

- Knowledgeable
- Balanced
- Good decision making skills (put words into action)
- Insightful/reflective
- Consensus builder
- Resource conscientious
- Good communication skills
- Representative (#1)
- Evaluative
- Decisive
- Collaborative

Appendix C

Collaborative Activity #3 Brainstorming Session Items

Qualities of Effective STEM Teachers

- Hands-on
- Backward design/refinement; lead to big picture
- Student-centered
- Rigor
- Solving a problem
- Real world application
- Inquiry-based/collaboration (#2)
- Standard/content knowledge
- Research/current
- Integrated curriculum
- Objectivity
- Communication skills
- Mentor/retain students/relationship building
- Investigating/desire to teach (#1)
- Knowing what comes before and comes after/holistic
- Innovation (#3)
- Teamwork

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Opportunities to Create Active Learning Techniques in the Classroom

Danielle J. Camacho | Jill M. Legare

The purpose of this article is to contribute to the growing body of research that focuses on active learning techniques. Active learning techniques require students to consider a given set of information, analyze, process, and prepare to restate what has been learned—all strategies are confirmed to improve higher order thinking skills. Active learning techniques transform complacent and apprehensive learners into active participants in the process. Group assignments and peer review scenarios establish a setting fostering the notion that students who teach one another are essentially learning to teach themselves. Technology in the 21st century allows instructors to incorporate active learning techniques such as web-based scavenger hunts, problem-based learning, cooperative learning, group discussion, and peer-reviewed and structured-learning groups into the classroom. This paper will provide a survey of existing literature and will provide examples of methods and techniques that instructors may apply in online and on-ground classrooms.

Chickering and Gamson (1987) remind educators that, “Learning is not a spectator sport. Students do not learn as much just sitting in classes listening to teachers, memorizing prepackaged assignments and spitting out answers” (p. 5). Educators must be flexible and adapt teaching methods and styles to focus on the learner. Wagner (2011) described seven survival skills for our 21st century workforce. Two of the seven survival skills of the 21st century included critical thinking leading to problem solving and accessing and analyzing information (Wagner, 2011). Nenty and Odili (2012) posited education in the 21st century must be creative, complex, and challenging. In the online classroom the role of the instructor must include teaching students “how to think and communicate effectively” (Wei, Chen, & Kinshuk, 2012, p. 531). Instructors must motivate students, personalize the learning experience, and strive to provide students with relevant and engaging learning experiences (Meyer, 2013). Educators may incorporate active learning technique (ALT) methods into the classroom and address the concerns researchers have identified with respect to best practices to educate the workforce.

The purpose of this article is to provide a survey

of existing literature and to highlight the growing body of research that focuses on ALTs. In this paper the authors introduce potential applications for ALT in the online classroom. The literature review for this paper included topics such as investigating active learning methods, effective teaching techniques, and the value of incorporating ALTs into the classroom to opportunities. Instructors may see the merits of incorporating ALTs such as web-based scavenger hunts, problem-based learning, cooperative learning, group discussion, as well as peer-reviewed and structured-learning groups into the online classroom (Krakowa, 2012).

ACTIVE LEARNING TECHNIQUES

ALTs encourage students to reflect on the materials, analyze, process, and prepare to discuss—all strategies confirmed to improve higher order thinking skills (Rissanen, 2014). By incorporating active learning methods into the classroom, instructors can create opportunities for learning instead of allowing students to sit passively and learn by absorbing information passed on by the instructor. Kim, Sharma, Land and Furlong (2013) described benefits of ALT to include improved critical thinking skills,

increased motivation, and enhanced interpersonal communication skills. Zayapragassarazan and Kumar (2012) reported similar benefits of ALT, noting increased student retention and a higher degree of student-focused personal accountability. Application of ALTs offer students opportunities to direct their learning, develop critical thinking skills, and engage in hands-on experience to prepare for real-world job situations. ALTs may empower students and promote synthesis and evaluation that will benefit the learners in all areas of life. ALT may also be used to promote a culture of learning, critical thinking, and student engagement in the classroom (Goldbert & Ingram, 2011).

