered in class. On the other hand, students rated a course highly if the instructors' course expectations matched their own. For instance, one student commented, "He understands that most of the people in this class are not going to be entomologists. . . . He just wants you to be able to know more about bugs in general." Both students in high- and low-rated courses addressed the coherence of the assessment and teaching. Highly satisfied students frequently mentioned that their tests matched their expectations and were similar to what they had been taught by the instructor. Students of the high-rated courses mentioned, "The tests are . . . very straightforward from the lecture and the book pages she assigns" and "Tests are very easy and predictable if you pay attention to her way of thinking." Students were concerned not only about the aspect of test difficulty, but also about the validity of the evaluation—a discrepancy between the instructional style and what was tested. Students in the low-rated courses continuously commented about the discord between what and how they learned and the assessment. For example, while the instructor in an introductory biology class for non-majors taught often by posing various cases and examples rather than providing facts in the textbook, students reported that the test only asked the specific information in the textbook. Student comments that indicate the discrepancy between the class instruction and the evaluation are as follows: "PowerPoints, pre class assessments, and clicker questions are NOTHING like the test questions"; "The tests did not follow the notes . . . and she doesn't really explain HOW to relate the material to everyday life, but that is what you are tested over"; "His tests have little to do with anything you read or heard"; and "She makes it seem that the mini tests and finals are all based on her PowerPoints, but that as simply not the case, I would suggest reading the book before all tests."

In summary, college students seem to be satisfied with courses in which materials are presented with clear instruction. Also, they liked instructors who were open to questions and willing to help students. If instructors were enthusiastic about a subject, students were more likely to be interested in it as well. Finally, students became frustrated by the instructors' unreasonable expectations about class workloads.

Discussion

This study explored the elements of instruction that influenced student satisfaction in college STEM courses. We gathered student comments from two course-rating websites to understand these teaching

characteristics from students' perspectives. In particular, we compared student comments on high-rated courses with those on low-rated courses. In the following, we briefly review the four themes of teaching characteristics germane to college STEM course satisfaction and discuss how they are related to, and distinct from, previous research. We conclude with limitations and implications of the study.

The first theme was related to the quality of instructional techniques. Students in the low-rated courses frequently reported confusion in the lessons and perceived limited support from the instructor. On the other hand, students in the high-rated courses mentioned that the lecture was clear and well-elaborated with appropriate examples and applications. Also, the instructors of the high-rated courses were flexible and responsive to students' needs in their teaching. In the literature, using practical examples and responding to student feedback have been long recognized as effective teaching strategies to enhance student learning (Bransford, Brown, & Cocking, 2000; Tennyson & Cocchiarella, 1986).

The second element that affected student satisfaction was teacher knowledge and preparation. While students in the high-rated courses were content with the ample resources provided by their instructors, those in the low-rated courses expressed frustration at their instructors' lack of knowledge.

The third theme was teacher attitude. Instructors in the high-rated courses were perceived to be passionate about teaching and student learning; on the other hand, those in the low-rated courses were viewed as having only a minimal interest in teaching. This finding is consistent with the previous research that found teacher attitude to be one of the predictors of student learning. Students demonstrated greater performance when they perceived their teachers as enthusiastic and caring (Osterman, 2000; Patrick, Hisley, & Kempler, 2000).

The last component of instruction that influenced student course satisfaction was practical workload and expectations. Student frequently reported dissatisfaction when they perceived a gap between what they had learned and what they were assessed on. Student comments also implied that instructors of low-rated courses failed to establish the agreed course requirements that satisfy students' needs. Students in the low-rated courses frequently reported that the class was above the level they had expected. It is well known that alignment between learning objectives, learning activities and assessment is critical for promoting learning (Anderson & Krathwohl, 2001; Bransford et al., 2000). This last theme suggests the added importance of such alignment in that it also affects student course satisfaction.

As you may have noticed, all four themes found in the study are consistent with what we have generally

regarded as attributes of good quality teaching. In fact, each theme corresponds to the five characteristics of effective teaching that NRC (2003) summarized. For example, the first theme is compatible with the second characteristic of effective college STEM teaching: skill, experience and creativity with a range of appropriate pedagogies and technologies. The second theme can be linked to the first characteristic (knowledge of subject matter); the theme of teacher attitudes is pertinent to the teaching characteristics of professional interactions with students and involvement with one's profession. The fourth theme of practical workload and expectations is related to appropriate assessment practices. These findings suggest that college students' satisfaction with a STEM course is largely dependent on the effectiveness of the teaching. In other words, students are satisfied with their STEM courses in which they have received quality education. While most existing research has emphasized these characteristics of effective teaching to increase students' learning, this study found that what we regard as effective teaching is also a key to student course satisfaction, which relates to student retention.

Implications of the Study

Because of the need to increase the number and quality of STEM students, teachers, and practitioners, the National Science Foundation (NSF) has increased its promotion of STEM innovators (Kuenzi, 2008). The NSF, for example, has invested \$7 billion annually in America's colleges and universities to promote discoveries and provide strategies. American universities are expected to play a vital role in educating and training undergraduate and graduate level scientists and engineers. Still, despite significant financial and human resources, the needs remain (NRC, 2012). This study suggests that the effectiveness of teaching is the critical factor that has a great impact on student satisfaction and retention in STEM courses. The rate of students dropping out from STEM majors might increase, not because the students are incapable or dislike STEM, but because they do not have a chance to receive effective instruction.

One thing that instructors in STEM fields can do to develop and improve their instructional strategies is to constantly communicate with students and seek out feedback from them throughout the semester. Generally, most colleges ask students to respond to formal course evaluations at the end of the semester. Because this is the only time when instructors receive feedback from students, instructors can hardly address students' needs or preferences during the semester. Beyond the final course evaluations, offering a mid-course evaluation to students will be a decent way to communicate with students during the semester so that

instructors can have chance to recognize students' needs before the semester ends. The mid-course evaluation may not necessarily need to be provided university-wide; rather, it could be offered by individual instructors. Instructors often believe that students tend to evaluate the course based on easiness of the course or students' biased perception about the course, especially when students use course-rating websites. The students' responses in the course-rating websites have sometimes been depreciated since some comments focused on professor's characteristics and personality with negative and emotional remarks and nonspecific statements. However, as Strand (2006) addressed, students' comments were not nearly as vitriolic, bombastic, or extreme as some would have us believe.

Instead of confirming negative expectation that students' responses in the course rating websites are emotionally biased and highly depend on the final grade they earned, this study yielded results that support the value of course-rating websites. This study found that students express their opinions about the quality of the instruction in the course-rating websites, and those opinions are aligned with characteristics of effective teaching reported in the literature. In this manner, this study sheds new light on the validity of course-rating websites that instructors may refer to as a way to improve their instruction. Without instructors' acknowledgement of students' perceptions, needs, and preferences and instructors' efforts to reflect students' perspectives in their everyday classroom instruction, the findings would remain as just another theoretical approach. Thus, we suggest student evaluation in the course-rating websites is worthwhile for instructors to take into consideration.

Limitations of the Study and Directions for Future Research

Our findings in the present study are subject to several limitations. To reduce unexpected variables that would be generated by including different types of universities, the current study focused on incidents at one university. Given the small sample size, caution must be applied, as the findings might not be transferable to all college level educational institutions. Further research should replicate the study with different, but similar levels of, universities in order to increase the generalizability of the findings. In addition, the current study was unable to separate courses that are taken by majors or non-majors of STEM subjects. Compared to STEM majors, non-STEM major students sometimes do not have adequate backgrounds from their high school experiences or their learning styles do not readily adapt to the environment of larger, less personal

classrooms and teaching laboratories (Linn & Eylon, 2006). Depending on students' majors, different types and levels of instruction as well as teaching strategies should be offered to the class. Future research needs to explore how STEM and non-STEM students' needs are different in order to provide appropriate learning environments that will reflect those student groups' needs. Also, students' needs may vary depending on each of the STEM fields. While the purpose of the current study was to explore the general patterns across different STEM fields, future studies are necessary to investigate domain-specific student perspectives and needs. Another limitation relates to the nature of course rating websites. Students can evaluate courses at any time, even after they graduate from college. Thus, it is possible that a student who posted in mid-semester may have a different perspective than a student who posted after the semester ended. Finally, analysis of documents enables the current study to understand students' general perceptions about teaching from one data source in the STEM area. In order to address domain-specific learning needs, future research is recommended to use multiple data sources to define prominent learning problems students may encounter. Not only analyzing students' comments, but also triangulating documents with focus group interviews or anonymous surveys, will help to address students' needs and will strengthen the understanding of students' perceptions.

References

- American Association for Higher Education. (1996). *What research says about improving undergraduate education*. Washington, DC: Author.
- Anderson, L., & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Addison Wesley Longman.
- Astin, A. W., Parrott, S. A., Korn, W. S., & Sax, L. J. (1997). *The American freshman: Thirty year trends*. Los Angeles, CA: Higher Education Research Institute, University of California, Los Angeles.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40. doi:10.3316/QRJ0902027
- Bransford, J., Brown, A., & Cocking, R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brown, M. J., Baillie, M., & Fraser, S. (2009). Rating RateMyProfessors.com: A comparison of online and official student evaluations of teaching. *College Teaching*, 57(2), 89-92. doi:10.3200/CTCH.57.2.89-92

- Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Lawrenceville, NJ: Princeton University Press.
- Caldwell, J. E. (2007). Clickers in the large classroom: Current research and best-practice tips. *CBE Life Sciences Education*, 6(1), 9-20. doi:10.1187/cbe.06-12-0205
- Calvo, R. A., Markauskaite, L., & Trigwell, K. (2010). Factors affecting students' experiences and satisfaction about teaching quality in engineering. *Australasian Journal of Engineering Education*, 16(2), 139-148.
- Chen, X., & Weko, T. (2009). *Students who study science, technology, engineering, and mathematics (STEM) in postsecondary education*. Washington, DC: U.S. Department of Education.
- Collis, B., & Moonen, J. (2002). Flexible learning in a digital world. *Open learning*, 17(3), 217-230. doi:10.1080/0268051022000048228
- Dey, E. L. (1991). *The American freshman: Twenty-five year trends, 1966-1990*. Los Angeles, CA: Higher Education Research Institute, University of California, Los Angeles.
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80-92.
- Glassick, C. E., Huber, M. T., Maeroff, G. I., & Boyer, E. L. (1997). *Scholarship assessed: Evaluation of the professoriate*. San Francisco, CA: Jossey-Bass.
- Glynn, S. M., Taasobshirazi, G., & Brickman, P. (2009). Science motivation questionnaire: Construct validation with nonscience majors. *Journal of Research in Science Teaching*, 46(2), 127-146. doi:10.1002/tea.20267
- Gormally, C., Brickman, P., & Lutz, M. (2012). Developing a test of scientific literacy skills (TOSLS): Measuring undergraduates' evaluation of scientific information and arguments. *CBE-Life Sciences Education*, 11(4), 364-377. doi:10.1187/cbe.12-03-0026
- Guzey, S. S., & Roehrig, G. H. (2009). Teaching science with technology: Case studies of science teachers' development of technology, pedagogy, and content knowledge. *Contemporary Issues in Technology and Teacher Education*, 9(1), 25-45.
- Higher Education Research Institute. (2010). *Degrees of success: Bachelor's degree completion rates among initial STEM majors*. Los Angeles, CA: Higher Education Research Institute, University of California, Los Angeles. Retrieved from <http://heri.ucla.edu/nih/downloads/2010%20-%20Hurtado,%20Eagan,%20Chang%20-%20Degrees%20of%20Success.pdf>
- Honan, W. H. (2002, August 14). The college lecture, long derided, may be fading. *The New York Times*. Retrieved from <http://www.nytimes.com/2002/08/14/education/14LES.html>
- Hutchings, P. (1996). Building a new culture of teaching and learning. *About Campus*, 1(5), 4-8.
- Kennedy, S. H. (1997). Is there a genetic basis to endometriosis? *Seminars in Reproductive Medicine*, 15(3), 309-317. doi:10.1055/s-2008-1068761
- Kindred, J., & Mohammed, S. N. (2005). "He will crush you like an academic ninja!": Exploring teacher ratings on RateMyProfessors.com. *Journal of Computer-Mediated Communication*, 10(3). doi:10.1111/j.1083-6101.2005.tb00257.x
- King, A. (1994). Inquiry as a tool in critical thinking. In D. F. Halpern (Ed.), *Changing college classrooms: New teaching and learning strategies for an increasingly complex world* (pp. 13-38). San Francisco, CA: Jossey-Bass.
- King, P. M., & Kitchener, K. S. (2004). Judgment model: Twenty years of research on epistemic cognition. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 37-61). Mahwah, NJ: Lawrence Erlbaum.
- Kuenzi, J. (2008). *Science, technology, engineering, and mathematics (STEM) education: Background, federal policy, and legislative action* (Congressional Research Service Report RL33434). Retrieved from the Federation of American Scientists website: <http://www.fas.org/sgp/crs/misc/RL33434.pdf>
- Kuh, G. D. (2001). *The national survey of student engagement: Conceptual framework and overview of psychometric properties*. Bloomington, IN: Indiana University Center for Postsecondary Research.
- Linn, M. C., & Eylon, B.S. (2006). Science education: Integrating views of learning and instruction. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 511-543). Mahwah, NJ: Lawrence Erlbaum.
- Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education*, 27(1), 27-52. doi:10.1080/03075070120099359
- Loverude, M. E., Kautz, C. H., & Heron, P. R. (2002). Student understanding of the first law of thermodynamics: Relating work to the adiabatic compression of an ideal gas. *American Journal of Physics*, 70(2), 137-148. doi:10.1119/1.1417532
- MacArthur, J. R., & Jones, L. L. (2008). A review of literature reports of clickers applicable to college chemistry classrooms. *Chemistry Education*

- Research and Practice*, 9(3), 187-195. doi:10.1039/b812407h
- Marchese, T. J. (2002). The new conversations about learning: Insights from neuroscience and anthropology, cognitive science and work-place studies. In *Assessing Impact: Evidence and Action* (p. 79-95). Washington, DC: American Association for Higher Education.
- Mestre, J. P. (1994). Cognitive aspects of learning and teaching science. In S. J. Fitzsimmons & L. C. Kerpelman (Eds.), *Teacher enhancement for elementary and secondary science and mathematics: Status, issues and problems* (pp. 3-53). Arlington, VA: National Science Foundation.
- Minstrell, J. A. (1989). Teaching science for understanding. In L. Resnick & L. Klopfer (Eds.), *Toward the thinking curriculum: Current cognitive research*. (pp. 129-149). Alexandria, VA: Association for Supervision and Curriculum Development.
- National Institute for Science Education. (1999). *Learning through technology*. Madison, WI: University of Wisconsin-Madison. Retrieved from <http://www.wcer.wisc.edu/nise/cll/ilt/>
- National Research Council (NRC). (1999). *Transforming undergraduate education in science, mathematics, engineering, and technology*. Washington, DC: National Academy Press.
- National Research Council (NRC). (2003). *Evaluating and improving undergraduate teaching in science, technology, engineering, and mathematics (STEM)*. Washington, DC: National Academic Press.
- National Research Council (NRC). (2012). *Research universities and the future of America: Ten breakthrough actions vital to our nation's prosperity and security*. Washington, DC: National Academies Press.
- National Science Board. (2007). *A national action plan for addressing the critical needs of the US science, technology, engineering, and mathematics (STEM) education system*. Arlington, VA: National Science Foundation.
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70(3), 323-367. doi:10.3102/00346543070003323
- Otto, J., Sanford D. A., Jr., & Ross, D. N. (2008). Does RateMyProfessor.com really rate my professor? *Assessment & Evaluation in Higher Education*, 33(4), 355-368. doi:10.1080/02602930701293405
- Patrick, B. C., Hisley, J., & Kempler, T. (2000). "What's everybody so excited about?": The effects of teacher enthusiasm on student intrinsic motivation and vitality. *Journal of Experimental Education*, 68(3), 217-236. doi:10.1080/00220970009600093
- Pomales-García, C., & Liu, Y. (2007). Excellence in engineering education: Views of undergraduate engineering students. *Journal of Engineering Education*, 96(3), 253-262. doi:10.1002/j.2168-9830.2007.tb00934.x
- Prior, L. (2003). *Using documents in social research*. Thousand Oaks, CA: Sage.
- Ramsden, P. (1991). A performance indicator of teaching quality in higher education: The course experience questionnaire. *Studies in Higher Education*, 16(2), 129-150. doi:10.1080/03075079112331382944
- RateMyProfessor.com. (2014). *About RateMyProfessors.com*. Retrieved from <http://www.ratemyprofessors.com/About.jsp>
- Schulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-22.
- Seymour, E. (2002). Tracking the processes of change in U.S. undergraduate education in science, mathematics, engineering, and technology (STEM). *Science Education*, 86, 79-105.
- Seymour, E., & Hewitt, N. M. (1997). *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO: Westview Press.
- Silva, K. M., Silva, F. J., Quinn, M. A., Draper, J. N., Cover, K. R., & Munoff, A. A. (2008). Rate my professor: Online evaluations of psychology instructors. *Teaching of Psychology*, 35(2), 71-80. doi:10.1080/00986280801978434
- Smith, K. A., Douglas, T. C., & Cox, M. F. (2009). Supportive teaching and learning strategies in STEM education. In R. Baldwin (Ed.), *New directions for teaching and learning: Improving the climate for undergraduate teaching in STEM fields* (Vol. 117, pp. 19-32). San Francisco, CA: Jossey-Bass.
- Stephans, J., Dyche, S., & Beiswenger, R. (1988). The effect of two instructional models in bringing about a conceptual change in the understanding of science concepts by prospective elementary teachers. *Science Education*, 72(2), 185-195. doi:10.1002/sce.3730720207
- Strand, E. (2006, July 28). Let's sue. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/jobs/news/2006/07/2006072801c/careers.html>
- Surridge, P. (2008). *The national student survey 2005-2007: Findings and trends*. Retrieved from http://www.hefce.ac.uk/media/hefce/content/pubs/indirreports/2008/rd1208/rd12_08.pdf
- Tennyson, R., & Cocchiarella, M. (1986). An empirically based instructional design theory for teaching concepts. *Review of Educational Research*, 56(1), 40-71. doi:10.3102/00346543056001040
- Timmerman, T. (2008). On the validity of RateMyProfessor.com. *Journal of Education for Business*, 84(1), 55-61. doi:10.3200/JOEB.84.1.55-61
- Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college

students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, 37(1), 1-22.

Yang, Y. F., & Tsai, C. C. (2010). Conceptions of and approaches to learning through online peer assessment. *Learning and Instruction*, 20(1), 72-83. doi:10.1016/j.learninstruc.2009.01.003

YUNJEONG (EUNICE) CHANG is a doctoral candidate in the Learning, Design, and Technology program at the University of Georgia. Her research

centers on designing student-centered learning environments for college-level learners of varying ability levels.

SEUNGWON PARK is a Postdoctoral Research Associate at Texas A&M University-Corpus Christi. She earned a master's degree in educational psychology at the Pennsylvania State University. Her PhD is in Learning, Design, and Technology from the University of Georgia. Her current research focuses on improving learning through enhancing student motivation and engagement.

The Impact of Peer Mentoring on Mentee Academic Performance: Is Any Mentoring Style Better than No Mentoring at All?

Birgit Leidenfrost and Barbara Strassnig
University of Vienna

Marlene Schütz
Philipps-University Marburg

Claus-Christian Carbon
University of Bamberg

Alfred Schabmann
University of Cologne

Universities frequently offer support programs to assist first-year students with the transition from school to the university. The purpose of this study was to examine the effects of different mentoring styles on mentee academic performance after 1 year and 2 years of study. Participants consisted of 417 psychology students who started their course of study in the 2007/2008 winter term at the University of Vienna. Three hundred twenty-eight students participated voluntarily in the peer mentoring program, Cascaded Blended Mentoring, in which they were supported by 48 peer mentors (advanced students) in small groups. Eighty-nine students did not participate in the mentoring program. The mentoring groups were classified according to one of three mentoring styles described by Leidenfrost, Strassnig, Schabmann, Carbon, and Spiel (2011): (a) motivating master mentoring, (b) informative standard mentoring, and (c) negative minimalist mentoring. Our data suggest that participants in the mentoring program performed better in their studies than students who did not participate in terms of average grade and number of courses passed. There was, however, no specific impact of the different mentoring styles on mentee academic performance.

The transition from school to university is a challenging life situation for young adults, as it involves many changes. First-year students have to organize their own learning, manage their new study and social schedules, build new social networks and friendships, and adjust to the requirements of university styles of learning and teaching (Pascarella & Terenzini, 2005). They have to get to know the so-called hidden curriculum of studying at a university (Bergenhengouw, 1987) beyond the formal curriculum of their course of study. Some students fail to make this transition to a university because of incorrect expectations about university life and its requirements and finally drop out of their course of study (Lowe & Cook, 2003; Pancer, Hunsberger, Pratt, & Alisat, 2000).

Nowadays, universities frequently offer support programs to assist first-year students in adapting from school to university culture. These programmatic interventions have diverse content and are structured quite differently (e.g., first-year seminars, courses in academic skills, advising and mentoring programs, or general support services). In general, a positive effect of such support programs is that study success is increased and drop-out rates among participating students are decreased (Robbins, Oh, Le, & Button, 2009). First-year seminars and mentoring programs are shown to be especially effective in supporting first-year students (Crisp & Cruz, 2009; Jacobi, 1991; Pascarella & Terenzini, 2005). Similarly, mentoring programs have shown positive effects including academic performance, reduced drop-out rates and better social integration (Allen, McManus, & Russell, 1999; Campbell & Campbell, 1997; Leidenfrost et al., 2011). So far, research has suggested that being a mentee improves academic performance, but little is

known if differences in realizing mentoring affect mentee academic performance in different ways.

The aim of our present study was to look at the improvement of academic performance through a peer mentoring program and to examine how individual differences in realizing mentoring affected mentee academic performance after 1 year and 2 years of study.

Social Integration and Academic Performance

Social integration is mentioned as a condition for the successful transition to a university (Pascarella & Terenzini, 2005; Tinto, 1975). Building new social networks and friendships and having contact with academic staff members are parts of social integration (Tinto, 1975). Academic success is frequently operationalized in terms of grade point average (GPA) or persistence; length of study is also used as an indicator of academic success (Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004). Specific student characteristics like achievement motivation or self-efficacy, social integration of the student, competences in study skills, and also specific socio-demographic characteristics (e.g., age, nationality) are predictors of academic success according to models of academic performance and social integration (e.g., Cantwell, Archer, & Bourke, 2001; Le, Casillas, Robbins, & Langley, 2005; Robbins et al., 2004; Tinto, 1975). Fletcher and Tienda (2009) showed that taking part in a course of study together with school friends resulted in better academic performance than studying alone. Moosbrugger and Reiß (2005) demonstrated that the extent of contact with academic staff members beyond lectures predicted GPA and length of study. One way to increase social integration is to take part in

programmatic interventions implemented by the universities (e.g., advising and mentoring programs).

Forms of Mentoring and Mentoring Programs

Mentoring—as a special form of social support—is mainly found in three different areas: (a) workplace mentoring, (b) mentoring in higher education, and (c) youth mentoring (Allen & Eby, 2007b). Although there is no consistent definition of mentoring (Crisp & Cruz, 2009; Jacobi, 1991), a traditional mentoring relationship can be characterized as a dyadic, hierarchic, and face-to-face relationship between a more experienced person and an inexperienced person in a specific field (e.g., a senior and a junior employee, faculty member and student, advanced student and first-year student). Especially in the context of higher education, peers who are more similar in age and hierarchy can act as mentors (Crisp & Cruz, 2009; Hixenbaugh, Dewart, Drees, & Williams, 2004; Jacobi, 1991). Nowadays, mentoring can also take place online, via email, chat, or online learning environments (Sinclair, 2003; Single & Muller, 2001).

In higher education, mentoring programs mostly show positive effects for mentees (e.g., better academic performance), as well as for mentors (e.g., more satisfaction) and the institution itself (e.g., reduced drop-out rates; Crisp & Cruz, 2009). Outcomes differ, depending on the aims of the mentoring programs. Folger, Carter, and Chase (2004) evaluated a program that supported first-year students and found out that participants achieved a higher GPA than non-participants. Likewise, Campbell and Campbell (1997) reported a higher GPA among mentees than among non-mentees, as well as more credits completed and reduced drop-out rates among mentees. On the other hand, Hixenbaugh et al. (2004) observed the positive effects of a peer mentoring program on social integration and satisfaction with the university among participating first-year students. In terms of online mentoring, Sinclair (2003) concluded that technology could enhance the mentoring experience, but it could not replace direct personal interaction.

Outcomes of mentoring programs do not only depend on the aims of a mentoring program, but also on the form of the relationship between mentor and mentee. Mentoring relationships can be differentiated as informal or formal (Chao, Walz, & Gardner, 1992; Zachary, 2000). Informal mentoring relationships are spontaneous, grow out of informal interactions between mentor and mentee, and are not structured. Mentor competence and mentee commitment are important characteristics for the quality of a mentoring relationship (Mullen, 2007). Formal mentoring relationships are specified by the goals and the structure of a mentoring program, and the mentee is assigned to the mentor (Zachary, 2000).

Mentoring relationships are roughly characterized by providing two dimensions of mentoring functions for mentees: (a) career-related mentoring functions (e.g., coaching) and (b) psychosocial mentoring functions (e.g., role modeling; Kram, 1985; Noe, 1988). It is easier for formal mentors and peer mentors to fulfill psychosocial mentoring functions and increase social support than to fulfill career-related mentoring functions (Chao et al., 1992; Ensher, Thomas, & Murphy, 2001). Besides, a mentoring relationship passes through four different phases: (1) initiation, (2) cultivation, (3) separation and redefinition from the mentee's perspective (Kram, 1985), and (4) preparing, negotiating, enabling, and coming to closure from the mentor's perspective (Zachary, 2000). Mentoring functions differentiate depending on the phase of the mentoring relationship, e.g., career-related functions are high in the initiation phase, and psychosocial mentoring functions are high in the initiation and redefinition phases (Bouquillon, Sosik, & Lee, 2005).

Mentors and Types of Mentoring Styles

Another approach to differentiate between different forms of mentoring is to look at different types of mentoring styles (i.e., individual differences in realizing mentoring relationships; Langhout, Rhodes, & Osborne, 2004; Leidenfrost et al., 2011). Langhout et al. (2004) examined different degrees of support, structure, and activity in mentoring relationships and identified four different mentoring styles in a traditional youth mentoring setting. *Moderate* mentors were conditionally supportive and showed moderate levels of activities and structure. *Unconditionally supportive* mentors were characterized by the highest levels of support. *Active* mentors offered the highest number of activities, but very little structure. *Low-key* mentors provided the lowest level of activity, but still high support. Looking at the outcomes of the different mentoring styles, Langhout et al. (2004) found that mentees generally benefitted most from moderate mentoring relationships with a conditional amount of support and a moderate level of activities.

Leidenfrost et al. (2011) examined the quantity and quality of online mentoring activities and questioned the mentees about their mentor, whom they also met face-to-face several times. They identified three different peer mentoring styles in a higher education setting. *Motivating master* mentoring was characterized by high commitment in online mentoring activities and many motivating messages to the mentees. *Informatory standard* mentors showed average performance in online mentoring activities, but their messages contained a large amount of information. *Negative minimalist* mentoring was characterized by a high percentage of negative online mentoring activities, such

as giving incorrect answers to questions or ignoring messages. Concerning the academic performance of mentees, Leidenfrost et al. (2011) found that motivating master mentoring showed a positive influence on the success in a peer mentoring program (which included elements of a course in academic skills) among those mentees who were characterized as poor academic performers at the beginning of the program.

The Purpose of This Study

The main aim of the present study was to examine the effects of a peer mentoring program on mentee academic performance. Our study had two objectives. First, we wanted to examine the effect of being mentored during the first term of study on academic performance (average grade, number of courses passed) after 1 year and 2 years of study. Second, we wanted to examine if there were different effects of three different mentoring styles (motivating master mentoring, informatory standard mentoring, negative minimalist mentoring; Leidenfrost et al., 2011) on mentee academic performance after 1 year and 2 years of study.

We expected the participation in the peer mentoring program to affect both the average grade and the number of courses passed in a positive way. Mentees should achieve better average grades and pass a higher number of courses after 1 year and 2 years of study than non-mentees. Furthermore, we expected the three mentoring styles to affect mentee academic performance in different ways according to the results of Leidenfrost et al. (2011). We assumed that academic performance among mentees who experienced a motivating master mentoring style would be better than academic performance among mentees who experienced an informatory standard or negative minimalist mentoring style.

Method

Study Setting

In winter term 2007/2008, psychology students from the University of Vienna, Austria had the chance to participate voluntarily in the newly implemented peer mentoring program, Cascaded Blended Mentoring, which took place during their first term of study. The mentoring program lasted for 3 months. There were online mentoring activities which were carried out in message boards in an online learning environment and five face-to-face meetings. The mentees were divided into 48 groups of about eight students each and randomly assigned to one peer mentor. The peer mentors were the mentees' first point-of-contact concerning the psychology program, and they discussed and practiced basic learning skills (e.g., information

literacy, time management) online and face-to-face with the mentees.

Peer mentors chose to participate in a two-semester seminar which was part of the psychology program for advanced students (topic: educational psychology). In the summer term of 2007, advanced students were trained in mentoring skills and basic learning skills to support a group of first-year students as peer mentors. In winter term 2007/2008, the peer mentors received a manual with guidelines for the structure and content of the online mentoring activities and face-to-face meetings and were supervised during the seminar for advanced students.

Participants

Participants consisted of 417 psychology students who started their course of study in winter term 2007/2008 at the University of Vienna, Austria and who still were studying psychology after 2 years of study. In winter term 2007/2008, 494 students registered as psychology major students. Three hundred seventy-six of the first-year students from winter term 2007/2008 (76%) participated voluntarily in the peer mentoring program. After 2 years of study, 328 mentees and 89 non-mentees were still studying psychology. For our analysis, non-mentees from winter term 2007/2008 who chose not to participate in the peer mentoring program served as a control group.

Of our sample, 323 students (290 mentees, 33 non-mentees) declared socio-demographic information in an online survey at the end of winter term 2007/2008. Among mentees, 79% were female and 21% male; the median age was 19.9; the age distribution ranged from 18 to 45; and 64% came from Austria, 31% from Germany, and 5% from other countries. Among non-mentees, 70% were female and 30% male; the median age was 20.9; the age distribution ranged from 18 to 51; and 76% came from Austria, 21% from Germany and 3% from other countries.

Measures

We classified peer mentors as belonging to one of the three mentoring styles described by Leidenfrost et al. (2011). We measured academic performance among students in terms of average grade and the number of courses passed. In this section, we also give background information on the design of the Austrian psychology course of study.

Mentoring style of the peer mentor. Leidenfrost et al. (2011) identified the mentoring styles through cluster analysis on the basis of eight specified indicators. Two indicators resulted from a mentee questionnaire (Mentor Functions Scale; see Noe, 1988 for assessment of peer mentor quality) and allowed a

general evaluation of all mentoring activities (face-to-face meetings and online mentoring activities). The other six indicators resulted from online behavior data of the peer mentor (total number of online sessions, number of posted messages, and median length of messages posted on a general message board), and from the quality of online mentoring activities of the peer mentor (percentage of positive motivational aspects, percentage of positive informational aspects, and percentage of negative online mentoring activities). These six indicators only included online mentoring activities. As described by Leidenfrost et al. (2011), a content analysis was applied to 532 peer mentor messages concerning the direction of online mentoring activity (positive or negative) and content of online mentoring activity (informatory or motivational). For example, a welcome message is a positive motivational mentoring activity; giving an incorrect answer is a negative informatory mentoring activity. Two independent evaluators conducted the coding using the representation of a consistent idea as a unit of analysis. They achieved an 80% agreement rate and discussed all disagreements until a consensus was reached.

In the present study, we classified 48 peer mentors as belonging to one of the three mentoring styles described by Leidenfrost et al. (2011; see Table 1 for a detailed description of mentoring styles). There were 14 motivating master mentoring groups with 102 mentees, 30 informatory standard mentoring groups with 201 mentees, and four negative minimalist mentoring groups with 25 mentees.

Academic performance among students. When the students started studying psychology in winter term 2007/2008, the psychology major at the University of Vienna was a 5-year course of study terminating with an Austrian diploma degree

(comparable to a master's degree, in psychology typically a MSc or MA, or historically comparable to degrees in German-speaking countries such as "dipl. psych." in Germany or "lic. phil." in Switzerland). The Diploma course of study was subdivided into two periods. The first period lasted for 2 years; the second period lasted for 3 years. In each period, students could organize their own schedule and thus study at their own pace. There was no fixed sequence or number of courses a psychology student was required to take per term. In order to finish the first period within 2 years, it was recommended to pass roughly seven to eight courses per term.

Average grade. The grading system utilized in Austrian schools and universities consists of five numerical levels from 1 to 5, with 1 = *excellent*, 2 = *good*, 3 = *satisfactory*, 4 = *sufficient*, 5 = *insufficient*. Students pass courses with grades from 1 to 4 and fail courses with a grade of 5. Therefore, a lower grade means higher academic performance. In Austria, students may repeat a failed course up to three times.

The average grade was $M = 2.72$ ($SD = 0.67$) after 1 year of study and $M = 2.70$ ($SD = 0.67$) after 2 years of study. All passing and failing grades from mentees and non-mentees who still were studying psychology after 2 years of study were considered for this calculation.

Number of courses passed. The number of courses passed was used as an indicator for the study progress after 1 year and 2 years of study. The more courses students passed within 1 year or 2 years of study, the better their study progress.

The average number of courses passed was $M = 10.38$ ($SD = 4.27$) after 1 year of study and $M = 22.18$ ($SD = 8.51$) after 2 years of study. The number of courses failed was not considered for this calculated.

Table 1
Description of Mentoring Styles According to Leidenfrost et al. (2011)

Style	Assessment of peer mentor	Online behavior data	Quality of online mentoring activities
MM	Evaluated best	High level of online mentoring activities (e.g., twice as many online sessions)	Messages nearly as motivating as informative
IS	Evaluated average	Average length of messages comparable to motivating master mentoring	Messages twice as informative as motivating
NM	Evaluated worst	Shortest length of messages	High percentage of negative mentoring activities; informational aspects lacking

Note. MM = motivating master mentoring, IS = informatory standard mentoring, NM = negative minimalist mentoring.

Procedure

The grades analyzed in this study were gathered from an examination database maintained by the Faculty of Psychology at the University of Vienna. This database contained information about each course taken (e.g., type of course, name of course, date of examination, grade achieved). Data were retrieved at the beginning of winter term 2009/2010 and included all examination data from the beginning of winter term 2007/2008 until the end of summer term 2009 for all psychology students who started their course of study in winter term 2007/2008. For each student, two different indicators of academic performance—average grade and number of courses passed—were calculated, each after 1 year and after 2 years of study.

Data Analysis

To examine the effects of the different mentoring styles on academic performance (average grade and number of courses passed), two sample *t* tests and analyses of variance (ANOVA) were computed in SPSS 15.0. In a first step, we compared the following two groups of students: all mentees and non-mentees. In a second step, we compared the three mentoring styles: (a) mentees in motivating master mentoring groups, (b) mentees in informatory standard mentoring

groups, and (c) mentees in negative minimalist mentoring groups. Where variances were unequal, *t* values from the Welch-Satterthwaite test and *F* values from the Welch test were used.

Results

Impact of the Peer Mentoring Program

Comparing mentees and non-mentees, there were statistically significant differences within all indicators of academic performance (see Table 2 for means, standard deviations, and detailed results). After 1 year of study, mentees had better average grades and passed more courses than non-mentees. After 2 years of study, mentees still had better average grades and passed more courses than non-mentees.

Impact of Different Mentoring Styles

Comparing the three groups of mentoring styles, there were no statistically significant differences within any indicator of academic performance. The ranking of the groups was the same for both indicators: mentees in informatory standard groups were followed by mentees in motivating master groups and by mentees in negative minimalist mentoring groups (see Table 3 for means, standard deviations, and detailed results).

Table 2
Comparison of Academic Performance Among Mentees and Non-Mentees

Variable	Mentees		Non-mentees		<i>t</i> (415)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Average grade						
After 1 year	2.66	0.61	2.94	0.83	-2.96	.004
After 2 years	2.65	0.63	2.88	0.80	-2.50	.014
Number of courses passed						
After 1 year	10.90	3.88	8.47	5.05	4.20	< .001
After 2 years	23.43	7.59	17.57	10.02	5.13	< .001

Note. *t* values from the Welch-Satterthwaite test were used as variances were unequal.

Table 3
Comparison of Academic Performance Among Different Mentoring Styles

Variable	MM		IS		NM		<i>F</i> (2, 325)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Average grade								
After 1 year	2.68	0.53	2.64	0.65	2.79	0.66	0.71	.493
After 2 years	2.68	0.54	2.63	0.66	2.73	0.68	0.37	.694
Number of courses passed								
After 1 year	10.38	3.91	11.24	3.83	10.20	4.00	2.12	.122
After 2 years	23.00	7.44	23.74	7.55	22.76	8.70	0.42	.656

Note. MM = motivating master mentoring, IS = informatory standard mentoring, NM = negative minimalist mentoring.

Discussion

The goal of the present study was to examine the effect of a peer mentoring program and, in detail, the impact of different mentoring styles on two indicators of mentee academic performance (average grade and number of courses passed) after 1 year and 2 years of study. Participants consisted of two first-year student groups of psychology students at the University of Vienna: students from winter term 2007/2008 who did voluntarily participate in a peer mentoring program during their first term and students from winter term 2007/2008 who did not participate. Data for the indicators of academic performance were gathered from an examination database maintained by the Faculty of Psychology. The mentoring groups were classified as belonging to one of three mentoring styles described by Leidenfrost et al. (2011): (a) motivating master mentoring, (b) informatory standard mentoring, and (c) negative minimalist mentoring.

Our data suggest that participants in the mentoring program performed better in their studies. Mentees achieved lower average grades (which mean higher academic performance in the Austrian grading system) and passed a higher number of courses after 1 year and 2 years of study than non-mentees. We could not find any specific impact of the different mentoring styles on mentee academic performance, although, descriptively, mentees in informatory standard groups achieved the best academic performance.

Overall, our findings seem to be consistent with other studies on mentoring programs which observed positive effects on indicators of academic performance like GPA, study progress, drop-out rates, and/or study persistence (Campbell & Campbell, 1997; Crisp & Cruz, 2009; Jacobi, 1991). Especially, our findings on the number of courses passed suggest a positive impact of the peer mentoring program on academic performance. There seem to be advantages for the study progress of all students who participated in the peer mentoring program when we compare the number of courses passed by mentees to the number passed by non-mentees. Because students often arrive at the university with incorrect expectations (Gibney, Moore, Murphy, & O'Sullivan, 2011; Jackson, Pancer, Pratt, & Hunsberger, 2000; Pancer et al., 2000), it seems reasonable that they willingly rely on recommendations (e.g., regarding the order in which to take courses or exams). For the course of study in psychology at the University of Vienna, there were unofficial recommendations by lecturers and advanced students on which courses should be taken during the first year of study and which courses should be taken later because they build on content and knowledge from the previous courses. Additional support for these issues during the first term (e.g., in form of a peer mentoring

program) seems to have a positive influence on academic performance.

There are no statistically significant differences in mentee study success depending on the mentoring style experienced in their mentoring group. We had to reject our assumption that academic performance among mentees who experienced a motivating master mentoring style would be better than academic performance among mentees who experienced an informatory standard or a negative minimalist mentoring style. A reason for this result could be that the classification to a specific mentoring style mainly depended on online mentoring activities. But online mentoring was only one component of the mentoring program. All mentees received face-to-face mentoring as well and met their peer mentor several times. One of the major concerns reported on mentoring is that it is time consuming (Ehrich, Hansford, & Tennent, 2004; Long, 1997). All peer mentors had to meet their mentees five times during the mentoring program, whereas the online mentoring activities were dependent on their own time commitment. Written communication used for online mentoring activities has to be clear and complete (Sinclair, 2003), which is again time consuming. Time delays between questions and answers complicate the online mentoring activities. In contrast, more personal and on-time support is possible face-to-face (Sinclair, 2003). Because online mentoring activities and face-to-face mentoring activities were treated as a whole, mentees could not differ between online and face-to-face mentoring activities when they assessed their peer mentors. Maybe, those peer mentors who practiced the little time consuming negative minimalist mentoring style online still were "good enough" face-to-face mentors during the five obligatory meetings.

Another reason could be related to the nature of our peer mentoring program in which all mentees had to work on different obligatory tasks which were specified in the peer mentoring program. Mentees also got obligatory support concerning some important topics. For example, it was an obligatory task for the peer mentor to discuss the mentees' individual learning schedules for taking exams at the end of term, to tell their mentees about their own experiences with the psychology course of study, and to talk about the importance of developing adequate study skills like time management or learning strategies. It was suggested that the peer mentors also discuss the course of study itself or the recommended order of taking courses with their mentees to give students insight into the hidden curriculum (Bergenhengouwen, 1987).

Limitations

A few limitations to our study have to be noted. First, the present study took place at only one

university, which limits the degree of generalization of the results. Nevertheless, we should not underestimate the possibilities of conducting such a study specifically at the Faculty of Psychology of the University of Vienna with so many psychology students there. The University of Vienna can be characterized as a mass university as it is one of the largest universities in Central Europe (about 88,000 students in 2011). Especially the psychology course of study is characterized by an alarming academic staff member to student-relationship of 1:141 (Leidenfrost, Strassnig, Schabmann, & Carbon, 2009) which means a huge number of students (in 2011, about 4,000 students in the diploma degree program), but a low number of academic staff members who could potentially give support to the students (which was one of the reasons to implement a peer mentoring program for first-year psychology students).

Second, another limitation of our study might be that we considered mentoring styles which only covered individual differences in characteristics of the peer mentor. We did not consider the reverse side, namely personal characteristics like achievement motivation, competencies in study skills, or specific socio-demographic characteristics of the students themselves, which could also influence academic performance (e.g., Cantwell et al., 2001; Le et al., 2005). However, since we used a randomized allocation of the mentees to the peer mentor, these factors should not vary too systematically from group to group.

Third, we have to be aware of a self-selection bias (Allen & Eby, 2007a; Pascarella & Terenzini, 2005) in light of the results. A self-selection bias means that participants in a voluntary program could generally be more motivated than non-participants (Larose et al., 2009). The overall differences in average grades and number of courses passed could have been influenced by the self-selection of students who chose to participate in the mentoring program, rather than the peer mentoring program itself. Unfortunately, it was not possible to collect sufficient data from students from winter term 2007/2008 to find out why they did or did not participate in the mentoring program.

Last, the model of mentoring styles as described by Leidenfrost et al. (2011) mainly refers to online mentoring activities even though there were face-to-face mentoring activities. In the light of the results, the influence of the face-to-face mentoring activities should have been included independently to the analysis.

In total, additional research is needed to replicate our results in more generalizable settings and to find out more about the complex interactions among personal traits and socio-demographic student characteristics, different mentoring styles, and programmatic interventions in general, as well as their

contribution to academic performance. Future studies might look at the perceived quality of interactions from the mentor's and the mentee's perspectives and the perfect mentor-mentee fit. Other studies could control for student motivation and interest for participation in a mentoring program and could also take into account self-efficacy and commitment, variables which might help in explaining self-selection.

Implications and Conclusion

Our current study provided insight into the effect of a peer mentoring program on mentee academic performance. Mentees seemed to benefit from the peer mentoring program independently of the mentor's individual mentoring style. Mentees passed a higher number of courses and achieved better average grades after 1 year and 2 years of study than non-mentees. Leidenfrost et al. (2011) showed that a motivating master mentoring style had a positive influence on poor academic performers in a short-term measure, whether or not the mentoring program itself was successfully completed. In the long term, regarding the study progress after 1 year and 2 years of study, the motivational master mentoring style did not differ from the other mentoring styles.

Our data suggested that any mentoring (style) was better than no mentoring at all. This finding raises implications for the training and supervision of student peer mentors for ensuring a certain quality level for being a mentor. Potential mentors should reflect on their motivation and readiness for mentoring relationships (Zachary, 2000). Therefore, preparing student peer mentors for their mentoring relationships with first-year students should be done in an applied way. We recommend making peer mentors aware of different motivation and different academic performance among mentees through role plays, also to meet changing mentee requirements over the mentoring phases (Bouquillon et al., 2005). Peer mentors should practice how to impart knowledge (e.g., mentoring program goals and content). Finally, most important for peer mentors is supervision during their time of being a mentor, especially when acting as a peer mentor is part of a seminar. Student peer mentors need to talk to other peer mentors and a supervisor about being a peer mentor or quality levels for being a mentor. It is also possible to compare mentoring relationships and to learn about and discuss different mentoring approaches during supervision.

Our present findings have also potential implications for university policies. Universities should continue offering support programs, especially mentoring programs focusing on supporting first-year students and assisting them during the transition from school to the university. The support need not be

given by the faculty members; it may also be sufficient for first-year students when peers (advanced students, similar in age and hierarchical level) are assigned to support programs. A mentoring cycle could be started when, after some time, mentees could become peer mentors themselves and could pass on their study experiences and knowledge. In the long term, accrued costs for such support programs could be balanced by a more efficient study progress of the supported students.

References

- Allen, T. D., & Eby, L. T. (2007a). Common bonds: An integrative view of mentoring relationships. In T. D. Allen & L. T. Eby (Eds.), *The Blackwell handbook of mentoring: A multiple perspectives approach* (pp. 398-419). Malden, MA: Blackwell.
- Allen, T. D., & Eby, L. T. (Eds.). (2007b). *The Blackwell handbook of mentoring: A multiple perspectives approach*. Malden, MA: Blackwell.
- Allen, T. D., McManus, S. E., & Russell, J. E. A. (1999). Newcomer socialization and stress: Formal peer relationships as a source of support. *Journal of Vocational Behavior*, 54, 453-470. doi:10.1006/jvbe.1998.1674
- Bergenhengouwen, G. (1987). Hidden curriculum in the university. *Higher Education*, 16(5), 535-543. doi:10.1007/BF00128420
- Bouquillon, E. A., Sosik, J. J., & Lee, D. (2005). "It's only a phase": Examining trust, identification and mentoring functions received across the mentoring phases. *Mentoring & Tutoring: Partnership in Learning*, 13(2), 239-258. doi:10.1080/13611260500105808
- Campbell, T. A., & Campbell, D. E. (1997). Faculty/student mentor program: Effects on academic performance and retention. *Research in Higher Education*, 38(6), 727-742. doi:10.1023/A:1024911904627
- Cantwell, R., Archer, J., & Bourke, S. (2001). A comparison of the academic experiences and achievement of university students entering by traditional and non-traditional means. *Assessment & Evaluation in Higher Education*, 26(3), 221-234. doi:10.1080/02602930120052387
- Chao, G. T., Walz, P. M., & Gardner, P. D. (1992). Formal and informal mentorships—A comparison on mentoring functions and contrast with nonmentored counterparts. *Personnel Psychology*, 45(3), 619-636. doi:10.1111/j.1744-6570.1992.tb00863.x
- Crisp, G., & Cruz, I. (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education*, 50(6), 525-545. doi:10.1007/s11162-009-9130-2
- Ehrich, L. C., Hansford, B., & Tennent, L. (2004). Formal mentoring programs in education and other professions: A review of the literature. *Educational Administration Quarterly*, 40(4), 518-540. doi:10.1177/0013161X04267118
- Ensher, E. A., Thomas, C., & Murphy, S. E. (2001). Comparison of traditional, step-ahead, and peer mentoring on proteges' support, satisfaction, and perceptions of career success: A social exchange perspective. *Journal of Business and Psychology*, 15(3), 419-438. doi:10.1023/A:1007870600459
- Fletcher, J. M., & Tienda, M. (2009). High school classmates and college success. *Sociology of Education*, 82(4), 287-314. doi:10.1177/003804070908200401
- Folger, W., Carter, J. A., & Chase, P. B. (2004). Supporting first generation college freshman with small group intervention. *College Student Journal*, 38(3), 472-475.
- Gibney, A., Moore, N., Murphy, F., & O'Sullivan, S. (2011). The first semester of university life: "Will I be able to manage it at all?" *Higher Education*, 62(3), 351-366. doi:10.1007/s10734-010-9392-9
- Hixenbaugh, P., Dewart, H., Drees, D., & Williams, D. (2004). Peer e-mentoring: Enhancement of the first-year experience. *Psychology Learning and Teaching*, 5(1), 8-14.
- Jackson, L. M., Pancer, S. M., Pratt, M. W., & Hunsberger, B. (2000). Great expectations: The relation between expectancies and adjustment during the transition to university. *Journal of Applied Social Psychology*, 30, 2100-2125. doi:10.1111/j.1559-1816.2000.tb02427.x
- Jacobi, M. (1991). Mentoring and undergraduate academic success: A literature review. *Review of Educational Research*, 61(4), 505-532. doi:10.3102/00346543061004505
- Kram, K. E. (1985). *Mentoring at work: Developmental relationships in organizational life*. Glenview, IL: Scott, Foresman.
- Langhout, R. D., Rhodes, J. E., & Osborne, L. N. (2004). An exploratory study of youth mentoring in an urban context: Adolescents' perceptions of relationship styles. *Journal of Youth and Adolescence*, 33(4), 293-306. doi:10.1023/B:JOYO.0000032638.85483.44
- Larose, S., Cyrenne, D., Garceau, O., Harvey, M., Guay, F., & Deschênes, C. (2009). Personal and social support factors involved in students' decision to participate in formal academic mentoring. *Journal of Vocational Behavior*, 74, 108-116. doi:10.1016/j.jvb.2008.11.002
- Le, H., Casillas, A., Robbins, S. B., & Langley, R. (2005). Motivational and skills, social, and self-management predictors of college outcomes: Constructing the student readiness inventory. *Educational and Psychological Measurement*, 65(3), 482-508. doi:10.1177/0013164404272493

- Leidenfrost, B., Strassnig, B., Schabmann, A., & Carbon, C. C. (2009). Improvement of the study situation for beginners through cascaded blended mentoring [Verbesserung der studiensituation für StudienanfängerInnen durch cascaded blended mentoring]. *Psychologische Rundschau*, 60(2), 99-106. doi:10.1026/0033-3042.60.2.99
- Leidenfrost, B., Strassnig, B., Schabmann, A., Carbon, C. C., & Spiel, C. (2011). Peer mentoring styles and their contribution to academic success among mentees: A person-oriented study in higher education. *Mentoring & Tutoring: Partnership in Learning*, 19(3), 347-365. doi:10.1080/13611267.2011.597122
- Long, J. (1997). The dark side of mentoring. *Australian Educational Research*, 24(2), 115-83. doi:10.1007/BF03219650
- Lowe, H., & Cook, A. (2003). Mind the gap, are students prepared for higher education? *Journal of Further and Higher Education*, 27(1), 53-76. doi:10.1080/03098770305629
- Moosbrugger, H., & Reiß, S. (2005). Determinanten von studiendauer und studienenerfolg im diplomstudiengang psychologie: Eine absolventenstudie [Determinants of study duration and study success in the graduate program of psychology: A graduate survey]. *Zeitschrift für Evaluation*, 2, 177-194.
- Mullen, C. A. (2007). Naturally occurring student-faculty mentoring relationships: A literature review. In T. D. Allen & L. T. Eby (Eds.), *The Blackwell handbook of mentoring: A multiple perspectives approach* (pp. 119-138). Malden, MA: Blackwell.
- Noe, R. A. (1988). An investigation of the determinants of successful assigned mentoring relationships. *Personnel Psychology*, 41(3), 457-479. doi:10.1111/j.1744-6570.1988.tb00638.x
- Pancer, S. M., Hunsberger, B., Pratt, M. W., & Alisat, S. (2000). Cognitive complexity of expectations and adjustment to university in the first year. *Journal of Adolescent Research*, 15(1), 38-57. doi:10.1177/0743558400151003
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco, CA: Jossey-Bass.
- Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, 130(2), 261-288. doi:10.1037/0033-2909.130.2.261
- Robbins, S. B., Oh, I. S., Le, H., & Button, C. (2009). Intervention effects on college performance and retention as mediated by motivational, emotional, and social control factors: Integrated meta-analytic path analyses. *Journal of Applied Psychology*, 94(5), 1163-1184. doi:10.1037/a0015738
- Sinclair, C. (2003). Mentoring online about mentoring: Possibilities and practice. *Mentoring & Tutoring: Partnership in Learning*, 11(1), 79-94. doi:10.1080/1361126032000054826
- Single, P. B., & Muller, C. B. (2001). When email and mentoring unite: The implementation of a nationwide mentoring program—MentorNet, the national electronic industrial mentoring network for women in engineering and science. In L. K. Stromei (Ed.), *Creating mentoring and coaching programs: Twelve case studies from the real world of training* (pp. 107-122). Alexandria, VA: American Society for Training and Development.
- Tinto, V. (1975). Dropout from higher education—Theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89-125. doi:10.3102/00346543045001089
- Zachary, L. (2000). *The mentor's guide: Facilitating effective learning relationships*. San Francisco, CA: Jossey-Bass.

BIRGIT LEIDENFROST is senior lecturer at the Department of Applied Psychology, Work, Education, Economy at the University of Vienna, Austria. She coordinates a Cascaded Blended Mentoring follow-up tutorial program at the Faculty of Psychology, University of Vienna, and trains and supervises student advisors who support first-year students. Her research interests are in the field of mentoring, e-learning, didactics in higher education, and higher education research in general.

BARBARA STRASSNIG is research assistant and evaluator in the private educational sector. Previously, she was research assistant and lecturer at the Faculty of Psychology, University of Vienna, Austria. Her research interests are in the field of online research, health prevention and resilience in higher education.

MARLENE SCHÜTZ is a doctoral candidate at the Faculty of Psychology, Philipps-University of Marburg, Germany. As an undergraduate student she served as a student assistant in the CBM project. Her research interests are in the field of higher education and self-assessment.

CLAUS-CHRISTIAN CARBON is Head of the Department of General Psychology and Methodology at the University of Bamberg, Germany. His research interests are in the field of perception, memory, and ergonomics as well as in the advancement of methods in social sciences and e-learning.

ALFRED SCHABMANN is Professor of Education and Didactics at the University of Cologne, Germany.

Previously, he was professor at the Department of Applied Psychology, Work, Education, Economy at the University of Vienna, Austria. His research interests are in the field of dyslexia, behavioral disorders, and mentoring in higher education.

Enhancement of Quality Learning: Capitalizing on the SAL Framework

Huy Phan
University of New England

Quality learning in higher education is an impetus and major objective for educators and researchers. The student approaches to learning (SAL) framework, arising from the seminal work of Marton and Säljö (1976), has been researched extensively and used to predict and explain students' positive (e.g., critical reflection) and maladaptive behaviors (e.g., work avoidance). It is prudent for educators to cultivate and encourage students to actively construct and make sense of their own learning, rather than to simply memorize and reproduce contents for assessment purposes. In this review, we revisit and examine the SAL theorization within the contexts of higher education. We scope the importance of quality learning and propose three major elements in our discussion, which may foster deep, meaningful learning inclination: assessment strategies, the classroom milieu, and alignment of learning objectives. We conclude this theoretical article with an offering of issues for continuing research development. This focus, in our view, is significant as we believe the SAL framework is not robust in its explanation of students' learning behaviors in different sociocultural settings.