Bachelor, Vaughan, and Wall (2012) found that student attitudes and willingness to participate were positively impacted by regularly implementing ALTs in the classroom. Active learning strategies such as group discussion, journal writing, case study, role play, problem-solving, and organized learning groups create opportunities for student participation and engagement (Detlor, Booker, Serenko, & Julien, 2012). The use of group work and active discussions allow students to both gather information and explore peer perspectives, which further develop application of learning (Levy & Petrulis, 2012).

Instructor use of active learning strategies may depend on class size, space, objectives, and time available to complete activities. Learning activities may be designed to provide opportunities for students to focus on problem-solving skills which lead to success in learning outcome mastery (Goldberg & Ingram, 2011; Lee & Hoffman, 2014). ALT may also incorporate web-based tools (Skiba, 2013). WebEx™ trainings, live training sessions, and group discussion boards are methods to communicate with students to prepare learners to use new technology and tools accessible from the online classroom. The learner-centered approach enables students to both become familiar with resources and to process the relevance of those resources through hands-on exercises. These real-world tools are available to all online learners and may help students generate appropriate learning outcomes (Johnson, Sproles, & Detmering, 2010).

ACTIVITIES THROUGH WHICH WE LEARN

Adult learners have needs which are unique, and instructors should consider the needs of the

learners in the creation of course and lesson designs. Galbraith and Fouch (2007) emphasized the importance of focusing on adult learning strategies and understanding the role of andragogy in adult learning. Praxis, meaning action with reflection, best illustrates the overall focus on andragogy (Galbraith & Fouch, 2007). Baker, Sanz Vergel, and Kuntze (2015) found that student engagement in the classroom is malleable. Adult participants in any course will need to understand the small and larger picture and invest time and effort in each lesson. Instructors may positively influence their student success rate as well as student engagement (Baker et al., 2015).

Students learn by talking and listening. A review of literature on active learning revealed a historical study conducted by Knowles (1980), which explained that in spite of creating and describing specific course objectives for a particular class, many of his students still did not understand the specific goals or outcomes. Knowles (1980) found that when students were asked to write the objectives in their own words, they were able to better understand and clarify the curriculum goals. Learning by simulation helps students to develop critical thinking skills and to inform future problem solving (Krakowka, 2012; Bligh & Bleakley, 2006). Galbraith and Fouch (2007) established that providing a set of learning objectives in the beginning of a lesson would help the adult learners to see the big picture and to know the direction of the session.

Donovan and Loch (2013) illustrated the ways in which implementing educational technology (such as a whiteboard or an audience-response system) in the classroom created an active learning environment which engaged students, promoted frequent feedback, and helped students to develop a deeper understanding of the application of course lessons. Galbraith and Fouch (2007) established that when adults understand the rationale for the lesson, they are more likely to engage in the training and to transfer those lessons to the workplace. Active techniques provide the student the opportunity to organize and reflect; activities which reinforce learning.

One method to foster this learning is accomplished when instructors begin the lecture by asking students to consider a list of pre-designed thought-provoking questions. These questions may

be asynchronous (as found in many online discussion boards), or synchronous, as seen on a live web seminar. Instructors may also employ this method by stopping a lecture to ask students to reflect on the materials or to be prepared to explain the concepts to the class at the close of the lecture—both methods have proven useful for reinforcing learning (Karmas, 2011).

The initial acquisition of knowledge is followed by comprehension and application for potential scenarios. For example, active learning methods may involve asking students questions such as: “If you experienced a natural disaster and had no Internet access for one week, explain whom would you contact and how might you go about this process?” Student answers would demonstrate the ability to analyze a situation and describe the best course of action. A second scenario may ask students to consider the actions that may result in intentional or unintentional plagiarism.

Students could consider the prompt here: “You have written a paper for a course, but the instructor noted that there was a high percentage match to a Turnitin.com report. Find the academic integrity policy and identify the steps to take to understand the academic integrity policy for our institution. Summarize a list of resources that may be used to ensure your work meets the academic rigor for our institution.” Exercises such as these described above allow students to review, analyze, and synthesize information to demonstrate mastery and understanding of the materials.

THE WRITING PROCESS AND GROUP WORK

The writing process allows students to process and synthesize information. Writing is effective when groups or pairing are not possible or when the class size is too large to ask students to present to the group. Karmas (2011) employed active learning practices in a technical business writing course where students were asked to pre-write papers by creating preview lists. The active learning method allowed students to create lists, then write sentences and repeat until the paper was completed. In the online classroom instructors can create an individual research assignment and ask students to share and discuss findings with a small team. Working in small groups allows students to teach one another how to solve problems and how to apply objectives more globally (Skiba, 2013). Addi-

tionally, the use of ALTs in the classroom may result in an improvement in both student engagement and student cooperation (Bachelor et al., 2012). For example, in a master’s level online course, Camacho (2014) required students to create a three to five slide PowerPoint presentation focusing on one of 10 assigned Human Resource Law topics. Students submitted the individual assignment for grading, and in the subsequent week students were asked to share their findings with a smaller virtual team via team discussion board. Students reported the benefit of this exercise to include enhanced learning of the materials vis a vis the requirement to teach others about the topic and heightened learning about multiple topics as students were able to learn about the multiple topics researched and shared within the group. Another active learning exercise in the online classroom requires students to interview a business leader and create a PowerPoint describing the key findings. After the individual work is graded students may be asked to share findings with peers in a smaller discussion forum or in a live webinar. In the latter scenario students gain information by interviewing experts in the field and subsequently share this knowledge with peers, passing along insights and best practices.

Several years ago, Legare designed a cooperative learning assignment in the form of a group discussion assignment for an undergraduate United States history course. The design resulted in a debate style exercise in which students chose one of two sides of a discussion concerning whether or not the Civil War was inevitable. The discussion areas designed allowed students to identify all possible options and solutions to this complex issue (Kim et al., 2013). Throughout the duration of the six-week class, students participated in small group discussions, which addressed issues from the bottom-up (working class to the elected officials who held office).

Goals of the exercise included raising real-world issues and allowing students to gain an understanding of the day-to-day experiences that were situated in their proper historical context. Each student was assigned a role; roles included various personas for men, women, children, the wealthy, poor, slaves, slave holders, and office holders. Group discussions may help to bring light to unclear explanations by allowing students who speak the same ‘language’ to discuss topics in a manner that

might help to remove confusion about the material (Goldberg & Ingram, 2011). Students who become comfortable learning from other classmates may be more likely to look to those peers for future guidance, which also helps to develop and maintain networking opportunities (Holland, Major, & Orvis, 2012). Another example of active learning was cited in a past study from Ohio State where students were asked to complete a reading assignment and then teach other students about the topic. Results from the study indicated that when engaged in this active learning method, students who taught other students, essentially taught themselves (Ohio State, 1988).

PROBLEM-BASED LEARNING

The problem-based learning method is a teaching technique that fosters the use of critical thinking and problem-solving skills and allows students to take an active role in learning to solve complex problems (Ghosh, 2013; Kwan & So, 2008). Goldberg and Ingram (2011) reported that students reacted most positively to activities with a focus on research and creativity. Kwan and So (2008) designed a learning experience that required students to investigate a problem, collect and analyze data, and create recommendations for the findings. The results of the study indicated that students who participated in the active learning experiences acquired in-depth knowledge of the topic and developed critical thinking and problem solving skills (Kwan & So, 2008). Jollands, Jolly, and Molyneaux (2012) found that problem-based learning fostered life-long learning. Researchers determined that students who could solve a problem requiring a focus on research, teamwork, critical analysis, and real-world scenarios would be work ready (Jollands et al., 2012). Similarly, Ghosh (2013) designed a problem-based learning scenario for a master's level economics course. Results from the study indicated students who participated in the problem-based learning exercise had a deeper understanding of the subject matter and were adept at applying the theories of international finance to a real-life business venture (Ghosh, 2013).