The notion of quality learning is an impetus for educators' consideration. In the field of Education, for example, educators and researchers have proposed a number of theoretical orientations, which help explain students' learning and academic successes in achievement contexts, for example: achievement goal orientations (Ames, 1992; Ames & Archer, 1988; Harackiewicz, Barron, Pintrich, Elliot, & Trash, 2002; Senko, Hulleman, & Harackiewicz, 2011), future time perspective (de Volder & Lens, 1982; Mehta, Sundberg, Rohila, & Tyler, 1972; Seijts, 1998), and expectancy-value theory (DeBacker & Nelson, 1999; Wigfield, 1994; Wigfield & Eccles, 2000). Researchers have, over the past three decades, shown considerable interests in the student approaches to learning (SAL) framework (Biggs, 1987; Marton & Säljö, 1976). The SAL framework, originating from Marton and Säljö's (1976) qualitative work, has made a major contribution to the study of motivation and learning.

It is valuable then, for us to revisit the important tenets of the SAL orientation (Biggs, 1987; Marton & Säljö, 1976) in the contexts of higher education. We provide, in particular, an overview and detailed scoping of this theoretical orientation and how it may explain students' quality learning and academic successes. We also examine, in the latter section of the article, a few major issues that have been noted in previous research (Mugler & Landbeck, 1997; Phan, 2013; Phan & Deo, 2007) for continuing research development.

Quality Learning and the Importance of SAL

Learning in higher education contexts is more than just the ability for one to memorize and produce a given fact (e.g., "List down and discuss briefly three major points about black holes"). One could say, in this instance, that learning extends beyond the realm of a performance-approach orientation, whereby normative evaluation practices play a major role. This

perception of learning, in relation to performance and producing facts, is limited and entails a more restrictive and biased pedagogical approach to teaching in classroom settings (e.g., an educator's stipulation of learning objectives that emphasize and encourage the recall of facts, the imparting of contents that lack authenticity, interest, task value). In a similar vein, an educator may adjust his/her pedagogical approaches in order to facilitate and encourage more performance-based learning.

Quality learning is an important emphasis and espouses the tenets of authenticity and constructive meaning (Phan, 2013). Individuals' engagement in meaningful dialogues and learning is paramount, whereby mastery of specific concepts and skills is a major focus for consideration (e.g., improving one's own critical analysis of reading tasks). In the area of teacher education, continuing theorizations have been made to account and enhance students' quality learning in various academic contexts. The NSW Model of Pedagogy (NSW Department of Education and Training, 2003), for example, is rather unique and details three pivotal components: (1) intellectual quality (e.g., encouraging deep learning), (2) quality learning environment (e.g., stimulating a positive classroom milieu), and (3) significance (e.g., promoting meaningful learning). Other theoretical models of teaching and learning (e.g., expectancy-value theory; Wigfield, 1994; Wigfield & Eccles, 2000) share similar attributes, and they connote and focus on the significance of deep and meaningful knowledge.

The important question, then, is why does the enhancement of quality learning matter to both educators and learners, alike? Apart from deep, meaningful learning in authentic contexts (e.g., "This aspect of Calculus is interesting; I wonder how applicable this is for my workplace"), quality learning also entails positive, adaptive behaviors. We contend that encouraging and instilling in-depth learning with

quality objectives (e.g., by the end of this unit, students should be able to detail three major implications for applied practice in relation to . . .) may, for example, cultivate a sense of positive well-being, belongingness, and cultural identity. Allowing students to negotiate and engage in debates about topical themes and controversial issues may, perhaps, foster appreciative task values (e.g., “I’m glad I’ve chosen this unit; it really helps me think about what I want to do”) or democratic values and citizenship (e.g., “I feel really positive about this; that I have a say in this discussion and not everything is unidirectional”). More importantly, from the perspective of academic achievement and professional development, quality learning may contribute in the prediction of students’ future time anticipations (e.g., “This course is very interesting and has highlighted the importance of Economics; this is something I need to consider whether I wish to pursue”; Eren, 2009; Lens, Simons, & Dewitte, 2002; Shell & Husman, 2001).

Consequently, from the mentioning in the preceding sections, we believe that quality learning for students at college and university is paramount. One major implication for educators, for example, involves the articulation and development of institutional policies, instructional practices, and other related pedagogical facets that could result in quality teaching for enriched learning experiences. In this section of the article, we examine in detail the SAL framework (Biggs, 1987; Marton & Säljö, 1976) and how this theoretical orientation features in the facilitation of effective teaching and quality learning outcomes.

The SAL Framework: Theoretical Overview

The qualitative work of Marton and Säljö (1976) established a premise for investigation into the approaches to learning that students may adopt in their studies. This seminal qualitative investigation, published in the *British Journal of Educational Psychology* in the late 1970s, produced preliminary evidence that discerned two major learning approaches: namely deep-approach and surface-surface. In this examination, Marton and Säljö (1976) asked students to read a text and then interviewed them about what they had learned from the reading and how they had approached the task. Findings indicated that there were students who were more intrinsically motivated and curious to make sense and seek meaning from their learning, hence, the coining of the term “deep-level” learning (Marton & Säljö, 1976). Students adopting this approach were committed to learning, and they related subject material to meaningful contexts and prior knowledge. In contrast, some students also based their learning on extrinsic motivation of positive and negative reinforcements, hence emphasizing the notion

of “surface-level” learning. Students adopting this approach were more concerned with passing examinations with minimal time and effort expenditure.

The Marton and Säljö (1976) study, consistent with other refinements made (e.g., Biggs, 1987), suggests that a learning approach subsumes two major facets: motives versus strategies. This distinction is a major aspect for consideration, given some researchers continuously use the terms “cognitive approach” or “cognitive strategy” to define *learning approach*. This interchange is erroneous, as the latter term is concerned exclusively with one’s own cognitive strategy engagement, maladaptive or meaningful, to make sense of the contents at hand (e.g., “I find most new topics interesting and often spend extra time trying to obtain more information about them”; Biggs, Kember, & Leung, 2001). It is important then, to note that an approach to learning (e.g., a superficial approach) branches to include also a motive as to why one would want to learn, for example, why am I doing this unit?

The achieving-approach to learning, theorized (Biggs, 1987) and tested by a number of researchers (e.g., Kember & Leung, 1998; Phan & Deo, 2007, 2008; Sachs & Gao, 2000), is the alternative to both the deep and surface learning approaches. This approach to learning, according to Biggs’ (1987) conceptualization, suggests that individuals may be motivated to compete and to obtain high academic grades. This achieving approach to learning involves study strategies that are context oriented and involve specific habits, such as systematic organization and the cost-effective use of effort and time management. Biggs’ (1987) conceptualization also indicates that the achieving-level dimension may associate itself with both surface and deep-level approaches. For example, a student may systematically rote learn in order to obtain high academic grades or, alternatively, to gain deep meaning of contents, thereby constituting the approaches of *surface* achieving and *deep* achieving, respectively. Similar to these two approaches, the achieving-approach encompasses both motive (e.g., “I want top grades in most or all of my units so that I will be able to select from among the best positions available when I graduate”; Biggs, 1987) and strategy (e.g., “I summarize suggested readings and include these as part of my notes on a topic”; Biggs, 1987) facets.

Despite the achieving approach to learning, a number of researchers (Justicia, Pichardo, Cano, Berbén, & de la Fuente, 2008; Kember, Biggs, & Leung, 2004; Phan & Deo, 2008; e.g., Richardson, 1994) have since then argued that approaches to learning in educational contexts may be more refined to include simply just two main facets: reproducing (e.g., “In this sense, I only want to learn this in order to obtain a good grade at the end”) and meaning (e.g., “I am doing this unit because it is interesting, and I want

to master and know more about the subject content”). This line of reasoning contends a dichotomy in learning approaches, whereby one’s own motives and strategies connote either a deliberation towards wanting to know more about a subject matter or learning a particular content because of its mandatory nature.

Our own theoretical perspective, arising from recent studies (Phan, 2013; Phan & Deo, 2007, 2008), differs from the recent proposed positioning that emphasizes the importance of *reproducing* versus one’s attempt to make sense of a subject matter (e.g., Richardson, 1994). We contend that approaches to learning in educational and non-educational contexts are more detailed and complex. This theoretical contention arises, in part, from existing methodological limitations, whereby Likert-type scale inventories have been used to gauge into students’ approaches to learning (e.g., Approaches to Studying Inventory [ASI], Entwistle & Ramsden, 1983; Motivated Strategies and Learning Questionnaire [MSLQ], Pintrich, Smith, Garcia, & McKeachie, 1993). Cognitive (e.g., processing strategies) and non-cognitive (e.g., personal self-efficacy) processes are complex, and theoretical insights into approaches to learning require, in our view, other non-quantitative approaches (Phan, 2013). Despite this cognizance, however, researchers have to date used surveys and inventories to validate relations between the two major learning approaches and other related cognitive and non-cognitive processes.

There is empirical evidence, arising from quantitative studies, to indicate that both surface and deep learning approaches relate to a number of psychological constructs, such as achievement goal orientations (Ames & Archer, 1988; Harackiewicz et al., 2002; Pintrich, Conley, & Kempler, 2003), reflective thinking practice (Dewey, 1933; Kember et al., 2000; Leung & Kember, 2003), personal self-efficacy (Bandura, 1997; Pajares, 1996), and effort expenditure (Zimmerman & Risemberg, 1997). A deep learning approach, in terms of motives and/or strategies, for example, is associated dialectically with personal self-efficacy beliefs for academic learning and a mastery goal orientation (e.g., “I like school work best when it really makes me think”; Dupeyrat & Mariné, 2005; Liem, Lau, & Nie, 2008; Midgley et al., 1998; Miller, Greene, Montalvo, Ravindran, & Nicholls, 1996; Senko & Miles, 2008; Simons, Dewitte, & Lens, 2004; Sins, van Joelingen, Savelsbergh, & van Hout-Wolters, 2008). Self-efficacious students, for example, and those who engage in learning for personal growth and interests (e.g., “I really liked biology since I was a kid; I’m thinking about doing graduate studies in veterinary science”) are more inclined to utilize in-depth and meaningful cognitive strategies in the course of their studies (e.g., going to the library and requesting interlibrary loan for a particular text). Students who are

disengaged, in contrast, tend to exhibit more maladaptive behaviors in schooling, such as adopting work-avoidance goals (e.g., “I want to do as little work as possible”; Harackiewicz, Barron, Carter, Letho, & Elliot, 1997) and, consequently, expending minimal effort in their learning. These students, similarly, would tend to incline towards superficial motives and utilize habitual strategies in their academic learning (e.g., skimming through unit notes with little emphasis on details; Fenollar, Román, & Cuestas, 2007; Meece, Blumenfeld, & Hoyle, 1988; Phan, 2008). This rationalized interrelation is not surprising, and we contend then that learning approaches and their corresponding outcomes (e.g., a preference for mastery goals) are malleable, and predisposition depends, in part, on short-term and long-term goals.

What is notable too, from our examination of the empirical literature, is the analogous relation between the two major approaches to learning and reflective thinking practice (Leung & Kember, 2003; Phan, 2007). This intertwined relationship is, again, pivotal to the cultivation and encouragement of quality learning in higher education contexts. Pedagogical strategies and/or learning objectives that entail complexities (e.g., a scholarly piece of group work that involve and call for an articulation of hypotheses), in this sense, stimulate intellectual curiosity and positive perceptions of task value (e.g., “I really appreciate doing this task; it makes me think critically and I realize now that it may relate to my career plan”), facilitating in this process engagement of meaningful learning and deep cognitive strategies (e.g., critical reflection; “As a result of this unit I have changed the way I look at myself”; Kember et al., 2000). Simplistic and low-key learning objectives (e.g., the listing of three major tenets from Lev Vygotsky’s sociocultural theory of cognitive development), in contrast, instill habitual engagement (e.g., “If I follow what the lecturer says, I do not have to think too much on this unit”; Kember et al., 2000) and automaticity, giving rise to disengagement and maladaptive habits, such as a preference for a surface learning approach to learning. Consequently, as a point of recommendation, we believe that quality learning outcomes, such as an emphasis on one’s ability to postulate a particular theory, may involve a number of aspects, for example, the structuring of unit materials (e.g., increasing complexities in expectations) and instructional practices (e.g., opportunities for student negotiation and debate) periodically.

Implications for Teaching

From the brief theoretical overview in the preceding sections, it is prudent that we consider utilizing the SAL framework (Biggs, 1987; Marton & Säljö, 1976) to foster and encourage exceptional

teaching and quality learning. The nature and characteristics of the various approaches to learning enable us to understand students' motives for their learning and how and why they succeed academically. Other theoretical orientations, approaches and/or strategies are also available, but the SAL system is rather unique as it discerns and explains both positive and maladaptive behavioral outcomes in educational and non-educational settings. There has been an emerging interest recently from researchers (e.g., Phan, 2009, 2013) to pursue exclusively the promotion of deep, meaningful learning. This avenue of inquiry is significant and emphasizes a focus on mastery rather than superficial learning subjects to normative evaluation practices (e.g., "It is important that I come first in this unit, ECO101, and show this to my family").

The SAL framework (Biggs, 1987; Marton & Säljö, 1976) enables us to discern two distinctive approaches to learning: reproducing contents versus an inner desire to make sense of one's own learning. What is important then, consequently, is an identification of instructional policies and practices that could assist and facilitate students' academic engagement in deep learning motives and strategies. Encouraging students to opt for deep learning motives and meaningful cognitive strategies, in our view, provides a basis for quality learning. In this section of the article, we discuss three major psychosocial and pedagogical approaches: assessment and evaluation practices, the classroom milieu, and learning objectives.

Assessment strategies. Emphasis pertaining to deep learning involves a rethinking in assessment strategies, and educators used these in classroom settings (Keppell & Carless, 2006). It has been observed, for example, that traditional assessment types such as multiple-choice tasks and short-answer questions (e.g., "In three lines, outline explain the term 'imprinting'") entail quick learning with a mindset in the reproduction of contents. In many cases, these types of traditional assessment tasks facilitate superficial learning and memorization of facts rather than striving for quality outcomes and academic excellence. Alternative assessment tasks, in contrast, may signify and emphasize personal improvement, mastery of key concepts, and deep learning. Research in the area of achievement goals (Ames, 1992; Urdan, 2004; Urdan, Kneisel, & Mason, 1999), for example, has yielded findings that show the de-emphasis of normative evaluation and social comparison practices when one uses non-traditional assessment methods.

In the fields of education, medicine, and other domains of functioning, a number of non-traditional assessment types have been used; for example, peer assessment and evaluation (Cheng & Warren, 1997; Sivan, 2000), personal portfolios (Tang, 1994), and

innovative feedback processes (Carless, 2002). These assessment types (e.g., e-portfolios), used in various degree programs and differing from traditional methods such as formal examination, have been found to stimulate critical thinking and active reflection of learning and professional development (Conrad, 2008; Kish, Sheehan, Cole, Struyk, & Kinder, 1997).

Classroom environment. The classroom climate is an important feat for both educators and researchers to consider in their quest to promote deep and meaningful learning (Dart et al., 1999; Dart et al., 2000; Langan, Sheese, & Davidson, 2005). Recognizing the impact of the classroom environment arises, in part, from a need for us, as educators, to encourage individual growth and mastery in personal competence. This emphasis aligns closely to research in the area of achievement goal structures (Ames, 1992; Maehr & Midgley, 1996; Urdan, 2004), whereby one major focus entails the saliency of mastery goals. This line of inquiry, applying to the context of SAL, has implications for applied educational practices. One educational implication, in this analysis, entails the design and structuring of institution and classroom climates that, in turn, foster deep learning and de-emphasize normative evaluation and social comparison practices. The question then, is how do we cultivate a learning environment that entices a sense of autonomy and non-threatening experiences for students?

There are different psychosocial facets that may be considered to define a classroom social milieu, for example, (a) teachers' attitudes and behaviors towards students, (b) a physical and interpersonal space where there is dynamic participation and social interaction and (c) the availability of information and resources (Rana & Akbar, 2007; Wilson, 1996). There is empirical research that has yielded findings attesting to the relations between the classroom environment and students' approaches to their academic learning (Meyer & Muller, 1990; Wong & Watkins, 1998; Yuen-Yee & Watkins, 1994); for instance, some researchers have found that perceptions of clear objectives and quality teaching from instructors and teachers result in students preferring a deep learning approach (Lizzio, Wilson, & Simons, 2002; Nijhuis, Segers, & Gijssels, 2007). This evidence, collectively, indicates the importance and dynamics of a classroom social milieu, calling in this case for the strengthening and fostering of certain psychosocial facets that enable mastery and deep learning (e.g., providing resources that are culturally appropriate for learning).

Alignment of teaching and learning objectives. There is increasing emphasis in higher education for lecturers and instructors to align their teaching to quality learning outcomes. This alignment, drawing from the 3P theoretical framework (Biggs, 1999), indicates three interrelated aspects that define the

teaching and learning processes: learning objectives, teaching strategies, and assessment outcome (Biggs & Tang, 2007). This close association, according to Biggs (1999), forms the basis for students to engage in deep motives and strategies that then enable the acquiring of meaningful learning. From an applied teaching perspective, it is important for a unit of study (e.g., ECO101) to have clear learning objectives that align closely to Biggs and Collins' (1982) SOLO taxonomy. The structuring of learning objectives, for example, may emphasize and reflect an order in increasing complexities (Biggs, 1999; Biggs & Collis, 1982; Biggs & Tang, 2007), ensuring in this case quality outcomes, critical reflection, and deep learning. The learning of motivation theories in the unit Psychology may include objectives that align closely to Biggs' (1995) cognitive levels of relational or extended abstract reasoning (e.g., "Why is it important for us to understand classroom motivation from sociocultural perspectives?"). Similarly, the teaching of Physics may include asking students to postulate what would happen when two objects of different masses free fall in a vacuum that contains non-gravitational force. These questions, of course, require in-depth understanding of unit materials and suggest that the skimming of unit notes and quick reading are inadequate and do not provide the necessary skills for hypothetical reasoning, higher-order abstraction, etc.

Learning objectives play a major role in the conveying of positive beliefs, expectations, and values placed in learning tasks. We believe prescribing learning objectives that vary in complexities may serve a number of purposes, for example, instilling a positioning that learning at university entails more than just the notion of memorization, or a thinking of, "I just need to get a pass." Aims and objectives that are sequentially structured, similarly, may help students recognize the importance of long-term planning and goal settings. Non-immediate goals may, for instance, assist students to orientate towards deep learning motives and strategies in order to succeed academically (e.g., "I need to allocate some extra time with my lecturer to go through this section" or "I need to do some do extra research at the library"). Constructive alignment, then, is integral to the teaching and learning processes and influences instructors' pedagogical approaches to teaching, such as the structuring of learning objectives and engagement in constructive teaching strategies (Biggs & Tang, 2007).

Reconceptualization for Further Research Development

We alluded earlier that despite its significance, the SAL framework (Biggs, 1987; Marton & Säljö, 1976) also has some major caveats, which in our view require

further examination. Inconclusive evidence and scholarly dialogues provide a basis for continuing research development into the various approaches to learning. One interesting line of thought, as noted recently, emphasizes the person-context interaction factors (Phan, 2012; Phan, Maebuta, & Dorovolomo, 2010) and how these may assist in the development of other methodological approaches that could assess students' approaches to learning. Our positioning posits a need for educators and researchers to consider alternative, non-quantitative inventories that could tap other possible learning motives and strategies. The scope of existing Likert-type scale inventories (e.g., Learning Process Questionnaire [LPQ]; Biggs, 1987) is rather limited and does not necessarily recognize the contextualized psychosocial factors mentioned previously. The work of Kember et al. (2004), for example, involved a revision of the LPQ, and this revision (R-LPQ-2F) entails eight sub-facets: (a) intrinsic interest (e.g., "I find that at times studying makes me feel really happy and satisfied"); (b) commitment to work (e.g., "I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes"); (c) for deep motive, relating ideas (e.g., "I try to relate what I have learned in one subject to what I learn in other subjects"); (d) understanding (e.g., "I try to relate new material, as I am reading it, to what I already know on that topic"); (e) for deep strategy and fear of failure (e.g., "I am discouraged by a poor mark on a test and worry about how I will do on the next test"); (f) aim for qualification (e.g., "Whether I like it or not, I can see that doing well in school is a good way to get a well-paid job"); (g) for surface motive and minimizing scope of study (e.g., "I see no point in learning material that is not likely to be in the examination"); and (h) memorization (e.g., "I learn some things by rote, going over and over them until I know them by heart") for surface strategy.

What is not clear, though, is whether students in higher education institutions incline toward and depend on other possible motives and strategies? This question suggests the possibility that approaches to learning may situate and/or contextualize within other systems of change. The person-context interaction (Bronfenbrenner, 1989; Kozulin, 1999; Phan, 2012; Phan et al., 2010; Walker, Pressick-Kilborn, Arnold, & Sainsbury, 2004; Williams, Davis, & Black, 2007) connotes a paradigm shift in theoretical tenets and understanding of individualized cognitive development and other related processes. One clear example, of course, entails the possible embedding of approaches to learning within the person-context framework. We contend that the notion of contextualization, culturally and/or socially, may influence individuals to deliberate their learning and actions with specific motives (e.g., "I want my parents to be proud of me; I want to achieve

good results because it is an expectation”) and adopt learning strategies that are based on historical upbringing.

The theoretical positioning that we propose, drawn from previous cultural studies (Kember & Gow, 1990; e.g., Kember & Gow, 1991; Mugler & Landbeck, 1997; Phan & Deo, 2008; Richardson, Landbeck, & Mugler, 1995; Watkins & Astilla, 1982; Watkins & Biggs, 1996), posits the possible situational placement of individualized approaches to learning within various sociocultural milieus. Does a particular approach to learning in an educational setting co-exist with certain sociocultural attributes? Ideologies, cultural ethos, and philosophies, as well as personal values, are significant, and they may influence our perceptions about learning, knowledge, and the world, in general. The Asian culture, for example, is well known for its accentuation on the notion of interdependency (Markus & Kitayama, 1991) and filial piety (Chow & Chu, 2007). Filial piety is rather unique, as a cultural entity, as it emphasizes loyalty, pride, and honor. Indigenous communities and societies, similarly, share communal beliefs and informal practices which differ extensively from the Western contexts (Nabobo-Baba, 2006; Phan, 2012). These attributes, in totality, may shape and influence individuals’ perceptions about learning. Some individuals may, in this instance, believe and contend that learning is more than just about the acquiring of knowledge.

The social, cultural, and political contexts of higher education institutions may espouse certain learning objectives, expectations, and personal and social criteria. Some institutions, for example, may incline more favorably towards scholarly dialogues, contributions, and academic competitions. By the same token, institutional expectations (e.g., a benchmark for success and/or failure), and social and peer pressure may influence individuals’ perceptions, views, and beliefs about the reasons for learning and acquiring knowledge. Family commitment and values, similarly, as we discussed, may also co-exist to influence individuals’ motives, resolve, and determination to learn and succeed.

Educators and researchers could, in essence, consider existing inventories (Biggs et al., 2001; Kember et al., 2004) and incorporate the proposition relating to the sociocultural attributes of cognitive development. Items that constitute the two major learning approaches (e.g., “I find that at times studying makes me feel really happy and satisfied”; Kember et al., 2004) at present do not take into consideration the importance of the person-context relationship. From our previous mentioning, we suggest researchers consider exploring additional items that may delve into other learning motives, for example: (1) communalism (e.g., “I find that at time studying together with others makes

me feel content and satisfied” and “I feel that studying with other students makes my learning more interesting and enjoyable”) and the well-being of others (e.g., “I find that assisting others in their learning makes me understand my own learning” and “I feel committed to help others learn and understand the unit materials”) for inter-related collaboration motive; and (2) family values (e.g., “I work hard at my studies because my family values learning and knowledge” and “I have a strong commitment to learn new things because of my family’s expectations”) and achievements for pride and dignity (e.g., “I work hard at my studies because I want to make my parents feel proud” and “It is dignified in my family for one to learn and to achieve”) for personal, family-committed motive. By the same token, we suggest existing learning strategies expand to include other psychosocial possibilities, for example: clarification (e.g., “I like to make sense of my learning for in-depth understanding” and “I try to verify issues as I go through my unit materials”) and expansion for application (e.g., “I try to relate what I have learned in this unit for application purposes” and “When I read a textbook, I try to relate it to everyday applications”) for in-depth application strategy. More cognitive emphasis may also include items, such as “I often visualize in my head, diagrammatically, connections between contents” and “I often cues to assist me in my learning and understanding of unit contents”).

Conclusion

This review has provided an in-depth examination of the SAL framework (Biggs, 1987; Marton & Säljö, 1976) and its implications for applied research and teaching practices. The synthesis and review of research studies in the preceding sections have provided a detailed scoping for educators to consider the potency of the SAL framework in the teaching and learning processes. Most noticeable, perhaps, is the notion that learning strategies and motives have varying impacts on achievement outcomes, as well as other achievement-related processes. In this analysis, our examination of the literature has discerned different structural relations that then result in either adaptive or maladaptive behaviors. Consequently, the impetus drawn from this inquiry is the recognition that, perhaps, we need to refine the SAL framework in order to accommodate other possible practices and study habits. There have been citations and ongoing reconceptualizations into the differing approaches to learning that students may adopt in their studies. From a critical point of view, we suggest there are many shortcomings that warrant a need for further research development into this area of inquiry. In part then, extending the works that have been conducted so far, we offered our own interpretation and conceptualization for continuing research development.

References

- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261-271. doi:10.1037//0022-0663.84.3.261
- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260-267. doi:10.1037/0022-0663.80.3.260
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman & Co.
- Biggs, J. (1987). *Student approaches to learning and studying*. Melbourne, Australia: Australian Council for Educational Research.
- Biggs, J. (1995). Assessing for learning: Some dimensions underlying new approaches to educational assessment. *Alberta Journal of Educational Research, 41*(1), 1-17.
- Biggs, J. (1999). *Teaching for quality learning at university*. Buckingham, UK: Open University Press.
- Biggs, J., & Collis, K. F. (1982). *Evaluating the quality of learning—The SOLO taxonomy*. New York, NY: Academic Press.
- Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two-factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*(1), 133-149. doi:10.1348/000709901158433
- Biggs, J., & Tang, C. (2007). *Teaching for quality learning at university*. Maidenhead, UK: Open University Press.
- Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.), *Annals of child development: Theories of child development: Revised formulations and current issues* (Vol. 6, pp. 187-251). Greenwich, CT: JAI Press.
- Carless, D. (2002). The "mini-viva" as a tool to enhance assessment for learning. *Assessment & Evaluation in Higher Education, 27*(4), 353-363. doi:10.1080/0260293022000001364
- Cheng, W., & Warren, M. (1997). Having second thoughts: Student perceptions before and after a peer assessment exercise. *Studies in Higher Education, 22*(2), 233-239. doi:10.1080/03075079712331381064
- Chow, S. S.-Y., & Chu, M. H.-T. (2007). The impact of filial piety and parental involvement on academic achievement motivation in Chinese secondary school students. *Asian Journal of Counselling, 14*(1-2), 91-124.
- Conrad, D. (2008). Building knowledge through portfolio learning in prior learning assessment and recognition. *Quarterly Review of Distance Education, 9*(2), 139-150.
- Dart, B. C., Burnett, P. C., Boulton-Lewis, G. M., Campbell, J., Smith, D., & McCrindle, A. (1999). Classroom learning environments and students' approaches to learning. *Learning Environment Research, 2*(2), 137-156.
- Dart, B. C., Burnett, P. C., Purdie, N., Boulton-Lewis, G. M., Campbell, J., & Smith, D. (2000). Students' conceptions of learning, the classroom environment, and approaches to learning. *Journal of Educational Research, 93*(4), 262-270. doi:10.1080/00220670009598715
- de Volder, M., & Lens, W. (1982). Academic achievement and future time perspective as a cognitive-motivational concept. *Journal of Personality and Social Psychology, 42*(3), 566-571. doi:10.1037/0022-3514.42.3.566
- DeBacker, T. K., & Nelson, R. M. (1999). Variations on an expectancy-value model of motivation in science. *Contemporary Educational Psychology, 24*(2), 71-94. doi:10.1006/ceps.1998.0984
- Dewey, J. (1933/1909). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston, MA: D. C. Heath.
- Dupeyrat, C., & Mariné, C. (2005). Implicit theories of intelligence, goal orientation, cognitive engagement, and achievement: A test of Dweck's model with returning to school adults. *Contemporary Educational Psychology, 30*(1), 43-59. doi:10.1016/j.cedpsych.2004.01.007
- Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. New York, NY: Nichols.
- Eren, A. (2009). Exploring the effects of changes in future time perspective and perceived instrumentality on graded performance. *Electronic Journal of Research in Educational Psychology, 7*(3), 1217-1248.
- Fenollar, P., Román, S., & Cuestas, P. J. (2007). University students' academic performance: An integrative conceptual framework and empirical analysis. *British Journal of Educational Psychology, 77*(4), 873-891. doi:10.1348/000709907X189118
- Harackiewicz, J. M., Barron, K. E., Carter, S. M., Letho, A. T., & Elliot, A. J. (1997). Predictors and consequences of achievement goals in the college classrooms: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73*(6), 1284-1295. doi:10.1037/0022-3514.73.6.1284
- Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Trash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology, 94*(3), 638-645. doi:10.1037/0022-0663.94.3.638
- Justicia, F., Pichardo, M. C., Cano, F., Berbén, A. B. G., & de la Fuente, J. (2008). The revised two-factor study process questionnaire (R-SPQ-2F): Exploratory and confirmatory factor analyses. *European Journal of Psychology of Education, 41*, 355-372.

- Kember, D., Biggs, J., & Leung, D. Y. P. (2004). Examining the multidimensionality of approaches to learning through the development of a revised version of the learning process questionnaire. *British Journal of Educational Psychology*, 74(2), 261-280. doi:10.1348/000709904773839879
- Kember, D., & Gow, L. (1990). Cultural specificity of approaches to study. *British Journal of Educational Psychology*, 60(3), 356-363. doi:10.1111/j.2044-8279.1990.tb00952.x
- Kember, D., & Gow, L. (1991). A challenge to the anecdotal stereotype of the Asian student. *Studies in Higher Education*, 16(2), 117-128. doi:10.1080/03075079112331382934
- Kember, D., Leung, D., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., . . . Yeung, E. (2000). Development of a questionnaire to measure the level of reflective thinking. *Assessment & Evaluation in Higher Education*, 25(4), 381-389. doi:10.1080/713611442
- Kember, D., & Leung, D. Y. P. (1998). The dimensionality of approaches to learning: An investigation with confirmatory factor analysis on the structure of the SPQ and LPQ. *British Journal of Educational Psychology*, 68(3), 395-407. doi:10.1111/j.2044-8279.1998.tb01300.x
- Keppell, M., & Carless, D. (2006). Learning-oriented assessment: A technology-based case study. *Assessment in Education*, 13(2), 179-191. doi:10.1080/09695940600703944
- Kish, C. K., Sheehan, J. K., Cole, K. B., Struyk, L. R., & Kinder, D. (1997). Portfolio in the classroom: A vehicle for developing reflective thinking. *High School Journal*, 80(4), 254-260.
- Kozulin, A. (1999). Sociocultural contexts of cognitive theory. *Human Development*, 42(2), 78-82.
- Langan, D., Sheese, R., & Davidson, D. (2005, October). *Beginning with values: Constructive teaching and learning in action*. Paper presented at the Sixth International Transformative Learning Conference, Michigan State University, East Lansing, MI.
- Lens, W., Simons, J., & Dewitte, S. (2002). From duty to desire: The role of students' future time perspective and instrumentality perceptions for study motivation and self-regulation. In F. Pajares & T. Urdan (Eds.), *Academic motivation of adolescents* (pp. 221-245). Greenwich, CT: Information Age.
- Leung, D. Y. P., & Kember, D. (2003). The relationship between approaches to learning and reflection upon practice. *Educational Psychology*, 23(1), 61-71. doi:10.1080/01443410303221
- Liem, A. D., Lau, S., & Nie, Y. (2008). The role of self-efficacy, task value, and achievement goals in predicting learning strategies, task disengagement, peer relationship, and achievement outcome. *Contemporary Educational Psychology*, 33(4), 486-512. doi:10.1016/j.cedpsych.2007.08.001
- Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education*, 27(1), 27-52. doi:10.1080/03075070120099359
- Maehr, M. L., & Midgley, C. (1996). *Transforming school cultures*. Boulder, CO: Westview.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224-253. doi:10.1037/0033-295X.98.2.224
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I—Outcome and process. *British Journal of Educational Psychology*, 46, 4-11. doi:10.1111/j.2044-8279.1976.tb02980.x
- Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology*, 80(4), 514-523. doi:10.1037/0022-0663.80.4.514
- Mehta, P., Sundberg, N. D., Rohila, P. K., & Tyler, L. E. (1972). Future time perspectives of adolescents in India and the United States. *Journal of Cross-Cultural Psychology*, 3(3), 293-302. doi:10.1177/002202217200300307a
- Meyer, J. H. F., & Muller, M. W. (1990). Evaluating the quality of student learning. I—An unfolding analysis of the association between perceptions of learning contexts and approaches to studying at an individual level. *Studies in Higher Education*, 15(2), 131-154. doi:10.1080/03075079012331377471
- Midgley, C., Kaplan, A., Middleton, M., Maehr, M. L., Urdan, T., Anderman, L. H., . . . Roeser, R. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology*, 23(2), 113-131. doi:10.1006/ceps.1998.0965
- Miller, R., Greene, B., Montalvo, G., Ravindran, B., & Nicholls, J. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology*, 21(4), 388-422. doi:10.1006/ceps.1996.0028
- Mugler, F., & Landbeck, R. (1997). Learning in the South Pacific and phenomenography. *Higher Education Research and Development*, 16, 227-239.
- Nabobo-Baba, U. (2006). *Knowing and learning: An Indigenous Fijian approach*. Suva, Fiji: Institute of Pacific Studies, University of the South Pacific.
- Nijhuis, J., Segers, M., & Gijssels, W. (2007). The interplay of perceptions of the learning environment, personality and learning strategies: A studies amongst International business studies

- students. *Studies in Higher Education*, 32(1), 59-77. doi:10.1080/03075070601099457
- NSW Department of Education and Training. (2003). *Quality teaching in NSW public schools*. Sydney, New South Wales: Author.
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543-578. doi:10.3102/00346543066004543
- Phan, H. P. (2007). An examination of reflective thinking, learning approaches, and self-efficacy beliefs at the University of the South Pacific: A path analysis. *Educational Psychology*, 27(6), 789-806. doi:10.1080/01443410701349809
- Phan, H. P. (2008). Teaching and learning in the South Pacific: A Vygotskian classroom? In J. Dorovolomo, C. F. Koya, H. P. Phan, J. Veramu, & U. Nabobo-Baba (Eds.), *Pacific education: Issues and perspectives* (pp. 68-87). Suva, Fiji: University of the South Pacific & Max.
- Phan, H. P. (2009). Future time perspective in sociocultural contexts: A discussion paper. *Electronic Journal of Research in Educational Psychology*, 7(2), 761-778.
- Phan, H. P. (2012, December). *A sociocultural perspective of learning: Developing a new theoretical tenet*. Paper presented at the Australian Association for Research in Education, University of Sydney, Sydney, Australia.
- Phan, H. P. (2013). Interplay between cognitive and non-cognitive processes: Review, implications, and directions. In L. Zhang & J. Chen (Eds.), *Academic achievement: Predictors, learning strategies and influences of gender* (pp. 1-32). Hauppauge, NY: Science Nova.
- Phan, H. P., & Deo, B. (2007). The revised learning process questionnaire: A validation of a Western model of students' study approaches to the South Pacific context using confirmatory factor analysis. *British Journal of Educational Psychology*, 77(3), 719-739. doi:10.1348/000709906X158339
- Phan, H. P., & Deo, B. (2008). "Revisiting" the South Pacific approaches to learning: A confirmatory factor analysis study. *Higher Education Research and Development*, 27(4), 371-383. doi:10.1080/07294360802406833
- Phan, H. P., Maebuta, J., & Dorovolomo, J. (2010). The relations between personal epistemology and learning approaches in sociocultural contexts: A theoretical conceptualization—Part II. *International Journal of Learning*, 17(5), 465-478.
- Pintrich, P. R., Conley, A. M., & Kempler, T. M. (2003). Current issues in achievement goal theory and research. *International Journal of Educational Research*, 39(4-5), 319-337. doi:10.1016/j.ijer.2004.06.002
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement*, 53(3), 810-814. doi:10.1177/0013164493053003024
- Rana, R. A., & Akbar, R. A. (2007). *Relationship between classroom learning environment and students' achievement in higher education*. Retrieved from http://www.apqn.org/events/past/details/103/presentations/files/03_relationship_between_classroom_learning_environment.pdf
- Richardson, J. T. E. (1994). Cultural specificity of approaches to studying in higher education. *Higher Education*, 27, 449-468.
- Richardson, J. T. E., Landbeck, R., & Mugler, F. (1995). Approaches to studying in higher education: A comparative study in the South Pacific. *Educational Psychology*, 15(4), 417-432. doi:10.1080/0144341950150405
- Sachs, J., & Gao, L. (2000). Item-level and subscale-level factoring of Biggs' Learning Process Questionnaire (LPQ) in a mainland Chinese sample. *British Journal of Educational Psychology*, 70(3), 405-418. doi:10.1348/000709900158209
- Seijts, G. H. (1998). The importance of future time perspective in theories of work motivation. *Journal of Psychology*, 132(2), 154-168. doi:10.1080/00223989809599156
- Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist*, 46(1), 26-47. doi:10.1080/00461520.2011.538646
- Senko, C., & Miles, K. M. (2008). Pursuing their own learning agenda: How mastery-oriented students jeopardize their class performance. *Contemporary Educational Psychology*, 33(4), 561-583. doi:10.1016/j.cedpsych.2007.12.001
- Shell, D. F., & Husman, J. (2001). The multivariate dimensionality of personal control and future time perspective beliefs in achievement and self-regulation. *Contemporary Educational Psychology*, 26(4), 481-506. doi:10.1006/ceps.2000.1073
- Simons, J., Dewitte, S., & Lens, W. (2004). The role of different types of instrumentality in motivation, study strategies, and performance: Know why you learn, so you'll know what you learn! *British Journal of Educational Psychology*, 74(3), 343-360. doi:10.1348/0007099041552314
- Sins, P. H. M., van Joolingen, W. R., Savelsbergh, E. R., & van Hout-Wolters, B. (2008). Motivation and performance within a collaborative computer-based modeling task: Relations between students' achievement goal orientation, self-efficacy, cognitive processing, and achievement. *Contemporary Educational Psychology*, 33(1), 58-77. doi:10.1016/j.cedpsych.2006.12.004

- Sivan, A. (2000). The implementation of peer assessment: An action research approach. *Assessment in Education*, 7(2), 193-214. doi:10.1080/713613328
- Tang, C. (1994). Effects of modes of assessment on students' preparation strategies. In G. Gibbs (Ed.), *Improving student learning: Theory and practice* (pp. 151-170). Oxford, UK: The Oxford Centre for Staff Development.
- Urdu, T. (2004). Using multiple methods to assess students' perceptions of classroom goal structure. *European Psychologist*, 9(4), 222-231. doi:10.1027/1016-9040.9.4.222
- Urdu, T., Kneisel, L., & Mason, V. (1999). Interpreting messages about motivation in the classrooms: Examining the effects of achievement goal structures. In T. Urdu (Ed.), *Advances in motivation and achievement* (Vol. 11, pp. 123-158). Bingley, UK: Emerald Group.
- Walker, R., Pressick-Kilborn, K., Arnold, L. S., & Sainsbury, E. J. (2004). Investigating motivation in context: Developing sociocultural perspectives. *European Psychologist*, 9(4), 245-256.
- Watkins, D., & Astilla, E. (1982). Some evidence on the reliability and validity of the Biggs study process questionnaire with Filipino children. *Australian Journal of Education*, 26, 104-106.
- Watkins, D. A., & Biggs, J. (Eds.). (1996). *The Chinese learner, cultural, psychological and contextual influences*. Hong Kong, China: ACER and CERC.
- Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review*, 6(1), 49-78. doi:10.1007/BF02209024
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25(1), 68-81. doi:10.1006/ceps.1999.1015
- Williams, J., Davis, P., & Black, L. (2007). Sociocultural and cultural-historical activity theory perspectives on subjectivities and learning in schools and other educational contexts. *International Journal of Educational Research*, 46(1-2), 1-7. doi:10.1016/j.ijer.2007.07.001
- Wilson, B. G. (1996). Introduction: What is a constructivist environment? In B. G. Wilson (Ed.), *Constructivist learning environments* (pp. 3-8). Englewood Cliffs, NJ: Educational Technology.
- Wong, N.-Y., & Watkins, D. (1998). A longitudinal study of the psychosocial environmental and learning approaches in the Hong Kong classroom. *Journal of Educational Research*, 91(4), 247-254. doi:10.1080/00220679809597550
- Yuen-Yee, G. C., & Watkins, D. (1994). Classroom environment and approaches to learning: An investigation of the actual and preferred perceptions of Hong Kong secondary school students. *Instructional Science*, 22(3), 233-246. doi:10.1007/BF00892244
- Zimmerman, B. J., & Risemberg, R. (1997). Self-regulatory dimensions of academic learning and motivation. In E. Phye (Ed.), *Handbook of academic learning* (pp. 105-125). New York, NY: Academic Press.

HUY P. PHAN is an Associate Professor of Educational Psychology and teaches in the School of Education at the University of New England. His research interests are related to cognition, motivation, and noncognitive processes in sociocultural settings. His current research focuses on theoretical and empirical multilevel examinations of individuals' learning processes and personal well-being. Correspondence should be directed to: School of Education, University of New England, Armidale NSW 2350 AUSTRALIA. Phone: 612 6773 3327. E-mail: hphan2@une.edu.au

Children and Violence: An Undergraduate Course Model of Interdisciplinary Co-Teaching

Linda Bucci
Lasell College

Sidney Trantham
Lesley University

The integration of co-teaching across disciplines in higher education is an approach that enhances the learning experience for both students and faculty. The process of examining material from the perspective of two disciplines contributes to critical thinking skills beyond traditional pedagogical approaches. This article presents a model for interdisciplinary co-teaching based on the authors' experience with an undergraduate course titled *Children and Violence*. The course *Children and Violence* evolved out of the professors' shared interest and professional experiences working on issues of childhood violence. *Children and Violence* was designed to encourage students to grapple with the complex issues that contribute to children becoming victims of violence or perpetrators of violence (or in some cases, both). The course was created using the criminal justice and psychology disciplines because these fields naturally interface when addressing the subject of child maltreatment and youth violence. A major purpose of the course was to examine the societal problem of children and violence from a critical multidisciplinary perspective. This paper will review the development of this course, as well as present suggestions for best practices for interdisciplinary co-teaching.

This article presents a model for interdisciplinary co-teaching based on the authors' experience with an undergraduate course titled *Children and Violence* at Lasell College in Newton, Massachusetts. Lasell College prides itself on involving students in non-traditional learning experiences. Students are engaged in academic material through a philosophy called *connected learning*, which is infused across the curriculum. As part of this approach, students are encouraged to learn course material through both in and out-of-class activities. This may include the faculty bringing guest speakers to classes, taking field trips, and students completing service-learning and research projects. Faculty are encouraged and often supported through grants to include connected learning activities in course curricula.

The course *Children and Violence* evolved out of the professors' shared interest and experience working on issues of childhood violence in their professional lives outside of the college. In addition, students advocated for more interesting and rigorous courses. The first author has over 16 years of experience as a prosecutor of major felonies. One of her positions was as the Chief of the Suffolk County District Attorney's Child Abuse Unit in Boston, Massachusetts. That position required working with a variety of professional disciplines to investigate allegations of child and adolescent maltreatment. The second author is a licensed clinical psychologist who has conducted research on childhood aggression, as well as on the effects of childhood sexual abuse, and who engages in clinical work with child, adolescent, and adult survivors of childhood maltreatment.

This course was originally geared towards students in the Justice Studies and Social Sciences departments (although open to all upper level students). Both

disciplines require students to complete internships in the field, often in multidisciplinary agencies. Because many students were upper level students (e.g., juniors and seniors) and had either completed or were beginning an internship, they were becoming exposed to multidisciplinary approaches to social problems. *Children and Violence* was first offered in the spring 2004 semester as an experimental course; it was then approved by the institution's Curriculum Committee as a permanent cross-listed course in Criminal Justice and Psychology. After assessment, the course was repeated in the spring 2007 and spring 2009 semesters. As the course developed over the years, a service-learning component was incorporated to encourage active student learning and to help students gain a deeper understanding of the course material. For example, in the last iteration of the course in spring 2009, students examined the issue of cyberbullying and developed a workshop for youth to present at the local Boys and Girls Club. They were trained within the classroom setting and developed strategies to use to engage with students at the Boys and Girls Club. This service-learning project allowed students to apply their knowledge of child development and criminal liability to youth, resulting in an integration of the two disciplines. After teaching the course twice and having it approved by the College's Curriculum Committee, the course became a permanent offering, serving as an elective for two minors.

Children and Violence was designed to encourage students to grapple with the complex issues that contribute to children becoming victims of violence or perpetrators of violence (or in some cases, both). The course was created using the criminal justice and psychology disciplines because these fields naturally interface when addressing the

subject of child maltreatment and its effects. A major purpose of the course was to examine the societal problem of children and violence from a critical multidisciplinary perspective (see Appendix A). Also, by having instructors from different disciplines teaching the course at the same time, students are exposed to an interdisciplinary approach to understanding multifaceted societal issues.

The integration of co-teaching across disciplines in higher education is an approach that enhances the learning experience for both students and faculty. The process of examining material from the perspective of two disciplines also contributes to critical thinking skills beyond traditional pedagogical approaches.

Literature Review

There is great debate about the causes of the current state of the American educational system as well as how to enact reform that will enhance the value of higher education. Educators have begun exploring innovative approaches to teaching that engage students in learning. Experimenting with non-traditional methods of enhanced learning and complex social problem-solving has led to a re-examination of how incorporating more than one discipline in the classroom can help provide undergraduates with the skills needed in today's global community. Examining issues from diverse perspectives develops critical thinking skills and allows students to achieve a comfort level with integrating subject matter cogently. Co-teaching is another approach that is receiving more attention in the educational reform movement.

Interdisciplinarity

As defined by Klein (1990), "Interdisciplinarity is a means of solving problems and answering questions that cannot be satisfactorily addressed using single methods or approaches" (Klein, 1990, p. 196). This concept of interdisciplinarity includes several core characteristics:

It unifies and integrates knowledge and must include an interaction, overlap, sharing of insights or bridging of disciplines among two or more disciplines from a theoretical, practical-outcome or problem-oriented approach. It borrows or applies tools between disciplines, and it may lead to the emergence of a new discipline and new fields of knowledge. (Franks et al., 2007, p. 171)

Although there have been a variety of co-teaching models that have attempted to involve more than one discipline, there is still very little research available from studies of the impact these courses have on

student learning (Lattuca, Voight, & Fath, 2004). Examining theories of learning and cognition, one reason interdisciplinary co-taught courses can enhance learning is that there is typically a multitude of opportunities to connect the new material to previously acquired knowledge (Lattuca et al., 2004). Also, "situational learning theories suggest that complex, real-world problems, such as those associated with interdisciplinarity, may enhance learning because they engage students in authentic tasks similar to those they will be expected to perform as workers or as citizens" (Lattuca et al., 2004, p. 32).

As Lattuca et al. (2004) pointed out, often interdisciplinary courses are taught in a fashion that places the student and experience at the center of learning. This constructivist approach to learning sees the professor as the facilitator and the student as the active learner which results in their accumulation of new knowledge. The student's experience becomes the focus of the learning, stressing discussion and participatory connected learning (Lattuca et al., 2004).

There are many other persuasive arguments presented for why there is value in interdisciplinary co-teaching. For example, engaging in discourse that critically examines a discipline from a different perspective allows students to discover the limitations of the field and encourages deeper student engagement in the learning experience (Woods, 2007). Many of our complex global problems require a holistic approach, and interdisciplinary education helps prepare students for working in a multi-professional context (Woods, 2007). At least one recent examination of such a course provides evidence that critical thinking is demonstrated and developed by both the professors and students in a team-taught interdisciplinary course at the University of Bristol in the United Kingdom (Hoare et al., 2008). Finally, engaging students in complex multidisciplinary social issues in a course such as this requires this type of rich experience because "human beings learn better if knowledge emerges from pedagogies that are both diverse and interactive" (Eisen, Hall, Lee, & Zupko, 2009, p. 99).

As the pedagogy is non-traditional, colleges employing interdisciplinary courses are not without their critics. For example, some have noted concerns that interdisciplinary studies can cause conceptual confusion for students, can take student focus away from their primary area of study, and undermines newer, inherently interdisciplinary programs like Communications and Women's Studies (Peterson, 2008). More traditional academics often see the topics covered in interdisciplinary courses as less substantive and less rigorous. Despite these critiques, the overall benefits far outweigh these concerns.

Co-Teaching

Co-teaching was originally developed by Roth and Tobin as a method to train student teachers in K-12 classrooms (Henderson, Beach, & Famiano, 2007). Much of the research on the effectiveness of co-teaching has focused on primary and secondary school settings; approximately 77% of middle schools were using some form of co-teaching as of 2006 (Kohler-Evans, 2006). The general consensus is that effective co-teaching involves attention to professionalism, classroom management, instructional process, learning groups, and monitoring of student progress (Nevins, 2006).

There is reason to believe that many of the principles involved in effective co-teaching also apply in a higher education setting. For example, Henderson et al. (2007) establish in a recent study at Western Michigan University that co-teaching at the higher education level is an effective way of ensuring fundamental and innovative pedagogical changes (Henderson et al., 2007). They discovered co-teaching in the college setting resulted in more engaged, active learners in the classroom, which informed the pedagogy of the instructors (Henderson et al., 2007). There is also some indication that co-teaching at the undergraduate level is especially useful when examining sensitive topics and utilizing group work in the classroom, and it can contribute to enhanced cognitive skill development (Kerridge, Kyle, & Marks-Maran, 2009).

Perhaps one of the most important aspects of co-teaching is the modeling by the two instructors of contrasting points of view on an issue and the resolution of differing perspectives on the same topic in front of the student learners (Harris & Harvey, 2000). This provides the college student the opportunity to see that true learning is an interactive process that adapts and changes continuously, something instructors know and are engaging in at the same time as students in a co-taught course. "Team teaching opens opportunities for students to join the team as teachers and learners. Although students and teachers have different responsibilities, we are all learning through our collective dialogue" (Game & Metcalfe, 2009, p. 46).

Interdisciplinary Co-Teaching in Higher Education

Accepting that both co-instruction and cross-disciplinary teaching are sound pedagogical approaches, interdisciplinary co-teaching at the college level may provide additional benefits for both students and educators. While there are a variety of co-teaching and interdisciplinary models for course instruction, combining the two at the higher education level is still relatively rare. What makes the pedagogy of interdisciplinary co-teaching special in this context includes a diverse and interactive classroom (Eissen et

al., 2009), cross-cutting topics that enhance critical thinking (Hoare et al., 2008), and different perspectives on the many issues discussed (Vogler & Long, 2003). It impacts the faculty because it ripples into faculty development (Eissen et al., 2009) and promotes collegiality (Hoare et al., 2008). It enhances student learning because academic disciplines are not mutually exclusive (Hoare et al., 2008). "Situated learning theories suggest that complex, real-world problems, such as those associated with interdisciplinarity, may enhance learning because they engage students in authentic tasks similar to those they will be expected to perform as workers or citizens" (Lattuca et al., 2004, p. 32).

An Interdisciplinary Course Model

Orlander, Gupta, Fincke, Manning, and Hershman (2000) presented a model of co-teaching developed for physicians in clinical teaching institutions. Their model of co-teaching was developed with the goal of fostering "lifelong, independent improvement in the practice of teaching" (Orlander et al., 2000, p. 257). They also noted that their model was developed based on theories of adult and professional education (Orlander et al., 2000). Orlander et al. (2000) cited research that indicates "adults learn best when working to solve a real problem" (p. 259). They also note that professionals "learn their field by doing, assessing the results of their actions, and then altering their behavior to increase the effectiveness of their work" (Orlander et al., 2000, p. 259). Finally, Orlander et al. (2000) suggested "co-teaching allows the teachers involved to identify their own learning needs derived from their teaching responsibilities. This learner-centered approach to identifying problems makes discoveries about teaching most relevant, powerful, and durable" (p. 259).

The model developed here in the undergraduate setting is based on similar goals. The major goal of Children and Violence was to examine the societal problem of children as victims of violence or perpetrators of violence (or in some cases, both) from a critical multidisciplinary perspective. In this instance, the two disciplines were Criminal Justice and Psychology. Reflecting on the experience of co-teaching an interdisciplinary course revealed the value to student learning and precipitated the creation of this model.

Course Development

Creation of a co-taught interdisciplinary course is a labor-intensive process and requires careful planning and preparation in the months prior to the course offering. This stage is referred to in the model presented here as the *generative stage* because it is the time when

co-instructors identify the purpose, goals, and content of the course. The first time offering of a co-taught interdisciplinary course requires buy-in and support from department and administrative personnel and in some cases faculty curriculum committees. In *Children and Violence* the instructors were able to secure department chair approval as the course was part of an overload for each instructor. The first time *Children and Violence* was offered it was an experimental course; this did not require curriculum approval and made it easier to offer once the department chairs approved the project. The generative stage can last anywhere from 6 months to well over a year. Given the requirements of many institutions to list courses several months in advance to allow for course pre-registration, the instructors found that starting at least 6 months prior to that process provided the necessary time for preparing the course.

Finally, during this stage the instructors had preliminary conversations with department chairs and Deans/Provosts of Academic Affairs regarding faculty issues such as workload and compensation. For example, in the model presented here, faculty members were provided with half a course credit for co-teaching the course (e.g., one and a half credits for a three-credit course). However, by the third time the course was taught, compensation was increased to two credits for each faculty member for a three-credit course.

A major factor that determines the amount of time necessary to create the course is the disciplines being combined. For example, *Children and Violence* may have taken less time to develop as a course because of the experience and background of the faculty involved and the natural interrelationship of the disciplines. Also, the intersection of programs within a designated school may be easier than combining courses between schools. That is, it may be more complicated to create a course that bridges the disciplines of business and philosophy (two programs which are often in different schools and many would argue have highly dissimilar points of view).

A significant part of the generative stage is identifying course goals and objectives. Having clear course objectives and goals provides faculty with an outline within which to assess the course after its completion. In *Children and Violence* a major goal was to help students understand the role of violence in children's lives from a psychological, criminal justice, and legal perspective. For example, as part of *Children and Violence*, students read a fiction novel about a teen who commits mass murder that explores the psychological factors that may contribute to antisocial behavior. At the same time, review of the new state statutory framework for sentencing juveniles convicted of homicide highlighted the legal ramifications of committing murder. By simultaneously examining both the mental health and criminal justice aspects of the

issue, it was hoped that students would engage in more complex thinking about the topic. In addition, one would identify student learning outcomes related to these course goals and objectives (see Appendix B).

Another important aspect of the generative stage of course creation is brainstorming possible course readings, assignments, and activities. This involved reviewing current popular and news media, and relevant mental health and criminal justice publications to identify topic categories for the course. For example, in one iteration of the course, violent video games were explored in depth, while at another time teen dating violence was a significant component of the course.