BRIDGE 'SUCCESS STRATEGIES' COURSES

Promoting creativity in the classroom helps to produce a more diverse approach to problem solving in other areas (Lee & Hoffman, 2014); ALTs

such as creating a problem-based learning scenario, positively influence student learning. Jansen (2010) concluded that incoming student learning skills and time management skills may positively impact a college student's first-year study behavior and academic achievement. First-year and first-generation online learners face unique challenges with respect to preparing for both the online learning experience and for understanding the resources that are available at the learning institution. First-year online students who are not prepared to take courses may decide to withdraw from the courses instead of accessing relevant resources. Bridge courses help to address this gap by acquainting online learners with institutional resources and technology resources (i.e., writing labs, academic integrity tutoring, and campus services such as career placement). Bridge courses are commonly called, "Success Strategies" or "Introduction to Online Learning." The courses assist students who struggle with their writing skills and focus on identifying the resources that may assist the student throughout the educational process. ALTs built into bridge courses can increase the opportunity for student success (Meyers, 2013).

THE SCAVENGER HUNT

Twenty years ago, students in an undergraduate environmental studies course were taken on a field trip to Cameron Park, a wooded area in Waco, Texas (J. Legare, personal communication, January 1, 2015). Students were placed into groups and were asked to spend two hours locating specific species of plants and animals. After locating and identifying the flora and fauna, students returned to the classroom. In the classroom, students analyzed the unique contributions of each individual plant and animal, as well as the interconnectedness of these flora and fauna with respect to the larger ecological system in the park. Students engaged in round-table discussions and presented findings to the group. During the presentations students demonstrated mastery of the learning objective measurement, ranging from describing basic knowledge of the systems in place, to analysis and synthesis of the topics. Hands-on active learning processes such as these are still relevant today—although, many times, the scavenger hunt might be a digital one, rather than a walk in the woods.

Field trip assignments no longer require stu-

dents to leave the classroom. Technology may be implemented to design virtual field trips, which become self-referential and provide simulation of learning that might have been previously prevented based on geography or resources (Bligh & Bleakley, 2006; Krakowka, 2012). A technical scavenger hunt can be designed to allow students to apply critical thinking to identify the location of materials and to provide an explanation and analysis of the discovery process. Technical scavenger hunts may require students to search solely online or to use technology to locate a physical resource.

Smartphone technology in education and private businesses allows users to access information in an instant. Krakowka's (2012) scavenger hunt utilized Google Earth to create a virtual field trip for students. This exercise required students to use smart phone technology in a scavenger hunt and resulted in students drawing conclusions based on their individual online hunting experience (Krakowka, 2012). Quick Response (QR) codes which provide a digital image linking users with the specific business or item location may also be used in a scavenger hunt assignment. For instance, instructors can create assignments that require students to utilize the code to locate the physical object or item to be studied. Wells (2012) introduced an online scavenger hunt with the purpose of increasing student awareness of the online resources available in the institution. Participating students reported improved knowledge of the resource available and higher levels of engagement in the classroom.

An example of tasks assigned in an online scavenger hunt could include requiring students to locate the online resources for the respective university, and students might locate the student services, online library, writing tutor, and academic policy links. Active learning exercises allow students to self-direct learning. To close an active learning exercise, students may be asked to describe the ways in which the resources identified in a scavenger hunt may be used during the degree program. The outcome from scavenger hunts and resource identification may also be designed to assist graduates to best prepare for their transition into the workforce. For example, a scavenger hunt could be designed to include a search for job prospects, salary information, and resume and cover letter composition tools (Wells, 2012; Segrist & Nordstrom, 2007).

SELECTION OF ACTIVE LEARNING STRATEGIES: TECHNOLOGY

The goal of the education process is to teach global lessons; in other words to teach students to 'learn how to learn'. ALT techniques include hands-on web-based tools that are available to online learners and lend to achieving instructor created Bloom's Taxonomic goals (Skiba, 2013). Instructors may incorporate web-based tools, such as Jing or Meebo to best-illustrate a course concept in an online classroom. Jing, an online tool, allows users to record keystrokes and online activities, and it allows visual learners to benefit by watching an instructor complete specific tasks (Bianco & McCollom, 2009). For instance, if a student does not understand how to use a Drop Box tool within an online course, the instructor could meet with the student and share his screen to walk the student through a demonstration of the tool. A Jing video can capture the audio and visual recordings of meetings in which the instructor may provide instructions and for a student to follow.