A period of clarifying and revising course objectives, goals, and assignments needs to occur after the initial brainstorming phase; this stage is referred to as the *refining stage*. During this process, the course topics, readings, and assignments are created and narrowed to a manageable form for the course. In addition, confirmation of guest speakers, field trip activities, and service learning projects is a critical aspect of this stage. This is often a time-consuming process that may involve meetings with colleagues within the university and visits to potential sites for field trips but leads meaningful activities for students that allow the integration of course-related concepts. For example, during the most recent iteration of the *Children and Violence* course faculty met with the Director of the Center for Service Learning the semester prior to the course to develop a service-learning component for the course. Contact with several agencies, as well as additional meetings with the center director resulted in the anti-cyber-bullying project that students engaged in at a local Boys and Girls club. In addition, contact with professionals in the mental health and criminal justice fields led to a social worker visiting the course to present on teen dating violence. Another professional connection led to students observing the proceedings of a local juvenile court as well as being able to meet with a chief juvenile probation officer and presiding judge.

Another significant aspect of the refining stage is confirming with department chairs, the Registrar's office, and the Dean/Provost for Academic Affairs about how the course will be listed on the course schedule. For example, cross-listing an interdisciplinary course leads to a more equal distribution of students from both disciplines, which contributes to the overarching rationale for interdisciplinary courses. In this instance, the Psychology and Criminal Justice programs already shared several minors that included electives from both programs, which seamlessly led to *Children and Violence* being cross-listed in both programs.

The last stage in the development of an interdisciplinary co-taught course is called the *finalizing*

stage. During this stage, a draft of the syllabus is completed, including learning objectives, course goals, course assignments, and course schedule. Completing and providing the syllabus prior to course pre-registration helps to clearly articulate the nature of the course to other faculty as well as to students. Faculty who serve as advisors can play a significant role in guiding students to courses, which may help ensure that a new interdisciplinary co-taught course will run successfully.

One final aspect of this stage of course development is the co-instructors identifying who will take responsibility for various aspects of the course. Concretely, co-instructors must come to an agreement about who will have primary responsibility for instruction on what days. Reviewing each of the scheduled topics and identifying which instructor takes the lead in presenting material and engaging students in discussion and activities helps the course to run smoothly. In addition, faculty can also decide to delegate responsibilities such as taking of attendance or management of the course web portal (e.g., Blackboard, Moodle). For example, on one occasion one faculty took primary responsibility for attendance and managing the course grade book, while the other took primary responsibility for the collection of papers and return of papers as well as communication with students via email. It should be noted that although there was a division of responsibilities, there were also regular meetings to review student work and discuss student inquiries and questions.

Course Delivery

Developing and planning an interdisciplinary co-taught course is critical in order to ensure its success. However, it is also important to clearly delineate a class instruction model for course delivery.

The model of interdisciplinary co-teaching described here has both instructors present in each class. This allows for a more robust interdisciplinary experience as a result of the interaction of both instructors during presentation of course topics. Kohler-Evans (2006) also recommends practicing parity when co-teaching a course. Parity in a co-teaching situation includes both instructors being fully represented in all aspects of the course (Kohler-Evans, 2006). This concept of parity does not prevent one instructor from taking primary responsibility for leading a course on a particular topic, and it still leaves room for simultaneous co-instruction. For example, in one iteration of Children and Violence, one instructor with criminal justice and legal expertise took primary responsibility for reviewing the current state of federal law on international child exploitation. The second instructor, a psychologist, was present in the classroom,

and when the class discussion led to issues related to the psychological trauma of child victims, the instructor was able to provide valuable insight. This has an added benefit of allowing students an opportunity to make critical connections that allow for deeper learning.

Because of the possibility of unplanned co-leadership of a specific class, the adherence to weekly check-ins is essential to identify and address any issues in the co-teaching relationship that may arise. These weekly meetings to review prior classes are essential for addressing course needs. This gives the faculty the opportunity to reflect on the prior class experience and to enhance the collegial relationship. Since having regular “check-ins” where faculty can state openly what worked and did not work in the prior class helps ensure the collaborative relationship necessary to successfully co-teach, it is important that part of the review and planning discussion focus on the interaction and relationship of the co-teaching faculty (Orlander et al., 2000). These meetings allow faculty to discuss matters such as concerns about student performance and student reaction to course content. One aspect of these meetings is to distribute and review student work and set parameters for assessment of course assignments. Finally, these meetings provide the opportunity to plan for upcoming presentation of topics and material to be covered.

In the model presented here, evaluation of student learning involved weekly reflection papers on the assigned readings and topics addressed in class, a small group final presentation, a term paper, and assessment of student work on the service learning project. The development of rubrics to evaluate student work assisted in the reliable and efficient grading of course assignments. At first, each assignment was independently read by each instructor, and then evaluations were compared at the weekly meetings in order to reach consensus on the assignment grade. Over time, it was discovered that the use of clear assignment goals, objectives, and rubrics resulted in consistent assessment of student work by each instructor. In fact, the grades were nearly identical for the majority of the assignments.

Although the format may appear similar with each iteration, the content and focus were revised each time the course was taught. For example, the instructors reviewed the literature and contemporary media to identify the most current issues related to the course theme of children and violence. This helped to keep the material most relevant for the students. In 2004, a major focus of the course was child sexual exploitation and maltreatment. By 2007, the course highlighted media violence and juvenile crime. In 2009, a central theme was cyberbullying and social media. In addition, over time the instructors wanted to bring the material to the next level by developing a collaborative project with

the college's Center for Community Based Learning. This worked well with the theme of cyberbullying and involved students visiting a local Boys & Girls Club and conducting a training for the children on the topic.

Summary and Recommendations

Offering this co-taught interdisciplinary course has resulted in multiple benefits. For the two professors, the course did a great deal to inform their teaching. Participation in co-teaching is motivating to both instructors as faculty can gain new insights into their own teaching and feel reinvigorated (Orlander et al., 2000). This process can also contribute to the development of a larger group of dedicated and high quality instructors for the institution. As other instructors at the institution learned of the experience of this co-taught interdisciplinary course, additional co-taught interdisciplinary courses were developed at the institution. Colleges and universities across the country are increasingly looking at interdisciplinary co-taught courses to address basic values of a liberal arts undergraduate education (Letterman & Dugan, 2004). This type of teaching also results in constant re-examination of an instructor's pedagogy, which requires a high degree of self-reflection and encourages innovative pedagogical changes (Orlander et al., 2000; Henderson et al., 2007).

Another benefit of interdisciplinary co-teaching as evidenced here is that the core concepts of one discipline are examined and clarified by the underlying principles of the other. This results in being able to critique and analyze tenets in your discipline in a sharper fashion. This occurs partially by the parallel process of professors modeling interdisciplinary discourse and the students then participating in it. For example, in *Children and Violence* the concept of "insanity" as it relates to violent crime is a topic covered. Students and faculty grappled with the discipline-specific perspectives on insanity when examining the conduct of violent juvenile offenders. Insanity from a psychological point of view is not a clinical diagnosis. However, in criminal law the idea of insanity not only exists, but also has some very distinct consequences for the juvenile offender. In this context, each instructor not only discussed the concept of insanity from the point of view of their discipline, but also engaged in a dialogue with one another to clarify the other's perspective. Students witnessed this, joined in, and engaged in their own discourse on the topic. Interdisciplinary co-teaching clarifies the ambiguities, contextualizes the issue, and stresses discussion and participatory connected learning. As stated, "human beings learn better if knowledge emerges from pedagogies that are both diverse and interactive" (Eissen, et al., 2009).

In addition, interdisciplinary co-teaching can lead to improved performance and refreshed disciplinary interest in the faculty. It can also build inter-departmental collegiality and improved morale, which enhances both productivity and student satisfaction. These courses can strengthen traditional interdisciplinary programs, like women's studies and environmental studies, by serving as required or elective courses for the programs. In *Children and Violence* the class counts for several minors, including Child and Adolescent Studies, Youth and Crime, Forensics Studies, and Human Rights. Additionally, cross-listing interdisciplinary co-taught courses increases the diversity of the students enrolled and further supports the integrative nature of the course.

For the students, there are also many learning benefits achieved through this process. A truly liberal arts student should take all types of courses and be conversant as an undergraduate in more than one discipline. In fact, taking interdisciplinary co-taught courses encourages the students to keep the door open to prepare for the specialization needed at the graduate level. Another strength of these courses is that they often deal with interesting and current subjects, which keeps the students' interest. For example, in *Children and Violence* the issue of cyber-bullying was brought into the classroom, which engaged the students in material often found in the headlines. In addition, this subject became one of the foundations of a major assignment in the course: the service-learning component of presenting to children at the local Boys and Girls club. Rigor and topical subjects are not necessarily mutually exclusive. The excitement that comes from examining these issues can also enhance student learning. The courses push the boundaries and comfort levels of the students, forcing them to transcend the traditional educational model to be active learners and to engage in higher-order critical thinking. At times the discomfort students experience in integrating multiple disciplines can lead to realizations that would not come from a traditional single instructor lecture experience (e.g., the "ah-ha" moment). The complexity of an interdisciplinary co-taught course moves the students from consumer mode to participating in the active construction of shared knowledge.

One thing the professors learned in conducting this course, as others have pointed out (Kohler-Evans, 2006, p.262), is the importance of weekly meetings and dialogue. Continual and constant communication ensures the smooth success of a valuable teaching experience (Orlander et al., 2000). In addition, continual reflection on the assignments, the classes, and the material is an invaluable part of the experience (Orlander et al., 2000; Kohler-Evans, 2006).

It is also important that the two instructors who co-teach the course are selected carefully. In this case, the professors had an extremely collegial working

relationship even before the first class was offered. The individual characteristics of each instructor were compatible and helped to make the course a success. For example, in this course, both instructors were comfortable stating their opinions, were able to effectively manage disagreements, had high levels of mutual respect for one another, and were able to be flexible. This resulted in each instructor learning from the other, thus allowing for refinements in teaching style and approach. In addition the entrepreneurial egalitarian spirit of the institution allowed the instructors to offer the course and present it in the fashion the professors found most productive.

After teaching this course three times, several pitfalls were discovered that one can plan for when creating future co-taught interdisciplinary classes. For example, students are not normally oriented to the co-teaching process since it is not the predominant approach taken in the American educational system. Many students struggle with confusion and frustration when first experiencing the co-taught classroom setting. In the course described in this paper, at times the students struggled with not being able to clearly identify one instructor as the primary authority figure. On a few occasions, a student would direct all course interactions toward only one of the two instructors. Instructors can avoid this by providing clear statements about the joint responsibility of each instructor for lectures and grading. The role of each instructor should be clarified throughout the course.

There were several other challenges faced by the instructors in conducting the co-taught interdisciplinary course. Being at an institution that focuses on teaching and advising, as well as both instructors being chairs of departments, made it sometimes difficult to find regular times to collaborate. For the course to work, it is imperative for the professors to meet consistently. The authors found that the course was most effective when it was continually engaging and highly interactive. With the time constraints, although it may seem easier to split up the lectures between instructors, the interdisciplinary nature of the course is diminished in such instances.

Administratively, there were also challenges that needed to be addressed. One was the issue of the department in which the course should be housed and also the question of cross-listing. Part of this is a budgeting matter, in that the course required additional resources for such things as guest presenters, field trips, and service learning activities. Institutional buy-in is also imperative. Faculty must begin the process of seeking departmental and administrative approval to offer an interdisciplinary co-taught course early in its development. In addition, both faculty teaching an interdisciplinary co-taught course should each receive full workload credit, which may impact other teaching responsibilities. The model of interdisciplinary co-

teaching presented here involved a full commitment of both instructors to be present at each class, which allowed the students the maximum benefit of interdisciplinary discourse.

After teaching the course several times, it became clear that mid-term course evaluations could be a useful tool in enhancing an interdisciplinary co-taught course. Mid-term evaluations provide students an opportunity to identify any concerns regarding the co-teaching experience and become more engaged in the course by providing input to the instructors. Such evaluations also help instructors assess how well course goals and objectives are being achieved at a time when course revisions can still be made. In addition, the traditional final course evaluations do not address the unique needs of assessing an interdisciplinary co-taught course. For example, standard final course evaluations do not address students' experiences of the interdisciplinary course and may not provide a way for students to evaluate both instructors. Final course evaluations need to be revised to assess the unique aspects of a co-taught interdisciplinary course. Finally, assessment methods need to be developed and enhanced to more accurately evaluate the impact of interdisciplinary co-taught courses on student learning. While a variety of co-teaching models have attempted to involve more than one discipline, there is little research on the impact of such courses on student learning (Lattuca et al., 2004). However, a more recent study of an interdisciplinary co-taught course suggests that such courses enhance critical thinking of both students and instructors (Hoare et al., 2008).

The model presented here is just one example of how to engage students in a co-taught, cross-disciplinary course. Because of emerging advances in technology, students can readily access new and different perspectives and ideas related to their discipline. In addition, multidisciplinary teams are increasingly the norm in the modern workplace. Students will be required not only to be experts in their areas of study, but also to be able to master and integrate tenets of multiple fields. Students must also learn how to effectively communicate with diverse audiences in multi-professional settings. Interdisciplinary co-taught courses are one way to provide students with the skills necessary to accomplish these goals.

References

- Eisen, A., Hall, A., Lee, T. S., & Zupko, J. (2009). Teaching water: Connecting across disciplines and into daily life to address complex societal issues. *College Teaching*, 57(2), 99-104. doi:10.3200/CTCH.57.2.99-104
- Franks, D., Dale, P., Hindmarsh, R., Fellows, C., Buckridge, M., & Cybinski, P. (2007).

- Interdisciplinary foundations: Reflecting on interdisciplinarity and three decades of teaching and research at Griffith University, Australia. *Studies in Higher Education*, 32(2), 167-185. doi:10.1080/03075070701267228
- Game, A., & Metcalfe, A. (2009). Dialogue and team teaching. *Higher Education Research & Development*, 28(1), 45-57. doi:10.1080/07294360802444354
- Harris, C., & Harvey, A. N. (2000). Team teaching in adult higher education classrooms: Toward collaborative knowledge construction. *New Directions for Adult and Continuing Education*, 87, 25-32. doi:10.1002/ace.8703
- Henderson, C., Beach, A., & Famiano, M. (2007). Diffusion of educational innovations via co-teaching. *Proceedings of the American Institute of Physics Conference Proceedings, USA*, 883, 117-120. doi:10.1063/1.2508706
- Hoare, A., Cornell, S., Bertram, C., Gallagher, K., Heslop, S., Lieven, N., & Wilmore, C. (2008). Teaching against the grain: Multi-disciplinary teamwork effectively delivers a successful undergraduate unit in sustainable development. *Environmental Educational Research*, 14(4), 469-481. doi:10.1080/13504620802278811
- Kerridge, J., Kyle, G., & Marks-Maran, D. (2009). Evaluation of the use of team teaching for delivering sensitive content: A pilot study. *Journal of Further and Higher Education*, 33(2), 93-103. doi:10.1080/03098770902856637
- Klein, J. T. (1990). *Interdisciplinarity: History, theory and practice*. Detroit, MI: Wayne State University Press.
- Kohler-Evans, P. A. (2006). Co-teaching: How to make this marriage work in front of the kids. *Education*, 127(2), 260-264.
- Lattuca, L. R., Voight, L. J., & Fath, K. Q. (2004). Does interdisciplinarity promote learning? Theoretical support and researchable questions. *Review of Higher Education*, 28(1), 23-48. doi:10.1353/rhe.2004.0028
- Lettermann, M. R., & Dugan, K. B. (2004). Team teaching a cross-disciplinary honors course. *College Teaching*, 52(2), 76-79.
- Nevins, A., (2006). Can co-teachers provide quality education? Let the data tell us! *Remedial and Special Education*, 27(4), 250-251.
- Orlander, J. D., Gupta, M., Fincke, B. G., & Manning, M. E., & Hershman, W. (2000). Co-teaching: A faculty development strategy. *Medical Education*, 34, 257-265. doi:10.1046/j.1365-2923.2000.00494.x
- Peterson, V. V. (2008). Against interdisciplinarity. *Women and Language*, 31(2), 42-50.
- Vogler, K., & Long, E. (2003). Team teaching two sections of the same undergraduate course: A case study. *College Teaching*, 51(4), 122-126. doi:10.1080/87567550309596426
- Woods, C. (2007). Researching and developing interdisciplinary teaching: Towards a conceptual framework for classroom communication. *Higher Education*, 54(6), 853-866. doi:10.1007/s10734-006-9027-3

LINDA BUCCI, MS, JD, is a Professor and Chair of the Justice Studies Department at Lasell College in Newton, MA. Professor Bucci's professional and scholarly interests are in criminal law, with a specialization in the study of violence against women, children, and other disenfranchised groups. Professor Bucci has presented two papers internationally and has published on the subject of the impact of Muslim migration on domestic violence policy in Europe. Prior to her tenure at Lasell College, Professor Bucci worked in the Suffolk County District Attorney's Office for several years holding various positions including Director of Training, Chief of the Child Abuse and Sexual Assault Unit, and Supervising Attorney for the Dorchester District Court. She also was a full-time Visiting Professor of Clinical Education at Boston College Law School. She is an experienced law instructor having also taught at Boston University School of Law in the Legal Research and Writing Program. She also worked as a superior court felony trial prosecutor for several years in the Norfolk County District Attorney's Office and in a litigation law firm.

SIDNEY M. TRANTHAM, PhD, is an associate professor in the Division of Counseling & Psychology, Graduate School of Arts and Social Sciences, Lesley University in Cambridge, MA. Dr. Trantham received his doctorate in clinical psychology in 1999 from the University of Florida Gainesville. His doctoral work focused on exploring the impact of early childhood sexual experiences on the psychological functioning of adult males. He was a Harvard Clinical Fellow (1996-2000), where he completed his clinical psychology internship and neuropsychological post-doctoral fellowships as well as engaged in research identifying early cognitive markers of HIV-related dementia. Currently, Dr. Trantham maintains a private practice where he provides integrative psychological, neuropsychological, and gender assessment as well as psychotherapy with children, adolescents, adults, and families. Areas of expertise include working with gender variant children and adolescents.

Appendix A
Children and Violence Course Components*

COURSE FEATURE	EXAMPLES
Discipline of instructor	Lawyer, psychologist, and guest speakers (e.g., domestic violence specialist, probation officer, judge)
Cross-listing	Criminal Justice and Psychology (300 level)
Meeting times	Two 75-minute meetings per week
Student profiles	Psychology, criminal justice, legal studies, sociology, human services
General education requirements addressed	Writing intensive
Topics explored	Child abuse and maltreatment Child pornography and exploitation Online predators Child witnesses of domestic violence Media violence Bullying Juvenile crime Child sex offenders Teen dating violence Children who kill Violence prevention
Pedagogical approaches	Lecture Guest speakers Out-of-class readings In-class discussion (e.g., small group activities, class debates) Reflection papers (five) Field trips Individual research papers Group presentations Service learning project
Grading basis	Class attendance Course participation Individual paper Group presentation Service learning project Note: use of rubrics to help students with clarity around assignments, expectations for academic work

*Modeled on an example from “Teaching Water: Connecting Across Disciplines and into Daily Life to Address Complex Societal Issues” (Eisen et al., 2009).

Appendix B
Course Objective, Goals, and Learning Outcomes for the Children and Violence Course

COURSE OBJECTIVE	COURSE GOALS	LEARNING OUTCOMES
Examine psychological, criminal justice, and legal issues surrounding children and adolescents who experience violence in their lives, both as victims of violence and perpetrators of violence	Increase student knowledge of psychological impact of violence on children and adolescents	Students will be able to articulate possible psychological impacts of violence toward children
	Increase student understanding of factors that influence children and adolescents to commit violence	Students will be able to how violence impacts child and adolescent development
	Increase student knowledge of legal issues that impact children and adolescents	Students will be able to articulate ways the criminal justice system handles violent youth
	Explore role of the criminal justice system in addressing violence in children and adolescents lives	Students will be able to compare and analyze the factors that contribute to child and adolescent violence
	Explore issues of race, ethnicity, gender, and sexual orientation and their role in violence	Students will be able to understand the role of professionals in working with children and adolescents who are victims and perpetrators of violence
	Examine moral and ethical issues of children and adolescents as victims and perpetrators of violence	Students will be able to assess the moral and ethical issues inherent in the study of child/adolescents violence
	To improve student critical thinking skills through oral discussion and written assignment	Students will be able to articulate how race, ethnicity, class, gender, and sexual orientation play a role in the experience of violence in children and adolescents' lives

Interteaching: An Evidence-Based Approach to Instruction

Thomas Wade Brown, Kenneth Killingsworth, and Mark P. Alavosius
University of Nevada, Reno

This paper describes *interteaching* as an evidence-based method of instruction. Instructors often rely on more traditional approaches, such as lectures, as means to deliver instruction. Despite high usage, these methods are ineffective at achieving desirable academic outcomes. We discuss an innovative approach to delivering instruction known as interteaching that is derived from the behavioral sciences and has empirical support with regard to applications in higher education. In an interteaching session, the instructor composes a preparation guide consisting of several questions that outline a required reading and distributes the guide during class. Students form small groups and work collectively on the guide while the instructor goes from group to group to answer questions. Following the session, the instructor gives a short, intensive lecture on problem areas. Previous research has shown that this approach is effective and allows for frequent assessment of instructional materials and timely guidance of student progress. Suggestions for application and areas of future research are presented.

For an instructor in higher education, the need to stay responsive to the evolving educational system is vital. Over the past 20 years, the nature of higher education has gone through extensive change. The number of students seeking higher education is rising (Snyder & Dillow, 2011), but funding for academic institutions has diminished (Tandberg, 2010). Technological advancements have created a paradigm shift in design, delivery, and assessment of instruction, yet methods are variable, and many instructors rely on older technologies and deliveries such as lectures with a midterm/final exam structure (Austin, 2000). Scholars have begun discussions exploring the accountability of higher education and data-driven decision making regarding effective instruction (Halpern & Hakel, 2003; Leveille, 2005; Michael, 1991; Saville, Lambert, & Robertson, 2011). Recent trends to innovate instruction include alternative approaches, such as flipping the classroom (Berrett, 2012) where lectures are posted to the web prior to class, and students complete homework during the allotted class time. Such methods are taking advantage of the technological advancements, but little data are reported on student performance. Innovation, empiricism and practicality all are important, and they should be used to better adapt to the ever-changing collegiate environment.

This paper describes a coherent approach to innovate instructional systems that is easily adaptable to the college classroom. First, a brief history of behavioral methods of instruction is provided followed by a description of an evidence-based approach known as *interteaching* (Boyce & Hineline, 2002). A review of previous literature and empirical evidence that supports interteaching is provided. A commentary on the use within higher education, directions for further research and suggestions for adoption and application of other forms of evidence-based instruction conclude this paper.

Behavioral Instruction in Higher Education

Behavior analysis provides a long history of integrating evidence-based approaches to educational methods (Austin, 2000; Boyce & Hineline, 2002; Keller, 1968; Lindsley, 1991; Skinner, 1958; Vargas & Vargas, 1991). Deeply rooted in the experimental analysis of behavior (Skinner, 1966), behavior analysis segments all behavior into objective units and identifies functional relationships for the purpose of prediction and control (Skinner, 1974). The applied implications of behavior analysis are profound and relevant in many disciplines including business, communications, clinical services, community applications, and more (Austin & Carr, 2000).

Behavioral applications in higher education are empirically effective for improving student retention and performance. Techniques such as programmed instruction (Vargas & Vargas, 1991), precision teaching (Lindsley, 1991) and personalized system of instruction (Keller, 1968) are effective through means of reinforcing successive approximations to mastery of course materials as evidenced by demonstration of proficiency on exams or other assessment tools. Within this paradigm, the instructor mainly serves as a designer and facilitator rather than a gatekeeper. It is the task of the instructor to allow for multiple opportunities for student response (frequent testing and assessment) and provide rapid feedback to students. Over the last five decades, several of these methods have been studied extensively (see Austin, 2000 for a review).

Resistance to behavioral methods of instruction has been documented over the years (Boyce & Hineline, 2002; Sherman, 1992). For example, the design and implementation of a behavioral program in a college classroom are labor intensive. Using a behavioral method of instruction also requires flexibility and wide institutional support, which has dwindled since the 1980s (Boyce & Hineline, 2002). An elegant approach

that captures the effectiveness of behavioral methods while also gaining administrative support is warranted.

Interteaching

Interteaching is a method of instruction derived from the empirical history of the behavior sciences (Boyce & Hinline, 2002). Interteaching creates a learning environment that includes guided instruction, study guides, peer-to-peer interactions, and instructor feedback. Lectures are included as a supporting element but are not the centerpiece of instruction. In a typical interteach session, students form small groups (two to three people per group) and work on a preparation guide for 30-45 minutes. As the session progresses, the instructor goes from group-to-group and clarifies questions, provides feedback on student responses, and assesses student performance. The remainder of the class period is used to address common questions raised during the interteach session in addition to addressing other aspects of the text. There are several important components of interteaching. In the following sections, we identify these components and offer standards and recommendations to implement in college classrooms.

Student Prep Guides

The fundamental variable in the delivery of an interteach session is the use of the preparation guide. The prep guide is distributed prior to the start of a class period and is a short series of questions that outline a required reading. Boyce and Hinline (2002) did not indicate how long in advance the prep guide should be distributed, offering that it may be appropriate to distribute the guide either at the start of the class period or a couple of days in advance. In designing the prep guide, it is important to consider the outcome objectives, the discussion topics necessary to adequately assess these objectives, and the time allocation to completion. The Appendix depicts a sample prep guide designed by the first author for an introductory psychology course.

The Interteach Session

Once the class begins, students form groups of two to three people and begin to work on answering the prep guide questions. Students are encouraged to work on answering questions prior to class, but they are expected to be active contributors during the session. Upon the start of the class period, students begin discussing responses on the prep guide and work together to find coherent and collaborative approaches to complex discussion points. While supplemental materials (e.g., notes, textbooks) may

be referred to during the session, Boyce and Hinline (2002) discourage over-utilizing these resources, as it promotes under-preparation on the part of the student.

The formation of the groups is also important. Students do not work with the same individuals throughout the duration of the course, and instead, work with different members of the class. This approach establishes a collectivist learning environment where students feel free to share opinions and thoughts about material and feel less discouraged about public scrutiny.

As the session goes on, the instructor migrates from group to group and clarifies any issues that may arise for the students. Since students are discouraged from utilizing supplemental materials, the instructor may need to shape incorrect student statements or provide guidance on how to investigate given topics. As the instructor discusses the material with different groups, notes are taken as to what problems are arising with respect to the material and questions posed by the preparation guide. If frequent problems arise, the instructor may stop the session, address a problem quickly, and inform the class that more information regarding a particular question will be more adequately discussed during the clarifying lectures following the session.

Record Evaluation and Clarifying Lecture

Once a session is complete, students fill out a short evaluation that outlines the quality of the session, which problems were difficult for the student to address, the quality of assistance provided by their group members, and the quality of the instructor's feedback. The instructor then reviews the feedback provided by the students and prepares a short clarifying lecture that allows for the problems identified by the student to be discussed at the class level. There are numerous variations and approaches to how this part of the instruction can be delivered, all of which are most likely contextually dependent on the conditions under which the course is occurring. For example, a clarifying lecture may be spent on discussing broader applications of a particular phenomenon that may not be adequately addressed in the book during weeks when the material is easy and more intensive on key concepts when the material is complex.

Another important aspect to consider is time allocation. Clarifying lectures do not take longer than one-third of a class period. Boyce and Hinline (2002) called for the clarifying lecture shortly after the interteach session so that materials presented to the class are in close temporal relation to the completion of the session. Others (e.g., Saville et al., 2011) have recommended postponing the lecture until the following class period so the instructor can better review the

written feedback provided by the record evaluation. Either approach, however, does not take an extensive amount of in-class time to administer.

Other Components

A valuable aspect of interteaching is the flexibility it allows instructors to deliver instruction while also keeping a level of engagement (Saville, 2011). Many of the traditional components that accompany instruction (e.g., papers, exams, quizzes) can still be utilized under this design, which may allow for some degree of administrative buy-in (Boyce & Hineline, 2002). It is recommended that frequent examinations and other learning assessments be delivered throughout the course of the semester to capitalize on the impact of interteaching (Boyce & Hineline, 2002; Saville et al., 2011).

Advantages of Interteaching

Interteaching is an advantageous methodology of instruction for several reasons. First, when utilizing interteaching, the instructor is incorporating an evidence-based technique within his/her instructional practices. Second, interteaching is more user-friendly than other behavioral applications of instruction.

Interteaching allows for frequent assessment of student progress because the role of the instructor is to assess student progress and form instructional tactics to promote active learning. Several products are generated by the students and the instructor to capture these assessments. First, record evaluations left by the student allow the instructor to identify areas that need improvement and focus class discussions toward these areas. As more classes go through similar didactic techniques, the instructor can estimate and predict

potential problem areas and generate materials in anticipation of troublesome questions and sections. In addition, the instructor is allowed anecdotal support via the verbal feedback generated by their students. Class discussions are more fluid and encompassing of the entire group as well. Table 1 offers a comparison of interteaching to lectures and highlights key differences in terms of student and instructor behavior and responses. As observed in this depiction, both shape crucial academic skills, but interteaching offers individual interaction with students more frequently and allows for efficient assessment of student progress and aptitude.

Challenges

Adopting interteaching comes with some factors to consider. First, the instructor is tasked with breaking materials and readings into unit outcomes and objectives. Preparation guides must be designed that allow for sufficient contact with required materials and that are also capable of generating discussion among the class. While this may seem elementary, the time associated with converting lecture materials into interteach discussions or preparation guides can be significant. In addition, it is likely that course activities or supplemental instructional demonstrations must be well planned or kept to a minimum to not overlap with scheduled interteaching sessions.

Another challenge to interteaching falls upon general course structures and times. For example, some classes meet twice a week, others three and some once. A systematic investigation has not been conducted searching for the ideal timeframe to conduct interteaching. Some instructors may have more flexibility to make adjustments in their own courses and alter the times in which they meet, while others may be

Table 1
A Comparison of Interteaching to More Conventional Methods of Instruction, Such as Lectures Combined with Exams

	Interteaching	Lectures
Student responses	Active student engagement via peer-peer discussion and rapid instructor feedback (Saville, 2011).	Students passively listen to lecture and encouraged to take notes.
Note taking	Shapes note taking skills by providing preparation guide that outlines material.	Unchecked note taking that is assessed via exams or quizzes (Austin, 2000).
Instructor interaction	Students approached individually.	Groups are addressed. Individual interaction occurs outside of class.
Class sizes	No research on large class sizes.	Can accommodate many students.
Assessment	Frequent opportunities (Boyce & Hineline, 2002).	Exams/papers as only index of learning (Austin, 2000).
Retention	High in classroom and laboratory studies (Saville et al., 2005; Saville et al., 2006).	Historically low (Matheson, 2008).

subject to more stringent requirements. Regardless, instructors interested in applying interteaching to their own courses must consider the time necessary to devote to interteaching.

Empirical Evidence of Interteaching

Since Boyce and Hineline's (2002) original article, systematic investigations into the effectiveness of interteaching offer support for its adoption. Saville, Zinn, and Elliott (2005) showed the effectiveness of interteaching compared to lecturing. In this study, participants were separated into three groups. Students in the first group read an article, returned the following week, and listened to a lecture on the article. A quiz was then given to each student on the contents of the article. Conditions in the second group were identical except instead of a lecture, students participated in an interteach session. In the last control group, students only read the article and took a quiz the following week. Results showed that students in the interteach condition outperformed those in the control condition and the lecture condition (Saville et al., 2005). This study is noteworthy as it integrates practical considerations into a tightly controlled environment and manipulates key variables in order to improve the application of a particular technology.

Saville, Zinn, Neef, Van Norman, and Ferreri (2006) replicated the results from their previous study and integrated interteaching into actual classroom instruction. In their first series of studies, the authors showed that interteaching was effective in two sections of an undergraduate course. In one section, interteaching was used in the first half of the course, while a lecturing technique was implemented during the latter half. The second section was identical, except the section began with lecturing and ended with interteaching. Students in both sections took weekly quizzes. Results of this study depicted that students in the interteaching sessions performed better than students in the lecturing sections. In the second part of this study, an interteaching component in a graduate human development course was investigated. A counterbalanced design was implemented in which the class alternated teaching techniques on a weekly basis (i.e., instruction alternated between interteaching and lecture). Students took weekly quizzes following the end of each phase. Results of this study showed that students performed higher on average during interteaching weeks than lecture weeks (Saville et al., 2006).

In their original description of interteaching, Boyce and Hineline (2002) discussed the use of quality points that are awarded to students if both members of the session respond correctly to a previous interteach question on an exam. Saville and Zinn (2009)

investigated the use of quality points on interteaching sessions. In this study, participants underwent interteaching followed by a unit exam for six units. Students responded to essay questions, which accounted for 5 points on the exam. If both students who participated in the dyad interteach session received a score of 4 or 5 on the exam, students were awarded 3 quality points. If one or both of the students earned less than four, then no students were awarded quality points. The authors note that the addition of quality points did not have any significant effect on the exam performance of students. The authors discussed some potential implications of this finding. First, the addition of quality points might be too delayed to have any lasting impact on the behavior of the students, as students did not typically know if they received quality points until after the exam had been graded (Saville & Zinn, 2009). Further, it is likely that the effective components of interteaching revolve around the formation of small groups, which creates a more immediate contingency where peers can shape the behavior of others to increase learning (Saville & Zinn, 2009).

The previous works described have focused more on small enrollment sizes. While replications with large class enrollments are warranted, few studies have examined the advantages of interteaching in courses with classes sized over 30 students. Scoboria and Pascual-Leone (2009) addressed this concern in their work. The authors applied interteaching in two sections of a large undergraduate course on abnormal psychology. The instructors distributed prep guides and utilized course assistants to aid in answering student questions, assisting students when questions arose. Clarifying lectures were then employed either in the following class period (Group 1: class met twice a week) or following a short class break (Group 2: class only met once a week). The authors report statistically significant results depicting that interteaching groups performed better on written assignments when compared to traditional lecture control groups (Scoboria & Pascual-Leone, 2009). These results show promise, as most published interteaching studies do not exceed *n* sizes of 30 students.

Interteaching has also begun to generate interest outside of the behavior sciences. Goto and Schneider (2009, 2010) incorporated interteaching into courses on nutrition. In their modified approach, the authors generated two separate preparation guides and assigned half of the class to the first and the remaining half to the second. Students assigned to guides served as instructors of the material. In follow-up experiments, preparation guide questions emerged into critical thinking synthesis assignments, during which those involved in the interteaching session worked toward generating a sufficient answer to a complex question.

Self-report metrics generated from these studies indicate that students preferred interteaching sections (Goto & Schneider, 2009, 2010). When asked to identify what the effective components of instruction were, most students suggested that the outline of the preparation guide assisted learners in reading materials and generating notations about the material. Also, students suggested that the review lecture after the interteach session was also helpful in that students had already contacted the material thoroughly and were more readily prepared to interact with the instructor. These studies are provocative for several reasons. First, they readily show the social validity of interteaching, which also allows for discussion and hypothesis forming of the effective components associated with interteaching. Second, these studies show effective modifications of interteaching in another subject discipline outside of psychology, which further increases readership and exposure of this methodology. Unfortunately, little data are shown on student performance in these studies.

Future Research

While interteaching is a promising method of instruction, an in-depth component analysis is warranted to specify which components of the methodology are effective, ineffective, or resilient to changes in schedule and structure. Given that the approach encompasses many social and behavioral components, an investigation into components is necessary to enhance both the effectiveness of interteaching and the advancement of the experimental history that interteaching is based upon. Further, many of the studies cited here used interteaching in a social science course, and little work has ventured out into other fields of study. For example, there has been no published work in using interteaching in math-based instruction or any of the physical sciences. Experimental applications in this field would generate interest on a broader scale. No studies have been organized where interteaching has been evaluated within the context of an elementary or secondary school. This absence alone creates several questions as to whether or not higher education methods can be directly replicated in these environments. Finally, interteaching has solely been used as a classroom technique. No investigation has been proposed that allows for an investigation to occur outside of the educational environment and into the adult training domain.

The scientist-practitioner approach (Hayes, Barlow, & Nelson-Gray, 1999; Shapiro, 2002) advocates for using both laboratory and experimental techniques to answer problems of social importance. Historically, this approach has been correlated with the

practice of providing human service care with the intent of keeping practitioners in contact with research and scholarship, while also providing researchers with examples of problems to address from a scientific level. We propose that similar methods of investigation and scholarship would be beneficial to higher education for several reasons. First, it would directly connect scholars from multiple disciplines to educational initiatives. This would create a network of multi-dimensional resources that would assist several instructors across the world. Second, the quality of instruction would increase as systematic investigation would further allow for pragmatism and functionality within the classroom, creating an outcome oriented approach to education. Lastly, the scientist-practitioner approach allows a mutually influential and beneficial relationship between research and application for equal emphasis on real-world problems. As generations of students change, so do learning preferences. A network that is constantly evaluating the instructional environment and notating anomalies and outcomes of practices would provide support to instructors at multiple levels.

The following framework of research questions is offered as a preliminary guide for a research program exploring interteaching in higher education.

Effective components. The scope and utility of interteaching can only be understood once the effective components of the process have been evaluated. Basic laboratory work in controlled settings that investigate the entire process would allow educators to implement proven methodologies in their instruction, while also providing a more fruitful basis in applied research for replication.

Large class sizes. Typical course sizes of interteaching studies do not exceed 45 students overall. A systematic replication of interteaching protocols within the context of a high enrollment courses would provide a scope of utility for instructors charged with educating a large number of students per semester ($n > 100$).

Interteaching compared to other methods. Recent discussions in higher education have centered on the idea of flipping the classroom to promote active learning during class time and delivery of lectures elsewhere (Berrett, 2012). While some of the foundational components of both interteaching and flipping are similar, there are differences in regards to how students spend their time out of class and the role of the instructor. Conceptual analyses that better define these roles are warranted, as are empirical comparisons. Such an agenda would add to the empirical evidence that flipping lacks, and it would provide wider interdisciplinary support for interteaching that may produce fruitful outcomes.

Interteaching in STEM. The limited research in interteaching has not expanded into the realm of

science, technology, engineering, or math (STEM). The application of these procedures to these content areas creates a provocative and exciting possibility of interdisciplinary work, connecting instructional researchers with subject experts to increase student proficiency within these subjects. Given the recent attention that this area has received (see Organization for Economic Co-Operation and Development, 2009, for their report on developed countries and their proficiencies), any research in this area aimed at improving student acquisition and retention of knowledge is warranted.

Interteaching is not designed for a particular subject matter, and we encourage educators across higher education to evaluate their own methods. Many factors impact the quality of an education, and taking an objective look at how and why our methods are designed, developed, and honed is worthwhile, especially in the context of our students facing over-taxed learning environments. Young instructors charged with building their courses are encouraged to incorporate interteaching into their curriculum and report their results. Senior instructors looking for new ways to innovate with their pedagogy are likewise encouraged to investigate this approach.

Conclusion

A growing body of interdisciplinary work supports interteaching, but much more needs to be done to answer questions of limitations, practical considerations, technological supplementation, and broader application and replication across subject matters. An instructor's selection of any program of instruction relies on a number of variables including the articulation and identification of the pedagogical assumptions of the instructor, predetermined course outcome objectives, modalities accepted at his/her institution, and application of evidence-based practice to influence learning. Evaluating the merits for adopting interteaching assists instructors in identifying these considerations and may alter their perspectives on the functions of instructors. Providing lectures to attentive students may be a satisfying experience, especially for fluent lecturers, but students' active responding during well-designed classroom activities may yield better outcomes and positive course evaluations. Instructional researchers are encouraged to study variations of this method systematically and report findings to advance the practice and notate anomalies and other practical considerations. Interdisciplinary research and application across many disciplines can identify the conditions where interteaching is worthwhile, while also notating potential weaknesses in application. The fundamental purpose of this paper is to encourage instructors to

reconsider their pedagogical assumptions and techniques. Interteaching offers an attractive method for bringing instructors into closer contact with measures of students' learning. Heightened focus on student performance and innovation in creating students' active participation can create more satisfying experiences for instructors while improving learning outcomes for students.

References

- Austin, J. (2000). Behavioral approaches to college teaching. In J. Austin & J. E. Carr (Eds.), *Handbook of applied behavior analysis* (pp. 449-472). Reno, NV: Context Press.
- Austin, J., & Carr, J. E. (2000). *Handbook of applied behavior analysis*. Reno, NV: Context Press.
- Berrett, D. (2012, February 19). How flipping the classroom can improve the traditional lecture. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/How-Flipping-the-Classroom/130857/>
- Boyce, T. E., & Hineline, P. N. (2002). Interteaching: A strategy for enhancing the user-friendliness of behavioral arrangements in the college classroom. *Behavior Analyst*, 25, 215-226.
- Goto, K., & Schneider, J. (2009). Interteaching: An innovative approach to facilitate university student learning in the field of nutrition. *Journal of Nutrition Education and Behavior*, 41(4), 303-304. doi:10.1016/j.jneb.2009.02.003
- Goto, K., & Schneider, J. (2010). Learning through teaching: Challenges and opportunities in facilitating student learning in food science and nutrition by using the interteaching approach. *Journal of Food Science Education*, 9(1), 31-35. doi:10.1111/j.1541-4329.2009.00087.x
- Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning to the university and beyond. *Change*, 35, 36-41.
- Hayes, S. C., Barlow, D. H., & Nelson-Gray, R. O. (1999). *The scientist practitioner: Research and accountability in the age of managed care* (2nd ed.). Boston, MA: Allyn and Bacon.
- Keller, F. S. (1968). "Good bye, teacher . . ." *Journal of Applied Behavior Analysis*, 1(1), 79-89. doi:10.1901/jaba.1968.1-79
- Leveille, D. E. (2005). *An emerging view on accountability in American higher education* (CSHE No. 8.05). Berkeley, CA: University of California, Berkeley. Retrieved from <http://cshe.berkeley.edu/sites/default/files/shared/publications/docs/ROP.Leveille.8.05.pdf>
- Lindsley, O. R. (1991). Precision teaching's unique legacy from B. F. Skinner. *Journal of Behavioral Education*, 1(2), 253-266. doi:10.1007/BF00957007

- Matheson, C. (2008). The educational value and effectiveness of lectures. *Clinical Teacher*, 5(4), 218-221. doi:10.1111/j.1743-498X.2008.00238.x
- Michael, J. (1991). A behavioral perspective on college teaching. *Behavior Analyst*, 14, 229-239.
- Organization for Economic Co-Operation and Development. (2009). *Programme for international student assessment*. Washington, DC: Author. Retrieved from <http://www.oecd.org/edu/school/programmeforinternationalstudentassessmentpisa/>
- Saville, B. K. (2011). Interteaching: A behavior-analytic approach to promoting student engagement. *Promoting Student Engagement*, 1, 128-133.
- Saville, B. K., Lambert, T., & Robertson, S. (2011). Interteaching: Bringing behavioral education into the 21st century. *Psychological Record*, 61, 153-166.
- Saville, B. K., & Zinn, T. E. (2009). Interteaching: The effects of quality points on exam scores. *Journal of Applied Behavior Analysis*, 42(2), 369-374. doi:10.1901/jaba.2009.42-369
- Saville, B. K., Zinn, T. E., & Elliot, M. P. (2005). Interteaching vs. traditional methods of instruction: A preliminary analysis. *Teaching of Psychology*, 30, 133-136.
- Saville, B. K., Zinn, T. E., Neef, N. A., Van Norman, R., & Ferreri, S. J. (2006). A comparison of interteaching and lecture in the college classroom. *Journal of Applied Behavior Analysis*, 39(1), 49-61. doi:10.1901/jaba.2006.42-05
- Scoboria, A., & Pascual-Leone, A. (2009). An "interteaching" informed approach to instructing large undergraduate classes. *Journal of the Scholarship of Teaching and Learning*, 9(3), 29-37. Retrieved from <http://josotl.indiana.edu/article/viewFile/2140/2050>
- Shapiro, D. (2002). Renewing the scientist practitioner model. *Psychologists*, 15, 232-234.
- Sherman, G. J. (1992). Reflections on PSI: Good news and bad. *Journal of Applied Behavior Analysis*, 25(1), 59-64. doi:10.1901/jaba.1992.25-59
- Skinner, B. F. (1958). Teaching machines. *Science*, 128(3330), 969-977. doi:10.1126/science.128.3330.969
- Skinner, B. F. (1966). What is the experimental analysis of behavior? *Journal of the Experimental Analysis of Behavior*, 9(3), 213-218. doi:10.1901/jeab.1966.9-213
- Skinner, B. F. (1974). *About behaviorism*. New York, NY: Vintage.
- Snyder, T. D., & Dillow, S. A. (2011). *Digest of education statistics 2010*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://nces.ed.gov/pubs2011/2011015.pdf>
- Tandberg, D. A. (2010). Politics, interest groups and state funding of public higher education. *Research in Higher Education*, 51(5), 416-450. doi:10.1007/s11162-010-9164-5
- Vargas, E. A., & Vargas, J. S. (1991). Programmed instruction: What it is and how to do it. *Journal of Behavioral Education*, 1(2), 235-251. doi:10.1007/BF00957006

THOMAS WADE BROWN, MA, is a doctoral student in the Behavior Analysis program at the University of Nevada, Reno. His academic interests include instructional design, organizational behavior, and delay-discounting of social commodities.

KENNETH KILLINGSWORTH, MA, is a doctoral student in the Behavior Analysis program at the University of Nevada Reno. His work and interests are centered on skill development and maintenance in a variety of applied settings including behavior management and community development.

MARK P. ALAVOSIUS, PhD, interests are in developing behavioral systems to improve performance particularly in the areas of health and safety. These focus on behavior systems analysis, management practices, instructional design, incentives, and entrepreneurial behavior. He held faculty appointments in the Behavior Analysis and Industrial/Organizational program at Western Michigan University and the Behavior Analysis program at West Virginia University, and is currently an Assistant Professor in the Behavior Analysis program at the University of Nevada.

Authors' Note

Correspondence concerning this article should be addressed to Thomas Wade Brown, Psychology Department, University of Nevada, Reno, 1664 North Virginia Street, M/S 296, Reno, NV 89557. E-mail: twbrown@nevada.unr.edu

Appendix
Interteach Assignment: Chapter 1

1. Psychology is currently defined as:
2. What is dualism?
3. Who was denied a PhD degree from Harvard because she was a woman?
4. Explain the difference between Clinical Psychology and Psychiatry.
5. Dr. James proposes that a man's desire for young and healthy women contributes to the survival of the human species. What psychological perspective is this and why??
6. Describe what a hypothesis is.
7. When everybody has an equal chance of being included in a study, this process is called:
8. Which of the following correlation coefficients reflects the *strongest* correlation?
 - A. $+.10$
 - B. $-.64$
 - C. $+.35$
 - D. $-.10$
9. Consistently we find low self-esteem is often related with high levels of depression. Does this mean that low self-esteem causes depression? Explain.
10. In order to prove a cause-and-effect relationship we must use what?
11. Neither the researcher nor the subjects knows whether or not they received the drug studied or a placebo. What type of study is this?

In Defense of Reading Quizzes

Elizabeth Tropman
Colorado State University

Many students fail to read the assigned material before class. A failure to read is detrimental to both student learning and course engagement. This paper considers the often-neglected teaching technique of giving frequent quizzes on the reading. Drawing on the author's experiences assigning reading quizzes, together with student opinions about the quizzes solicited in end-of-semester surveys, this paper suggests that quizzing students on the reading has much to recommend it, and that common reservations about the practice are unfounded.

Reading assigned texts before class is a valuable activity for any student. Still, many students decide not to do the reading. Unfortunately, failing to read leads to many undesirable results. Students who have not done the reading face more difficulties understanding the day's material. Additionally, such students are less engaged and less likely to contribute to class discussion. According to Karp and Yoels (1976), student self-reports indicate that failure to do the reading ranks among the strongest predictors of student non-participation. But the value of reading extends beyond facilitating a successful class meeting. Reading outside of class is a crucial step towards acquiring central skills, both general and discipline-specific, that many courses aim to impart.

In light of the above, quizzing students on the reading might be a useful teaching technique. Yet, reading quizzes are frequently dismissed as impractical or harmful or both. Drawing on my own experiences using reading quizzes in philosophy courses, together with student feedback collected in surveys about the quizzes, this paper considers—and ultimately defends—the merits of this teaching method. Asking students to respond to daily reading questions has much to recommend it, and moreover, many reservations about the teaching method may be misplaced.

Encouraging Reading

Students often fail to read if they think that reading is not necessary to do well in the course (Hobson, 2004). It is important, then, that reading is treated as a non-optional, important part of course work. Among the common suggestions for improving reading compliance, giving quizzes is usually absent. Consider, for example, the following recommendations one finds in the college-teaching literature:

- Explain the reading assignment's relevance and preview the reading (Hobson, 2004).
- Pose non-adversarial, unthreatening questions to the class about the reading (Gaede, 1989).

- Assign the reading close to the use date (Davis, 1993; Hobson, 2004).
- Set aside class time to allow students to read (Davis, 1993; Hobson, 2004).
- Include exam questions on elements of the reading not covered in class (Carkenord, 1994; Davis, 1993; Hobson, 2004).
- Ask students to complete summaries of reading either for extra credit, for use on a subsequent exam, or for a grade (Bean, 1996; Carkenord, 1994).
- Assign a reading log (Bean, 1996).
- Have students answer questions about the reading online 2 hours before class meetings and discuss student answers in class (Howard, 2004).
- Ask students to construct multiple-choice questions on the reading (Bean, 1996).
- Distribute study questions prior to the reading (Bean, 1996).

While these are no doubt excellent ideas, many of the practices, by themselves, may not represent strong enough motivators for students to read, and some of the practices have significant drawbacks. If answers to study questions are not collected and evaluated, students will take much less care with them. Assigning reading summaries for extra credit could inadvertently send the message that the kind of careful reading a summary requires goes above and beyond the class' standard expectations. Asking students to complete online quizzes outside of the classroom requires students to access additional technology, and instructors are constrained to evaluating answers right before class meetings. Even though testing students on reading not covered in class sounds similar to quizzing, students may presume that they only have to read assigned texts carefully before an exam rather than consistently throughout the semester and before each class discussion. However, the aim of this paper is not to dismiss the above practices for improving student reading, but to consider seriously the merits of using reading quizzes in the classroom.

Using Reading Quizzes

The following is an account of how I use reading quizzes in my introductory and upper-level undergraduate philosophy courses, of roughly 35 students in size, at an American public university. While frequent quizzing may not be as practical for large lecture classes, it is possible that the procedure could be revised to be useful in such a setting (e.g., with the help of clickers or other technologies). Further, reading quizzes are not specific to the discipline of philosophy; quizzes could find fruitful application in any course where reading outside of the classroom is an important activity.

On the first day of class, I explain to my students that reading philosophy is crucial to learning, writing, and doing philosophy. I communicate how important it is that every class member spends quality time with the reading before our meetings, and I devote class time to discuss strategies for reading assigned texts. In general, I underscore how important reading philosophy is for a philosophy class, and this stress is backed up by the reading quizzes.

I often give a quick quiz on the reading at the start of class. Quizzes typically consist of one or two brief questions on the reading. Some questions can be answered with a few terms (e.g., “Ross argued that there were seven basic categories for moral evaluation; identify three of these seven categories.”), while others require no more than one or two sentences (e.g., “The title of today’s paper was ‘Two Levels of Pluralism.’ What distinguishes second-level pluralism from first-level pluralism?”). Sometimes quizzes ask students to offer their own critical reflection on the day’s reading (e.g., “Discuss one possible weakness with Sturgeon’s response to Harman.”) or summarize the paper’s main points (e.g., “Referring to two specific details of today’s reading, clearly summarize the main conclusion of the paper.”). At other times, students complete quizzes in pairs or in groups. Some quizzes are open-book. I even assign a handful of take-home quizzes. There is not always a quiz each day, but they are frequent enough that students expect a quiz during most meetings. Make-up quizzes are not permitted, but students’ two lowest quiz scores are dropped by the semester’s end. The semester also begins with several non-graded, non-collected practice quizzes to help prepare students and reduce apprehension about the procedure.

In my introductory courses, quiz scores make up 20% of a student’s final grade. In an upper-level course, quizzes count for slightly less (i.e., 15%). These percentages are significant enough to demand a student’s attention, and final grades partly reflect one’s performance reading and writing about what one has read.

While students can exhibit some stress about taking the quizzes at the very start of the semester, this anxiety seems to disappear as students get used to the practice of answering reading questions in class and, also, as students realize that they can do well on the questions. (See discussion of student self-reports of anxiety below.) While quiz scores are typically low for the first or second quiz, the scores markedly improve throughout the semester. The use of quizzes sometimes brings students to my office, asking for help on how to do a better job reading the assignments (presumably so as to do better on quizzes). Before I used reading quizzes, students did not come to see me with concerns about their reading skills.

Quizzes have additional benefits. The assignments encourage attendance without having to take attendance. Students make more of an effort to arrive at class on time, as quizzes typically occur at the class’ start. My comments on, and evaluations of, their quiz answers also offer students timely feedback on their reading skills and, to some extent, on their writing and critical thinking. At the start of class, students are usually looking over the reading. Many students are talking about the reading with one another. Students sometimes contact me before class to ask questions about what they have read. This dialogue is welcome. There is already a real engagement with the class’ material before the class even begins. Not surprisingly, since many students come to class already familiar with the text at hand, and having thought about the reading, class discussion is much more fruitful and lively. Participation in class discussion is valuable, as it can strength one’s confidence with the material, facilitate deeper understandings, and foster a more active learning environment. Having done the reading and being prepared to discuss it critically are important objectives for student learning.

Student Attitudes Toward Reading Quizzes

Student attitudes about reading quizzes were assessed through an end-of-semester anonymous survey. Surveys were administered in my introductory sophomore-level philosophy class, Introduction to Ethics ($n = 27$), and my advanced upper-level philosophy class, Ethical Theory ($n = 28$). The survey started with an open-ended item to solicit general opinions about the quizzes. Students then answered five questions about the quizzes using a 5-point scale ranging from 1 (*very negative*) to 5 (*very positive*), or from 1 (*none*) to 5 (*high*).