Simulation exercises have been used in business, politics, and medical fields. Simulation exercises allow students to work within simulated contexts to complete exercises that develop practical skills and knowledge in the selected field (Keesara, Tessler, Coontz, Chu, & Stewart, 2013). Course developers can purchase pre-designed simulations to include in the classroom design. CAPSIM, a simulation technology design company, specializes in designing simulations which cater to ALTs. The CAPSIM offerings provide background, context, and ground rules for students who are able to enter into a simulated scenario and make decisions and gain an understanding of the outcomes based on the data set.

Visual learning techniques may also benefit students needing assistance with specific assignments. For example, if an assignment focuses on MLA or APA formatting, the instructor could provide a Jing video accompanied by audio. In many cases, citation errors are minor (placing the punctuation in the wrong place). The use of the Jing videos in the online classroom creates a personalized connection between instructors and students while addressing learning preferences (Karmas, 2011).

CLOSING REMARKS

Active learning strategies may bring new perspective and real-world relevance to classroom materials. When designing assignments, instructors may incorporate action words from Bloom's taxonomy—relying on the lists of action words—to help define the actions which will lead to the cognitive processes by which thinkers encounter and work within knowledge (Skiba, 2013). Bloom's (1956) taxonomy model was designed to create an effective objective learning measurement tool which for use in the classroom (Skiba, 2013). Like Bloom's model, ALTs can create a sense of connectedness with the students and the learning materials.

This paper began with a quote from Chickering and Gamson (1987) noting that, "Learning is not a spectator sport" (p. 5). Incorporating active learning strategies into the classroom produces a more effective learning environment and increased student participation and engagement. Senge (1990) may have captured the argument for learning most succinctly observing that students remember only a fraction of what they hear but remember a majority of what they do. Both the online and brick-and-mortar instructors have ample opportunities to incorporate ALT into the classroom. Application of ALT offers students a brighter opportunity to develop the abilities and attitudes needed to prepare our learners for success in the 21st century.

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Dr. Camacho began teaching at GCU in 2010. She serves as an Adjunct Faculty Member at Grand Canyon University, approved to teach business and management courses. Dr. Camacho enjoys coaching and mentoring students in the online classroom. She is a member of the Alpha Phi Omega Fraternity, the Society of Human Resources Management (SHRM) and has served on the peer review board for the *Journal of Institutional Research*. She resides in Gilbert, Arizona. Dr. Camacho holds several accredited degrees; a Bachelor of Arts (BA) in Psychology from Baylor University; a Master of Business Administration (MBA) from the University of Dallas and a Doctorate of Business Administration (DBA) from Walden University. Her doctoral study, *Improving the Environmental Effects of Business Practice Toward Corporate Social Responsibility*, provided Dr. Camacho the opportunity to gain professional and academic expertise to facilitate green initiatives within a small company in the construction industry.

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Does Small-Group Collaboration Increase the Number of Substantive Postings in Asynchronous Discussion Forums?

Pam Epler | Bruce Bennett | Rorie Ross

An asynchronous discussion forum is a tool used in courses delivered online. Many schools use discussion forums to enhance collaboration and increase interaction between students in a format in which there are no walls. Removing time constraints and allowing students to participate in classroom discussions online has a tendency to boost their motivation to learn. Traditionally, asynchronous forums are structured as whole class discussions, but research suggests that this format may discourage participation and that utilizing small group forums may be more effective.

Thus, this study sought to determine whether utilizing small group forums vs. large, whole class forums would increase the number of substantive postings in an online course. The study compared the number of postings from four experimental small groups and one large group during an 8-week period in one doctoral-level classroom using a quantitative correlation methodology that employed an ANOVA Dunnett Procedure. Findings revealed that overall, the group size did not affect the number of substantive posts. Further studies need to be performed to support or disclaim the current literature's stance that small group discussions result in more substantive participation in asynchronous environments.