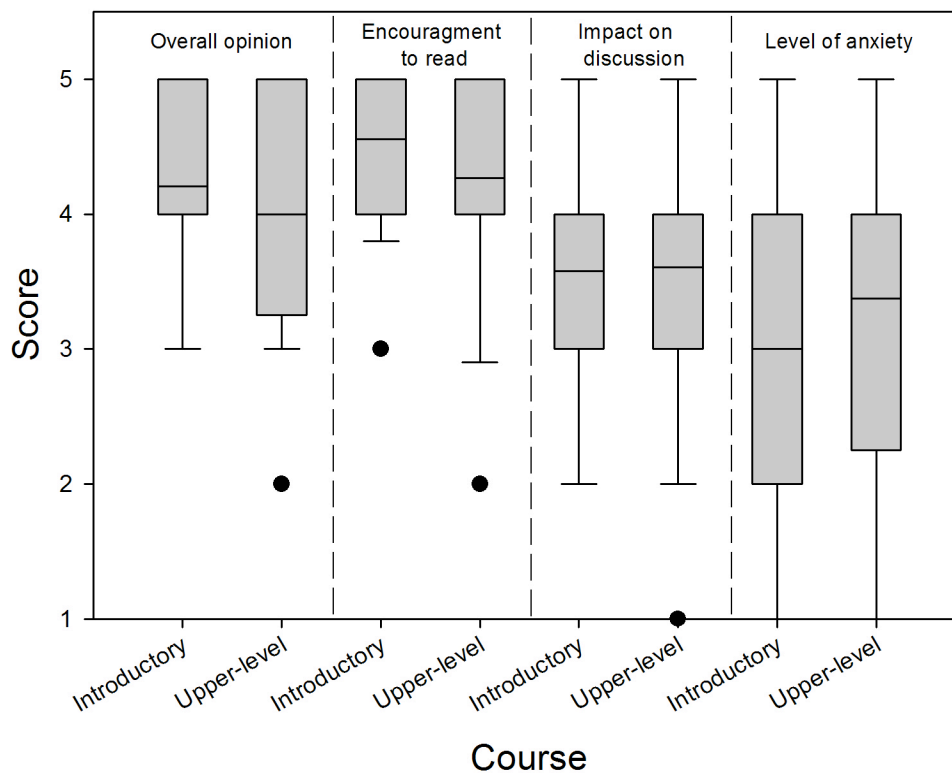
Responses to several survey questions are summarized in Table 1 and Figure 1. As Table 1 and Figure 1 indicate, students rated the quizzes favorably. A large majority of students surveyed (89%) reported a *very positive* (5) or *somewhat positive* (4) overall

Table 1
Summary of Survey Results

Question	Introductory course		Upper-level course	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
What is your overall opinion about the use of reading quizzes in the class?	4.2	0.7	4.0	0.8
What level of encouragement did the reading quizzes provide you to read the day's reading?	4.6	0.6	4.3	1.0
What impact did the reading quizzes have on your ability to engage in class discussions?	3.6	1.0	3.6	1.0
What level of anxiety about taking a quiz did you experience at the start of class?	3.0	1.4	3.4	1.3

Note. $n = 27 - 28$. For the first question, numerical scores 1 = *very negative*, 2 = *somewhat negative*, 3 = *neutral*, 4 = *somewhat positive*, and 5 = *very positive*. For the other three questions, 1 = *none*, 2 = *little*, 3 = *some*, 4 = *moderate*, and 5 = *high*.

Figure 1
Boxplots of Course Survey Data



Note. Boxes represent the range from the 25th to 75th percentile, whiskers indicate the 10th and 90th percentiles, lines indicate the mean values, and closed circles indicate outliers.

opinion of the quizzes. In the introductory course no one reported a negative opinion (1) or (2) of the quizzes, and in the upper-level course a single student reported a *somewhat negative* (2) opinion. When asked what level of encouragement the quizzes provided them to read the day's reading, 85% of students answered

high (5) or *moderate* (4). Students also perceived quizzes to have a positive impact on their ability to engage in class discussion.

The survey asked students to rate their level of anxiety about taking a quiz in class. Only 18% of students reported *high* (5) levels of anxiety. No

significant correlation was found between reported anxiety levels and overall opinions about the reading quizzes. One student included this comment next to the survey item about anxiety: "In the beginning high, but then low." This comment reflects my observation of student anxiousness over time.

Responses to the open-ended question, "In the space below, please offer any comments on the use of reading quizzes in this class," were generally positive. Responses such as the following were typical: "I actually enjoyed the quizzes. They provided additional motivation to complete the reading while not being so difficult as to cause anxiety"; "The fact of the matter is that generally students will not do the reading unless forced to which is a major problem for a discussion based class. I can't see how this class would function without the reading quizzes"; and, "At the time of the quizzes they didn't seem very appealing, but overall I would say they're helpful by motivating reading ahead, which contributed to class discussion since everyone is familiar with the text." Another student noted,

To be honest I really enjoyed having the reading quizzes. It caused me not only to *do* the readings but also to try and grasp what was said as opposed to just assuming I understood or waiting to hear in class about the main points of the readings.

Similarly, one student explained,

I like the quizzes a lot. It makes me do the reading even at times in the semester when there is a lot going on. Having all the reading done is really important for this class. So I was glad to have the extra incentive.

Thus, despite the unpleasantness of taking a quiz, students reported favorable attitudes about reading quizzes and associated benefits with having the quizzes assigned in class.

Objections to Reading Quizzes

Even though using reading quizzes has advantages, instructors are reluctant to employ this teaching method. This section considers several common objections to quizzing students on the reading and suggests that they are not as serious as they first appear.

A prominent argument against frequent quizzing is that such a practice fosters in students the wrong sort of motivation to learn and an undesirable, antagonistic attitude towards the professor. Lowman (1995) nicely captured this worry as follows. When outlining two general methods to encourage student reading, he described the unstructured, "laissez-faire approach" (Lowman, 1995, p. 230) whereby the professor simply

assumes that students will do outside reading and rarely refers to the reading in class. Lowman (1995) also observed the following:

At the other extreme of structure are instructors who have daily quizzes—or unannounced "pop" quizzes—on assigned reading. . . . Although these procedures are likely to produce more short-term compliance among students than are unstructured methods, they also often create student anxiety and an adversary relationship with instructors that color the orientation students bring to their learning. (p. 230)

Lowman advised instructors to find a middle ground. For him, "probably the best single option" (Lowman, 1995, p. 235) for motivating your students to do the reading is to refer to the reading explicitly in class. In courses that focus on texts assigned for class meetings, it is unlikely that a professor will not refer directly to the day's reading. For this reason, simply referring to the reading may not be enough to improve students' reading compliance.

Consider first Lowman's (1995) concern that quizzes foster a negative classroom atmosphere. Indeed, the use of quizzes might seem too intimidating for students. If almost every class started with a reading quiz, students could become quickly resentful and experience unnecessary anxiety at the start of class. Students might find the quizzes too demanding and complain that they are unfair. Constant quizzing could lead to an antagonistic relationship between the students and professor. As Burchfield and Sappington reported (2000), professors may be hesitant to penalize a student's grade for failing to do the reading "for fear of offending faculty colleagues, students, or both" (p. 60).

I shared these concerns the first semester that I used quizzes. Yet, rather than facing a class revolt, I found that students are grateful for quizzes. The survey results described above support my observations that students do not have a negative attitude about the quizzes. I have not yet had a student complain to me about the reading quizzes. While I do detect some tension during the first few quizzes, after the third quiz, students appear relaxed and ready. On the survey, several students commented that quiz questions were not too difficult if they were prepared. Student reports of anxiety levels were not overly high. For me, quizzes help set the atmosphere that I seek: one with the expectation that everyone comes to class prepared to engage with the material at hand. In their paper, "Ten Easy Ways to Engage Your Students," Gray and Madson's (2007) eighth suggestion to engage students was to quiz them daily. According to them, "Just the act of trying to get a correct answer changes the tone of the class. If you quiz at the beginning of the class, you will

arrive at class and find students studying together” (Gray & Madson, 2007, p. 85). They argued that holding students accountable daily is highly beneficial for both student learning and motivation.

If a reading is particularly challenging, one may object that it would be unfair to test students on it before it is discussed. This issue can be addressed. For example, I tell students that they should always be able to answer the following question on a reading quiz: “What was the main conclusion of the reading, and how did the author support this position?” Also, I sometimes give students several specific questions on the reading, especially if the material is difficult. If a question is given to them beforehand as a reading question, students can expect to be able to answer it on a quiz. Such questions are also useful insofar as they guide students’ reading and focus their attention on key points of relevance, points that will be centrally discussed in the upcoming class.

Contrary to Lowman’s (1995) prediction, I have not detected that the quizzes foster student-professor animosity. My own view is that the degree to which students feel adversarial towards their professor depends on a number of other factors about the course, the teacher, and the student—factors that do not turn on the implementation or non-implementation of quizzes. Also, over time, the quizzing becomes more of a daily practice of responding to a posed question about the day’s material and less like an examination or test. The quizzes are not a surprise, and they are so frequent that they do not function as traditional pop quizzes.

Lowman’s (1995) other concern was that quizzes provide the wrong sort of motivation to learn. We want to encourage students to read for learning’s sake. Reading merely to avoid a poor quiz score appears inimical to this aim. Lowman (1995) argued, “using grades to motivate compliance with routine homework or reading assignments has the unintended side effect of orienting students more toward the external grades they receive than toward internal intellectual satisfactions” (p. 231). These internal motives are important, as they are more effective and long-lasting than are external ones. Lowman (1995) and others have described the learning-oriented student as one who finds intrinsic value in the classroom experience, as well as personal significance and satisfaction in learning course material (Lowman, 1990; Milton, Pollio, & Eison, 1986). By contrast, the grade-oriented student is motivated by the extrinsic reward or punishment of grades and views classroom activities in terms of their implications for course grades (Milton et al., 1986). While Lowman (1990) admitted that using extrinsic motivators may represent a more powerful quick fix to prevent certain undesirable behaviors, the problem is that you must continually use the extrinsic motivator to ensure the result. But perhaps more importantly, Lowman (1990)

suggested that being extrinsically motivated in fact decreases one’s intrinsic motivational structure (see also Deci, Koestner, & Ryan, 1999). This is worrisome, as experiencing the intrinsic rewards of studying the subject is important to one’s learning and engagement in class. In support of this later claim, Milton et al. (1986) reported that learning-oriented students scored significantly higher on the Survey of Study Habits and Attitudes and exhibited high levels of participation and collaboration. Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) also found that being motivated by intrinsic goals had a positive effect on students’ learning and educational performance.

Using quizzes might unintentionally foster a grade-oriented motive to read rather than the more desirable learning-oriented motive to do so. According to Milton et al. (1986), the following descriptions characterize a grade-oriented professor: “Use frequent tests, and possibly surprise quizzes, strictly to enforce student reading. Believe that students will not attend class regularly without coercion such as penalizing absences. . . . Use elaborate point systems to monitor or reward student work” (p. 145-146). Research also suggests that instructors who adopt a controlling attitude in the classroom, rather than an autonomy-supportive one, negatively affect students’ educational performance and intrinsic motivation to learn (Reeve, 2009; Ryan & Deci, 2000; Vansteenkiste et al., 2004). The objection to daily quizzing, then, is that it promotes grade-oriented students and diminishes desirable learning-oriented motives. Starcher and Proffitt (2011) rejected using reading quizzes on similar grounds. They asserted the following:

It is difficult to see how threatening students with embarrassment in front of their peers if they don’t answer a discussion question, or forcing them to read the text so that they can pass a quiz consisting of ten multiple choice questions, will instill this [important] love of learning. (Starcher & Proffitt, 2011, p. 404)

In reply, it is not clear that reading quizzes harm students’ learning-oriented motives. The practice of quizzes could positively affect one’s intrinsic motive to read. To the extent that quizzes help improve one’s reading skills, reading will become less frustrating, as well as more enjoyable, rewarding, and stimulating. Once students are able to see a real connection between the day’s reading and classroom discussion, difficult texts can become less foreign and more accessible. Quizzes can also provide immediate feedback on how well one has read the material. As Concepción (2004) argued, the metacognitive activity of thinking about one’s reading practices and performance is an important step to growth as a reader.

Each semester, I meet with several students who report that they did the reading but performed poorly on quizzes. This opens the door to a conversation about good reading practices and possible reading strategies. If students do not regularly engage in the act of reading and do not monitor their progress in this area, it is hard to see how their reading skills could improve measurably. Unlike Lowman (1995), I am not opposed to using some apparently external motivators to encourage students to practice reading outside the classroom.

Finally, one might not object to quizzes on pedagogical grounds, but instead for the reason that they would be unduly time consuming to implement. Giving so many quizzes might take up invaluable class time. However, once classes get into the habit of taking quizzes, the entire procedure takes no more than 5 minutes. In addition, the process of writing a brief quiz answer can be a useful way for students to transition to discussing the material. Also, quizzes need not be given during every class.

Perhaps more objectionable is the amount of time that it would take to both write questions and grade responses. It is true that one has to devote some time devising and marking the assignments, but the task need not be onerous. In my own case, the small additional time spent putting the quizzes in place is worth the tangible benefits for my class discussions and students' success. With a bit of practice and some trial and error, it becomes easier to design effective quiz questions that are fast to grade.

Additional Suggestions for Implementing Quizzes

For readers interested in using reading quizzes in their courses, this section contains additional suggestions for their implementation. Regarding grading, I evaluate quizzes on a 5-point scale and give zeros to incorrect or missing responses. If answers are partly correct, but are difficult to understand or are otherwise faulty, they receive 1, 2, or 3 points out of five. I award 4 points to answers that are on the right track, but are unclear or somewhat inaccurate. Students appreciate the possibility to earn partial credit on quizzes. This reduces some of the pressure associated with taking a quiz, as success is not an all-or-nothing matter. Still, it is important, in my experience, not to be overly generous when marking quizzes, as some students will make up answers without having done the reading and hope that they will receive points for merely sitting the quiz. I typically give no credit to answers that display little or no familiarity with the reading.

Some students are also apt to skim the first and last pages of the reading and construct answers on that basis. Hence, it is a good idea to write quiz questions

that speak to central points of the reading, points that would be difficult to reproduce by a lucky guess or cursory glance at the opening paragraph. Finally, if a class performs particularly poorly on a quiz, instructors can always drop the quiz score or offer an opportunity for make-up credit.

As is the case when constructing any exam question or paper prompt for the first time, some newly written quiz questions will be more successful than others. Every so often, students misconstrue the question or find it easy to answer correctly with a guess. For these reasons, I keep a running log of which quiz questions are in need of revision for the future and why. I also maintain a record how each quiz question was graded, noting how many points were deducted for which sorts of answers. This makes grading easier in subsequent semesters.

In class, I go over the answers to quizzes immediately after they are collected and solicit sample responses from students. In this way, students can see how their peers have answered while receiving timely feedback on their own responses. Sometimes I ask students to trade quiz papers and comment on each other's work. This is especially effective when students have been asked to evaluate an aspect of the day's reading, and it can also facilitate a productive class discussion.

Conclusion

It is too easy for students to skip the reading, and when they do, their engagement and overall learning suffers. Of all of the suggestions to encourage students to read, reading quizzes are frequently dismissed as impractical and overly harsh. The professor who quizzes on the reading is often cited as an example of the adversarial and controlling professor who wields his or her power over grades to coerce student compliance. Despite the arguments to the contrary, I have had success using quizzes in my classes. Even though quizzes require extra work from students, survey results indicate that students had a positive opinion of the teaching technique. Quizzes make it clear to students that they are expected to read before each class. Students' performance on reading quizzes offers them some immediate feedback on their reading skills, and to some extent, on their writing abilities. Reading quizzes also encourage students to prepare carefully for the class meeting, and as such, students are more likely to participate in class discussion and understand the day's material. Unfortunately, critics of reading quizzes are often under a misconception about how students would react to them, and many of the reservations about using quizzes are unfounded. Given their potential benefits, reading quizzes merit serious consideration as an effective tool in the college classroom.

References

- Bean, J. C. (1996). *Engaging ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom*. San Francisco, CA: Jossey-Bass.
- Burchfield, C. M., & Sappington, J. (2000). Compliance with required reading assignments. *Teaching of Psychology*, 27(1), 58-60.
- Carkenord, D. M. (1994). Motivating students to read journal articles. *Teaching of Psychology*, 21(3), 162-164. doi:10.1207/s15328023top2103_8
- Concepción, D. W. (2004). Reading philosophy with background knowledge and metacognition. *Teaching Philosophy*, 27(4), 351-368. doi:10.5840/teachphil200427443
- Davis, B. G. (1993). *Tools for teaching*. San Francisco, CA: Jossey-Bass.
- Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125(6), 627-668. doi:10.1037/0033-2909.125.6.627
- Gaede, H. L. (1989). When they don't do the reading. *Teaching Professor*, 3(10), 3-4.
- Gray, T., & Madson, L. (2007). Ten easy ways to engage your students. *College Teaching*, 55(2), 83-87. doi:10.3200/CTCH.55.2.83-87
- Hobson, E. H. (2004). Getting students to read: Fourteen tips. *IDEA Paper*, 40, 1-10.
- Howard, J. R. (2004). Just-in-time teaching in sociology or how I convinced my students to actually read the assignment. *Teaching Sociology*, 32(4), 385-390. doi:10.1177/0092055X0403200404
- Karp, D. A., & Yoels, W. C. (1976). The college classroom: Some observations on the meanings of student participation. *Sociology and Social Research*, 60(4), 421-439.
- Lowman, J. (1990). Promoting motivation and learning. *College Teaching*, 38(4), 136-139. doi:10.1080/87567555.1990.10532427
- Lowman, J. (1995). *Mastering the techniques of teaching*. San Francisco, CA: Jossey-Bass.
- Milton, O., Pollio, H. R., & Eison, J. A. (1986). *Making sense of college grades: Why the grading system does not work and what can be done about it*. San Francisco, CA: Jossey-Bass.
- Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, 44(3), 159-175. doi:10.1080/00461520903028990
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78. doi:10.1037/0003-066X.55.1.68
- Starcher, K., & Proffitt, D. (2011). Encouraging students to read: What professors are (and aren't) doing about it. *International Journal of Teaching and Learning in Higher Education* 23(3), 396-407. Retrieved from <http://www.isetl.org/ijtlhe/pdf/IJTLHE1057.pdf>
- Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology*, 87(2), 246-260. doi:10.1037/0022-3514.87.2.246

ELIZABETH TROPMAN is Associate Professor of Philosophy at Colorado State University. Her research is in ethics and metaethics, with specific attention to moral realism, moral intuitionism, and the epistemology of moral judgment.

Conceptualizing Criticality as a Guiding Principle for High Quality Academic Service Learning

Angela Lewellyn Jones and Pamela M. Kiser
Elon University

Recent service-learning literature proposed a dichotomous framework for understanding service learning as either traditional service learning or critical service learning. Within this proposal, critical service learning is differentiated from traditional service learning as emphasizing social change, working to redistribute power, and seeking to develop authentic relationships, while traditional service learning does none of these. Traditional service learning is described as being of lower quality, more often resembling a charitable approach to engaging students with the community, without attention to the role of inequality in the social system, thereby presenting dangers to the community and the students that clearly outweigh the benefits. Rather than adopt the traditional vs. critical service learning paradigm that has been proposed, we suggest that criticality be considered in the construction of all service-learning courses and that faculty consider thoughtfully the level of criticality that is appropriate within a given course and academic discipline. Further, we suggest that criticality might be increased through more fully integrating critical thinking into service-learning courses.

As universities prepare students for life in the 21st century, equipping them to understand and navigate issues of diversity and inequality in society becomes imperative due to increasing diversity and socioeconomic polarization within our own borders as well as increasing communication and interdependence globally (Association of American Colleges and Universities [AAC&U], 2007; Hurtado & DeAngelo, 2012). Developing effective pedagogies to accomplish these goals becomes paramount within this context, and service learning has been touted by many as one such pedagogy. Since the 1970s, service learning has been practiced in a variety of forms and within diverse disciplines with research on its effects suggesting that students who participate in service learning are more likely (a) to develop a stronger pluralistic orientation (Hurtado & DeAngelo, 2012); (b) “to confront notions of prejudice, be inclusive of views different from their own, and embrace social justice” (Finley, 2011, p. 17; see also Densmore, 2000; Hurtado, 2009; Zuniga, Williams, & Berger, 2005); (c) to express tolerance of, and appreciation for, diversity (Eyler & Giles, 1999; Jay, 2008; Krain & Nurse, 2004; Levesque-Bristol, Knapp, & Fisher, 2010; Marullo, 1998); (d) to reduce stereotyping (Eyler & Giles, 1999; Hirschinger-Blank, Simons, & Kenyon, 2009; Myers-Lipton, 1996; Root, Callahan, & Sepanski, 2002; Simons & Cleary, 2005); (e) to develop a deeper understanding of social issues (Jones & Hill, 2001; Markus, Howard, & King, 1993); (f) to exhibit greater racial understanding (Astin & Sax, 1998); (g) and to “move from awareness to critical consciousness” (Davi, 2006, p. 92). Since service learning’s inception there have been on-going debates regarding which forms of service learning yield the greatest benefits to student learning and community well-being. Much of the research on service learning seeks to answer this important question through

empirical evidence. As faculty who have taught service-learning courses for a collective total of nearly 50 years, we too have given considerable attention to this question as it has pertained to our service-learning teaching and course development. As service-learning leaders on our campus, we have had countless opportunities to discuss this question with colleagues from nearly every academic discipline as they developed their own service-learning courses and scholarly agendas. Through this process, we have come to appreciate a wide range of service-learning practices as potentially valuable to both student learning and community well-being.

Recent scholarship regarding the strengths and weaknesses of various forms of service learning suggests that critical service learning is the most beneficial approach, while raising concerns about “traditional” service learning as potentially causing harm rather than contributing positively to higher education’s accomplishment of its civic mission (Chesler, 1995; Cooks, Scharrer, & Paredes, 2004; Mitchell, 2008; Wade, 2001). Mitchell (2008), for example, proposed a framework for differentiating these two models for service learning. According to this framework, three key elements differentiate critical service learning from its traditional counterpart. Critical service learning (a) takes a social change orientation, (b) works to redistribute power, and (c) seeks to develop authentic relationships. Traditional service learning is defined by the absence of these characteristics. Advocates of critical service learning express concern that traditional service learning carries risks, such as reinforcing stereotypes and bolstering the privileged status of students in relation to the community. Therefore, they suggest that critical service learning should be embraced as a more effective method of community engagement (Chesler, 1995; Mitchell, 2008; Wade, 2001).

Advocates of critical service learning have made a positive contribution to service-learning literature and practice by articulating what critical service learning is and how it might best be implemented. They have also reminded practitioners of the potential pitfalls in service learning. However, their ideas also raise a number of important questions that merit consideration by service-learning scholars and practitioners. These questions include:

1. What is traditional service learning? Why is the term “traditional” used to describe the type of non-critical service learning depicted by critical service-learning advocates? In what sense and to what extent is non-critical service learning, traditional?
2. To what extent can critical service learning be practiced across the service-learning paradigms previously proposed in the service-learning literature? (e.g., see the Morton, 1995 discussion of charity, project, and social change)
3. To what extent is the emphasis on critical service learning in accord with the current value placed on the practice of service learning across the disciplines? Similarly, to what extent can critical service learning practice address community needs as identified and expressed by diverse community members?
4. How do critical service-learning practices fit within higher education’s mission to develop students’ critical thinking skills?

Why Traditional Service Learning?

Though critical service learning has been discussed by many scholars (Chesler, 1995; Diemer, Voight, & Mark, 2011; Mitchell, 2008; Wade, 2001), a particularly comprehensive description of critical service learning as a model distinct from traditional service learning is offered most clearly in Mitchell’s (2008) article, “Traditional vs. Critical Service-Learning: Engaging the Literature to Differentiate Two Models.” Throughout the discussion traditional service learning is said to carry considerable risks and to be generally less desirable than is critical service learning as a form of community engaged pedagogy. Critical service learning is offered as an approach that minimizes the risks of traditional service learning by short circuiting the “stance of charitable pity that traditional volunteerism often produces” (Mitchell, 2008, p. 54). Highlighting distinctions between the two models, Mitchell (2008) asserted that “without the exercise of care and consciousness, drawing attention to root causes of social problems, and involving students in actions and initiatives addressing root causes, service learning may have no impact beyond students’ good

feelings” (p. 51). Consistent with this theme, traditional service learning has been described as focusing on “services to individuals” rather than “service for an ideal” (Mitchell, 2008, p. 51). Although traditional service learning is not defined, examples of traditional service learning offered in the article are consistently of a direct service nature, such as feeding the homeless or tutoring children, rather than addressing social and political issues associated with these concerns. For the most part, Mitchell (2008) described traditional service learning in terms of what it is not rather than clearly describing what it is.

Throughout the article, several broad generalizations are made regarding prevailing service-learning practice, presumably falling within the traditional service-learning model, but no supporting evidence is provided for these generalizations. The following quotes illustrate this concern. Quoting Wade (2001), Mitchell (2008) asserted, “*Rarely* [emphasis added] do students in service-learning programs consider whether some injustice has created the need for service in the first place” (p. 1). Similarly she cited Chesler (1995) as stating, “As students fit into prescribed agency roles for their service work they *typically* [emphasis added] do not challenge the nature and operations or quality of these agencies and their activities” (p. 130). Further, Cipolle (2004) was cited as stating, “Students are *often* [emphasis added] unprepared for the service learning experience” and specifically lack knowledge and understanding of the people being served (p. 20). Mitchell (2008) expanded on this theme, stating that agencies, too, are

often [emphasis added] unprepared for service-learning with unclear expectations for students’ service and time, with limited understanding of what service-learning is, and (sometimes) without an accurate understanding of the history, knowledge, skills, and experiences of the students coming to serve. (p. 60)

The practices described in these assertions are less than ideal, and therefore service-learning practitioners are well-advised to be aware of them as potential pitfalls in their work. All of these practices no doubt have occurred and continue to occur in service learning to some extent. However, there has not been sufficient research to date to document the frequency with which any of these practices occur, so it is impossible to assert with confidence which practices occur rarely or often. Because it is impossible to make such generalizations with confidence in the absence of sufficient data on prevailing service-learning practices, the descriptor of “traditional” does not seem to be an appropriate one if it is being used to imply that these practices are typical or normative within the service-learning field.

An alternative understanding of the term “traditional” as describing practices that have been passed down from earlier times through multiple generations is also problematic in that this view is not easily reconciled with what we know about service learning’s history. An examination of the earliest service-learning pioneers reveals that they valued the importance of critical reflection in all forms of service-learning practice and did not support the practices that are described as components of traditional service learning. The definition of service learning, as distinct from volunteerism/charity, emphasizes the importance of critical reflection as evidenced in Bringle and Hatcher’s (1995) oft-cited definition, which described service learning as

a course-based, credit-bearing educational experience that allows students to (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility. (p. 112)

Kendall (1990), a service-learning pioneer and former executive director of the National Society for Experiential Education, wrote more than twenty years ago, “a good service-learning program helps participants see their [service] questions in the larger context of issues of social justice and social policy—rather than in the context of charity” (p. 20). Similarly, Sigmon (1979) outlined three principles of service learning that reflect a strong connection with critical service learning’s commitment to redistribute power among those involved in service learning when he asserted that

(a) those being served control the service(s) provided; (b) those being served become better able to serve and be served by their own actions; and (c) those who serve are also learners and have significant control over what is expected to be learned. (Stanton, Giles, & Cruz, 1999, p. 3)

Though the pioneers’ views reflect many of the elements of critical service learning, they varied among themselves in their primary goals for engaging in service-learning practice. Pollack (1999) identified 33 service-learning pioneers and explains that they were quite varied in their motivations for service-learning practice. He described the following three distinct “axes” of motivation among the pioneers and the key concern that informed each: (a) social justice (focusing on social change), (b) democratic education (preparing students for effective, democratic engagement), and (c) education’s

service to society (ensuring that education serves society’s needs). Pollack described the pioneers’ thought as “debates along the axes” (p. 19). This history conveys clearly the divergent conceptualizations of service learning’s mission among its earliest practitioners. Pollack (1999) affirmed this divergent thought in saying, “Like beauty, service is a many-splendored thing. Its value is in the eye of the beholder” (p. 12). The service-learning pioneers too affirmed the divergent views among themselves and sought to develop a *big tent* approach that was inclusive and built upon common values, principles, and language. Among others expressing this view, Jane Kendall (as cited in Stanton et al., 1999) perhaps expressed this best when she said,

Even though people come to service-learning from different values, whether it’s civic participation or social justice, academic learning or career development, international or cross-cultural learning—all the different parts—the principles are still the same. But because they use different language, it’s very hard for them to talk to each other. . . . [It’s] important to bridge some of those gaps. (p. 214)

Thus if we consider the ideas of the service-learning pioneers to be service learning’s historical tradition, there is evidence that their work included a wide range of practice and thought, including the views about social justice that are central to the proposed critical service learning model. Moreover, through their *big tent* approach to defining the field, they passed down a commitment to inclusivity and to identifying common ground among divergent views rather than narrowing the definition to “either-or” thinking or “versus” terminology.

Given the difficulties with the traditional label, it seems more appropriate to consider the two models discussed by Mitchell (2008) simply as critical vs. non-critical service learning. Conceptualizing criticality in this way is not only more precise and accurate, but also presents possibilities for the synthesis of critical service learning with other earlier models of service learning that have been proposed.

Critical Service Learning Across Paradigms

Mitchell’s (2008) proposal of two models in service learning evokes consideration alongside Morton’s (1995) proposal of three service-learning paradigms: charity, project, and social change. Charity is defined as “the provision of direct service where control of the service remains with the provider” (Morton, 1995, p. 21). The Project Model is “focus[ed] on defining problems and their solutions and implementing well-conceived plans for achieving

those solutions” (Morton, 1995, p. 21). Social change, Morton (1995) suggested, “typically focus[es] on process: building relationship among or within stakeholder groups, and creating a learning environment that continually peels away the layers of . . . root causes” (p. 22).

While at first glance Mitchell’s (2008) critical service learning might be considered synonymous with Morton’s (1995) social change paradigm, closer thought suggests that criticality might be incorporated into all three of the paradigms to varying degrees. From this perspective, criticality resides, not in the nature of the work being done in the community, but in the manner in which it is conceived, implemented, and intellectually processed. Additionally, within this perspective, criticality might be thought of as existing along a continuum rather than as a binary, all-or-nothing model in its own right. In keeping with the continuum approach, each of critical service learning’s three key elements—(a) working to redistribute power, (b) developing authentic relationships in the classroom and in the community, and (c) working from a social change perspective—might be thought of as varying

along a continuum, somewhat independently of one another (see Table 1).

Drawing on this perspective, criticality can be integrated theoretically with all three of Morton’s (1995) approaches. Charity- and project-based service learning, while not focused explicitly on social change work, might be high or low in criticality depending upon the nature of the relationships, the attention to power dynamics and the extent to which participants consider root causes and social change issues pertinent to the service. The social change paradigm, despite its obvious focus on social change, might also vary in its degree of criticality. Morton explains that work within all three paradigms can be done with or without depth and integrity. He suggests that social change work at its “thinnest” can be “only rhetorical, narrowly selfish, and against a wide range of offenses without offering alternatives” (p. 28). Moreover, social change work in service learning can and does vary in terms of the authenticity of participants’ relationships, the attention to power dynamics in the service learning and classroom settings, and the extent to which committed action for social change is integral to the experience.

Table 1
Examples of Morton’s Service-Learning Models Along the Criticality Continuum

	Lower criticality*	Higher criticality**
Charity	Students provide tutoring in a school, while applying the teaching concepts that they have learned in an Education course, with no examination of how the students or themselves relate to the larger complicated social picture with the political pressures and inequalities at play.	Students provide tutoring in a school. While applying teaching concepts they learn in an education course, they also deeply engaging with race, class and gender awareness, analysis of the systems at play (e.g., political, educational structure, funding), organizing a complex, multi-layered, systemic analysis of the community and its relationship to the community’s need, and offering a social action plan to help the school better address the students’ needs. In future semesters, students may secure funding and implement the social action plan.
Project	Students develop a website for a non-profit organization	Students develop a website or an organizational newsletter for a non-profit agency partner, after learning the in-depth history of the organization, and the complexities of their relationship with the community in terms of various dimensions of race, class and gender, political power, etc.
Social change	Students rally for a cause without fully understanding the issues underlying the need for the change (e.g., distribute flyers, demonstrate at a rally)	Students develop authentic relationships with a community partner that has a history of ongoing effort to affect change, actively advocating on an issue; they pay close attention to power dynamics and social change concerns, and after having done so, they implement their own means of working for social change around the related issue.

Note. *Lower criticality: Students provide a service, product, or person power for a cause, without examining the underlying social issues related to the need. **Higher criticality: Students engage in learning through service work, product development, or person power for a cause, while deeply examining the social issues and inequalities related to the need within the community.

Therefore, we suggest that critical service learning is best conceptualized as a variable (i.e., criticality) to be thoughtfully addressed in the design of each and every service-learning experience (whether charity, project, or social change in nature) rather than as a distinct model in and of itself.

Implications for Service Learning Across the Curriculum

If critical analysis of social problems and societal structures must occupy a central position in high-quality service learning, as critical service learning proponents suggest, an important question is raised as to whether service learning is advisable across a wide array of academic disciplines. Faculty in most disciplines are not (at least by virtue of their disciplinary training) equipped to engage in critical social analysis with their students. In similar fashion, course goals and student learning outcomes in courses of various disciplines do not include this type of analysis due to the very nature of the disciplines and related curriculum. If a high level of criticality is considered to be a necessary condition for high-quality service learning, faculty in many disciplines will likely and reasonably conclude that service learning is an inappropriate pedagogy for them to employ in their courses. Mitchell (2008) began to address this concern by pointing out that faculty who do not have skills in critical analysis might be well-advised to co-teach their courses with a faculty member who has that expertise. While this may be one possible path forward, it is reasonable to expect that there also are faculty who do not perceive this emphasis on social critique to be central to the learning goals of their courses or within the range of expertise of their disciplines. These faculty, in all likelihood, will decline the team teaching option and may instead choose not to incorporate service learning into their courses.

The findings of Buzinski et al. (2013) reinforced this view. Through their research on faculty from the humanities; the Behavior and social sciences; science, technology, engineering, and mathematics (STEM); and the applied professions, these researchers found substantial disciplinary differences in the language faculty use to discuss service learning and civic engagement; their conceptualizations of these practices; and their motivations for, and concerns about, incorporating these practices into their teaching and scholarship. Based on their findings, Buzinski et al. (2013) suggested that civic engagement and service learning cannot be presented in “one size fits all” language. Rather, such pedagogies “need to be promoted through language that resonates with different disciplinary identities” (Buzinski et al., 2013, p. 62). They concluded, “In light of these findings, a

universalized approach to the incorporation of civic engagement or servicelearning may be ill-advised” (Buzinski et al., 2013, p. 65).

A one size fits all approach is also contrary to service learning’s history and to the strong value on inclusivity that has been evidenced in the field to date. Since the inception of service learning, higher education has embraced the idea that service learning can and should be practiced across the disciplines. Numerous resources, organizations, and structures support the implementation of this idea. For example, the American Association of Higher Education produced a well-known monograph series to assist faculty in implementing service learning within their disciplinary teaching. These monographs address a wide range of disciplines in the liberal arts, STEM fields, and professional fields such as business, communication, education, and hospitality services (Zlotkowski, 2004). Additional resources for this purpose are available through National Campus Compact, the National Service-Learning Clearinghouse, and various professional journals focused on academic service learning, such as the *Michigan Journal of Community Service Learning and Partnerships*. Beyond this set of publications, regional, national, and international conferences in diverse disciplines have included service-learning research and practice as a focus over the past 2 to 3 decades. Among the most well-known of these is the International Conference for Research on Service-Learning and Community Engagement (www.researchslce.org). At this conference, faculty members present service-learning scholarship from fields as diverse as computer science, literature, and philosophy. Faculty awards are also in place to recognize the significant contribution that this work makes to both the academy and the partnering communities (e.g., the Thomas Ehrlich Civically Engaged Faculty Award and the Robert L. Sigmon Service-Learning Award). Faculty from a wide array of disciplines have been recognized through these awards. Beyond national and regional level supports, additional structural supports are now available on many campuses through internal service-learning offices that provide staffing and programming to assist faculty across the disciplines in integrating service learning into their courses.

The perspectives, expertise, and resources represented within the diverse academic disciplines of higher education provide avenues for productive work with communities in response to a wide range of concerns and for the benefit of all parties. Sigmon (1979) stated that when devising a service-learning feature for a course, community voice is the most critical component: the community “would control the agenda, educationally and work-wise. . . . Start there, because that’s where the creativity is; that’s where the

new knowledge is being created” (Stanton et al., 1999, p. 228). Community voices articulate a range of assets and challenges that universities might partner with constructively. These range from requests for direct service with client populations to engagement in advocacy work and community education, from community-based research to marketing campaigns and website creation, and from assistance with book drives to assistance with local environmental challenges. In short, community-identified needs and related requests are diverse. Narrowing the definition of high quality service learning to be inclusive only of critical service learning runs the risk of narrowing higher education’s ability to respond to a wide range of community needs.

Critical Service Learning and Students’ Development of Critical Thinking Skills

Research suggests that service learning can have a positive impact on student intellectual growth in areas such as complexity of understanding, problem analysis, critical thinking, and cognitive development (Ash, Clayton, & Atkinson, 2005; Astin, Vogelsang, Ikeda, & Yee, 2000; Batchelder & Root, 1994; Conrad & Hedin, 1991; Eyler & Giles, 1999; Osborne, Hammerich, Hensley, 1998; Vogelsang & Astin, 2000). Critical service learning’s strong orientation toward social justice (Chesler, 1995; Ginwright & Cammarota, 2002; Mitchell, 2008; Wade, 2001) raises important questions about how to teach social justice content effectively. Butin (2011) articulated this concern well in his critique of service learning as an intellectual movement. In discussing “the myth of an agreed-upon justice” (p. 31) he stated,

[S]ervice-learning from a political perspective is undermined by a ‘critical dogmatism’ that leaves unquestioned its own foundational underpinnings that discount alternative perspectives. This is the mythical equivalence of ‘social justice’ as a neutral and already agreed-upon principle. From a political perspective, service learning is meant to function as a mechanism to move individuals from the (political) right to the (social justice) left. This is traditionally described as helping students move from individualistic to structural understandings of societal problems, and from passive acceptance to collective action. (p. 31)

Butin (2011) referred to this as a “regressive loop” that allows for no “exterior questioning” of the “agreed-upon social justice” (p. 32). This teaching approach seems to run counter to higher education’s broader mission to develop and strengthen students’ skills in critical thinking. The AAC&U promotes critical thinking as an important outcome of higher education

and provides a rubric for assessing students’ development in this area. This rubric defined critical thinking as “a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion” (AAC&U, n.d.).

Intellectual development theories, such as King and Kitchener’s (1994) Reflective Judgment Model, suggest that presenting individuals with perspectives that contradict their previously held views is an important component of intellectual growth (Goodman, 2011, p. 40). In this process, “we expect people to engage in critical thinking by examining assumptions, exploring various viewpoints, analyzing positions, engaging in self-reflection, and developing their own perspectives” (Goodman, 2011, p. 40). Similarly, social identity theory suggests that most people from privileged groups (currently the background of most college/university students in the United States) tend to accept the social structure that they have been reared within and also tend to accept the prevailing cultural beliefs and ideas that justify their group’s dominance (Goodman, 2011). Social identity theory suggests that after being presented with experiences and information that contradict their world view, individuals may move to a new stage of development in which they question their assumptions and gain new insights into societal injustices.

Taken together, these theories suggest that students are best served by faculty avoiding the presentation of an agreed upon understanding of social justice in the classroom and ensuring that students are challenged to consider views of the world that differ from their own. While teaching within the “regressive loop” is problematic, service learning seems undeniably well-positioned to raise important questions about social conditions, to confront students with diverse ideas about these conditions, and to engage them in considering and weighing evidence about conditions they encounter through their community engaged work. Critical thinking’s emphasis on “examining assumptions, exploring various viewpoints, analyzing positions, engaging in self-reflection, and developing [one’s] own perspectives” (Goodman, 2011, p. 40) is ideally suited for students’ thorough and authentic processing of their service-learning experiences in light of existing evidence and competing perspectives. In contrast, presenting students with an already agreed upon understanding of social justice fails to model the skills and practices of critical thinking and seems likely to trigger resistance and backlash from students who enter the classroom holding opposing views (Butin, 2011). Also within this context, students who enter the classroom with views that are consistent with the agreed upon social justice position are unlikely to experience the intellectual challenge of examining and critiquing their own views and underlying assumptions.

Conclusion

Advocates of critical service learning give voice to important concerns and cautions that all service-learning practitioners are wise to consider. They have also articulated a clear description of critical service learning as a means of circumventing these pitfalls. However, in articulating a binary traditional vs. critical service-learning model, they have defined criticality as distinct from a straw-man referred to as traditional service learning. We argue that the concept of traditional service learning, as it is described in the critical service-learning literature, is not a useful construct (Mitchell, 2008). We offer the alternative suggestion that service-learning practitioners and scholars consider the role of *criticality* in various approaches to academic service learning. Critical service-learning goals can be best served through conceptualizing criticality as a variable to be considered within all service-learning paradigms rather than as a discrete service-learning model.

In terms of pedagogy, we offer several suggestions for those considering the issue of criticality as it pertains to their service-learning courses as well as a case illustration. First, faculty must consider what level of criticality is appropriate and feasible for the particular service-learning course under consideration: to what extent is criticality appropriate within this particular course, within this discipline, with students at this level? To what extent is criticality appropriate to the learning goals of the course? We suggest that, depending upon the learning goals and the nature of the discipline, lower levels of criticality may be entirely appropriate. For example, accounting students might audit the financial records of a non-profit agency to learn the applicability of accounting techniques and methods without delving deeply into the social issues related to the partner agency and their clients. In contrast, high criticality would no doubt be warranted in a sociology department's social problems course. The student learning outcomes for such a course would likely require that the complexities of race, class, and gender be considered in depth as well as how these axes of domination play out in the political arena within the communities and agencies in which students are engaging in service learning.

A parallel question for the faculty member to consider pertains to community voice and community control of the service being provided. To what extent is the community partner supportive of, invested in, and/or requesting a critical approach in their work with students? To what extent is criticality appropriate or feasible in working with this particular community partner? Research has shown that community partners' work with service-learning students and faculty can divert their time and attention away from their jobs

(Stoecker & Tryon, 2009). Within this context, high criticality's expectation of developing authentic relationships with community partners might require more time from the participating agency staff than they have available.

When a high level of criticality is appropriate from the perspective of both the course and the community, faculty must then be mindful of moving forward in a way that avoids the potential pitfall of "a single agreed upon social justice" (Butin, 2011, p. 32). We suggest that engaging students in the study of social conditions and the root causes of social problems must be grounded in reliable data about those conditions rather than lapsing into assumptions and opinions. Classroom discussions must invite and respect multiple points of view while also holding all participants (including the faculty member) to the expectation that their assertions be supported with reasonable evidence. These practices are central to developing the critical thinking skills that are associated with high quality service learning and with higher education's goals.

We encourage faculty to consider the level of criticality in each and every service-learning course that they teach and consider whether a higher level of criticality might enhance student learning while staying within the parameters of the course goals and community voice. For example, might student learning be enhanced in the accounting course referenced earlier by considering with students the funding challenges of the partnering organization and the societal values reflected in that situation? Even this one relatively small modification to the course could help students contextualize their auditing work and consider their roles as citizens within a broader social context. From a developmental perspective, it seems likely that faculty who engage in this kind of reflection about their service-learning courses will find opportunities to increase criticality in their teaching over time.

We offer one of the authors' courses as an example to illustrate this development. Jones has been teaching a course called *Violence in Families*, which reviews scholarly material related to various forms of abuse within families and intimate relationships, for the past 14 years. In the first iterations of the course, service learning took the form of charity with low criticality (e.g., the students held donation drives for the local battered women's shelter and offered their time at the shelter, painting the interior of the building, and interacting with the children in the shelter while their mothers were in group sessions). Although the course content offered a high level of criticality in terms of understanding the underlying issues involved in domestic violence, Jones soon realized that while the students' charitable service-learning work was providing for needs of the partner agency, it was offering little in terms of learning for her students. They

were not developing their knowledge through application of the course material to the relationships within the agency, nor were they seeing any hope of ending domestic violence through this experience.

In an effort to modify the service-learning experience to help reach the student learning goals for the course, Jones met with the director of the community partner agency and discussed at length the goals of the agency, as well as what she and her students could do to help achieve those goals. Both she and the director invested a great deal of time together building a relationship, which resulted in a collaborative effort to restructure the service-learning component of the course. They agreed that, with the 33 students in Jones' course, the agency's community education efforts could grow significantly, and the organization could expand its reach from the elementary and middle schools that they already served into the area high schools as well. Together, they selected the Mentors in Violence Prevention (MVP) program, developed by Jackson Katz (1995) at Northwestern University in the mid-1990s, and they team-taught this program to the Jones' students, who then took the program out into the local high schools. The university students visited all of the ninth grade health courses across the county and offered the MVP program to the high school students. Through their roles as community educators, the students developed a far deeper understanding of domestic violence and abusive relationships than had been the case with the previous service model. They learned how to respond effectively to violence and acquired a much greater sense of empowerment as they took what they were learning in the classroom into the community and shared it with others.

Through this transformation of the service-learning experience, all three aspects of critical service learning were enhanced in the course. The social change focus of the course was strengthened. The relationships among all the participants (faculty, students, and community partners) became more authentic. Greater equality of power among these participants was also achieved, with an agency staff member genuinely engaged as a co-teacher in the classroom. Even so, it must be said that the significant changes in the course were possible only because the staff of the partnering organization were eager to invest their time into the effort, the students in this 300-level course were capable of assuming a high level of responsibility and professional presence in the community, the faculty member had developed confidence and expertise in teaching service-learning courses, and the faculty member and partnering organization had developed a significant level of trust over time. As this example illustrates, higher levels of criticality in service-learning courses may be more likely to evolve incrementally through sustained effort over time rather than exist

fully-formed from the outset. All factors involved in achieving higher criticality are not directly within the faculty member's control, and in many cases higher levels of criticality cannot be achieved except through the maturing of the partnering relationship and evolving expertise of the various participants.

Through our own teaching and that of our colleagues, we have seen the impact of well-developed community partnerships linked to service-learning experiences from all three of Morton's (1995) approaches (charity, project, and social change), and we know from these experiences the tremendous value of these learning opportunities to our students and to the community. As a result we are strong advocates of the continued use of academic service learning and believe whole-heartedly in the value-added to our students' education from this engaged learning. Rather than adopt the traditional vs. critical service-learning paradigm that has been proposed, we suggest that criticality be considered in the construction of all service-learning courses and that faculty consider thoughtfully the level of criticality that is appropriate within a given course and academic discipline. Further, we suggest that criticality might be increased through more fully integrating critical thinking into service-learning courses. Through implementing this approach the academy can successfully sustain high quality service learning in a wide range of disciplines and, most importantly, can develop students' intellectual skills, empowering them to cultivate their own well-informed views on social issues throughout their lives.

References

- Association of American Colleges and Universities (AAC&U). (2007). *College learning for the new global century: A report from the national leadership council for liberal education and America's promise*. Washington, DC: Author.
- Association of American Colleges and Universities (AAC&U). (n.d.) *Critical thinking value rubric*. Retrieved from <http://www.aacu.org/value/rubrics/pdf/CriticalThinking.pdf>
- Ash, S. L., Clayton, P. H., & Atkinson, M. P. (2005). Integrating reflection and assessment to capture and improve student learning. *Michigan Journal of Community Service Learning*, 11(2), 49-60.
- Astin, A. W., & Sax, L. J. (1998). How undergraduates are affected by service participation. *Journal of College Student Development*, 39(3), 251-263.
- Astin, A. W., Vogelsang, L. J., Ikeda, E. K., & Yee, J. A. (2000). *How service learning affects students*. Los Angeles, CA: University of California, Higher Education Research Institute.
- Batchelder, T. J., & Root, S. (1994). Effects of an undergraduate program to integrate academic learning

- and service: Cognitive, prosocial, cognitive, and identity outcomes. *Journal of Adolescence*, 17(4), 341-355. doi:10.1006/jado.1994.1031
- Bringle, R., & Hatcher, J. (1995). A service learning curriculum for faculty. *Michigan Journal of Community Service Learning*, 2, 112-122.
- Butin, D. W. (2011). Service-learning as an intellectual movement: The need for an "academic home" and critique for the community engagement movement. In T. Stewart & N. Webster (Eds.), *Problematising service-learning: Critical reflections for development and action* (pp. 19-36). Charlotte, NC: Information Age.
- Buzinski, S. G., Dean, P., Donofrio, T. A., Fox, A., Berger, A. T., Heighton, L. P., . . . Stocker, L. J. (2013). Faculty and administrative partnerships: Disciplinary differences in perceptions of civic engagement and service-learning at a large, research-extensive university. *Partnerships*, 4(1), 45-75.
- Chesler, M. (1995). Service, service-learning, and change-making. In J. Galura, J. Howard, D. Waterhouse, & R. Ross (Eds.), *Praxis iii: Voices in dialogue* (pp. 137-142). Ann Arbor, MI: OCSL Press.
- Cipolle, S. (2004). Service-learning as counter-hegemonic practice: Evidence pro and con. *Multicultural Education* 11(3), 12-23.
- Conrad, D., & Hedin, D. (1991). School-based community service: What we know from research and theory. *Phi Delta Kappan*, 72, 743-749.
- Cooks, L., Scharrer, E., & Paredes, M. C. (2004). Toward a social approach to learning in community service learning. *Michigan Journal of Community Service Learning*, 10(2), 44-56.
- Davi, A. (2006). In the service of writing and race. *Journal of Basic Writing*, 25(1), 73-95.
- Densmore, K. (2000). Service learning and multicultural education: Suspect or transformative? In C. R. O'Grady (Ed.), *Integrating service learning and multicultural education in colleges and universities* (pp. 45-48). Mahwah, NJ: Lawrence Erlbaum Associates.
- Diemer, M. A., Voight, A. M., & Mark, C. (2011). Youth development in traditional and transformational service-learning programs. In T. Stewart & N. Webster (Eds.), *Problematising service-learning: Critical reflection for development and action* (pp. 155-173). Charlotte, NC: Information Age.
- Eyler, J., & Giles, D. E. (1999). *Where's the learning in service-learning?* San Francisco, CA: Jossey-Bass.
- Finley, A. (2011). *Civic learning and democratic engagements: A review of the literature on civic engagement in postsecondary education*. Retrieved from http://www.civiclearning.org/SupportDocs/LiteratureReview_CivicEngagement_Finley_July2011.pdf
- Ginwright, S., & Cammarota, J. (2002). New terrain in youth development: The promise of a social justice approach. *Social Justice*, 29(4), 82-95.
- Goodman, D. J. (2011). *Promoting diversity and social justice: Educating people from privileged groups* (2nd ed.). New York, NY: Taylor & Francis.
- Hirschinger-Blank, N. B., Simons, L., & Kenyon, A. (2009). An evaluation of a service-learning model for criminal justice undergraduate students. *Journal of Experiential Education*, 32(1), 61-78. doi:10.5193/JEE.32.1.61
- Hurtado, S. (2009). Assessing higher education's advancement toward a new vision of society. *Diversity and Democracy*, 12(1), 1-3.
- Hurtado, S., & DeAngelo, L. (2012). Linking diversity and civic-minded practices with student outcomes: New evidence from national surveys. *Liberal Education*, 98(2). Retrieved from http://www.aacu.org/liberaleducation/le-sp12/hurtado_deangelo.cfm
- Jay, G. (2008). Service learning, multiculturalism, and the pedagogies of difference. *Pedagogy: Critical Approaches to Teaching Literature, Language, Composition and Culture*, 8(2), 255-281. doi:10.1215/15314200-2007-040
- Jones, S. R., & Hill, K. (2001). Crossing high street: Understanding diversity through community service-learning. *Journal of College Student Development*, 42(3), 204-216.
- Katz, J. (1995). Reconstructing masculinity in the locker room: The mentors in violence prevention project. *Harvard Educational Review*, 65(2), 163-175.
- Kendall, J. C. (1990). Combining service and learning: An introduction. In J. C. Kendall & Associates (Eds.), *Combining service and learning: A resource book for community and public service* (pp. 1-33). Raleigh, NC: National Society for Experiential Education.
- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco, CA: Jossey-Bass.
- Krain, M., & Nurse, A. M. (2004). Teaching human rights through service learning. *Human Rights Quarterly*, 26(1), 189-207. doi:10.1353/hrq.2004.0005
- Levesque-Bristol, C., Knapp, T. D., & Fisher, J. B. (2010). The effectiveness of service-learning: It's not always what you think. *Journal of Experiential Education*, 33(3), 208-224. doi:10.5193/JEE33.3.208
- Markus, G. B., Howard, J. P. F., & King, D. C. (1993). Integrating community service and classroom instruction enhances learning: Results from an experiment. *Educational Evaluation and Policy Analysis*, 15(4), 410-419. doi:10.2307/1164538

- Marullo, S. (1998). Bringing home diversity: A service-learning approach to teaching race and ethnic relations. *Teaching Sociology*, 26(4), 259-275. doi:10.2307/1318767
- Mitchell, T. (2008). Traditional vs. critical service-learning: Engaging the literature to differentiate two models. *Michigan Journal of Community Service Learning*, 14(2), 50-65.
- Morton, K. (1995). The irony of service: Charity, project and social change in service-learning. *Michigan Journal of Community Service Learning*, 2, 19-32.
- Myers-Lipton, S. J. (1996). Effect of a comprehensive service-learning program on college students' level of modern racism. *Michigan Journal of Community Service Learning*, 3, 44-54.
- Osborne, R. E., Hammerich, S., & Hensley, C. (1998). Student effects of service-learning: Tracking change across a semester. *Michigan Journal of Community Service Learning*, 5, 5-13.
- Pollack, S. (1999). Early connections between service and education. In T. Stanton & D. Giles (Eds.), *Service-learning: A movement's pioneers reflection its origins, practice, and future* (pp. 12-32). San Francisco, CA: Jossey-Bass.
- Root, S., Callahan, J., & Sepanski, J. (2002). Building teaching dispositions and service-learning practice: A multi-site study. *Michigan Journal of Community Service Learning*, 8(2), 50-59.
- Sigmon, R. L. (1979). Service-learning: Three principles. *Synergist*, 9, 9-11.
- Simons, L., & Cleary, B. (2005). Student and community perceptions of the "value added" for service learners. *Journal of Experiential Education*, 28(2), 164-188. doi:10.1177/105382590502800208
- Stanton, T. K., Giles, D. E., Jr., & Cruz, N. I. (1999). *Service-learning: A movement's pioneers reflect on its origins, practice, and future*. San Francisco, CA: Jossey-Bass.
- Stoecker, R., & Tryon, E. (Eds.). (2009). *Unheard voices: Community organizations and service learning*. Philadelphia, PA: Temple University Press.
- Vogelsang, L. J., & Astin, A. W. (2000). Comparing the effects of community service and service-learning. *Michigan Journal of Community Service Learning*, 7, 25-34.
- Wade, R. C. (2001). ". . . And justice for all": *Community service-learning for social justice*. Retrieved from <http://www.ecs.org/clearinghouse/29/13/2913.htm>
- Zlotkowski, E. (Ed.). (2004). *Service-learning in the disciplines series*. Sterling, VA: Stylus.
- Zuniga, X., Williams, E., & Berger, J. (2005). Action-oriented democratic outcomes: The impact of student involvement with campus diversity. *Journal of College Student Development*, 46(6), 660-678. doi:10.1353/csd.2005.0069

ANGELA LEWELLYN JONES, PhD, Associate Professor of Social Justice, has taught at Elon University since 1999. She was a service-learning faculty scholar at Elon in 2006 and has imbedded academic service-learning into her courses throughout her time at Elon. She currently serves as Associate Dean of Elon College, the College of Arts & Sciences.

PAMELA MYERS KISER, MSW, Professor of Human Service Studies, has taught at Elon University since 1981. She was the 2009 recipient of the Robert L. Sigmon Award for outstanding contributions to the service-learning field and was a national finalist for the Thomas Ehrlich Award for Outstanding Faculty in Service-Learning. At Elon University, she served as Faculty Fellow for Service-Learning from 2003-2009, was named Distinguished University Professor in 2010, and currently holds the Watts-Thompson Professorship.