INTRODUCTION

Online students are required to post substantive messages. The terms substantive and participation are defined by the individual universities using this method. For instance, Grand Canyon University (GCU) policy requires a doctoral-level participation post (initial or ongoing) to be a minimum of 150 words in length (Class participation, 2014). The post should include appropriate foundational knowledge, be factual, enhance the ongoing dialogue, and include support from scholarly literature. Because of the last requirement, the majority of a learner's substantive participation posts should include at least one citation that is not from the GCU lecture. However, rather than just reporting what someone else has stated, the learner should demonstrate application and/or reflection of knowledge such that he or she enhances the meaning of the referenced material. Contributing to the

discussion should promote an exciting, vibrant, shared learning community that accomplishes two or more of the following:

- Expands on a classmate's comments in a value-adding, topic-related way.
- Promotes a collaborative, supportive doctoral community.
- Advances the dialogue through follow-up questions.

Other universities have similar requirements. For example, the University of Texas, Permian Basin (UTPB) lists six categories that must be covered in a substantive post: reflection, analysis, elaboration, application, synthesis, and evaluation (Substantive posts in the conference boards, n.d.). In terms of frequency, The University of Phoenix requires eight substantive messages spread across three different days (Attendance and participation, 2015).

Online universities favor the use of collabora-

tive learning due to its ability to reach all students without significant time and location constraints (Chen & Jang, 2010). This practice has been known to produce a social learning network for all students. However, in order for the environment to be productive, students must effectively participate in the collaborative environment, and motivating them to do so can sometimes be a difficult endeavor. Current research suggests that students are more motivated to provide substantive contributions in online collaborative learning environments when they are placed into groups of three to four students, rather than grouped as a whole class (Chung & Hew, 2004). Thus, the authors—three adjunct faculty teaching strictly in asynchronous environments and seeking methods for increasing the number of substantive posts in the discussion forums in their classes—sought to determine whether small group collaboration vs. whole class collaboration affects the quantity of substantive posts in online courses. This study excluded hybrid and traditional face-to-face courses and focused on the number of substantive posts (per the university's definition). Self-determination theory was used as the theoretical framework.

SELF-DETERMINATION THEORY AND LEARNER MOTIVATION IN ONLINE DISCUSSIONS

Inherent motivation is an important focus of self-determination theory (Deci & Ryan, 1985). According to self-determination theory, a person must be willing to participate in the task at hand before positive outcomes can be achieved. Recent challenges regarding student engagement in online classes have renewed an interest in this theoretical perspective in the field of education.

Self-determination theory is related to online courses in that it reveals the potential for valuable learning outcomes of students (Chen & Jang, 2010). The inherent motivation of each student is the driving force behind any achievements that he or she will make in an online class. Online courses offer learners many chances to be equal participants in the learning environment, and research points to the connection that must be made between the instructor's ability to rationalize the stages in which a student participates in discussion versus his or her need for motivation (Chen & Jang, 2010). Fostering individual self-determination is essential to an online learning environment, as the attitude and en-

agement of the student will specifically affect his or her participation in discussion activities.

Self-determination is supported by the use of contextual support systems. The ability to cope with the demands of online environments is a critical component (Chen & Jang, 2010). For example, student engagement in discussions, assignments, and group activities requires a great deal of time and planning, which can certainly cause motivational issues for persons that have full-time employment or other commitments. Self-determination theory connects to these issues by offering single types of efforts that offer positive outcomes (Chen & Jang, 2010).

REVIEW OF THE LITERATURE

Asynchronous discussion forums in online classrooms allow students and faculty to interact on assigned topics. The forums replace the face-to-face interaction afforded a traditional classroom (Andersen, 2009) and enhance collaboration and interaction (Cox & Cox, 2008), not only between the teacher and students but also between individual or groups of students (Hew, Cheung, & Ng, 2010).

Many discussion forums used in an asynchronous environment require students to respond to a prompt or question, and students typically interact within the context of a large discussion group. This structure, however, can result in limited and/or low-quality participation. Hew et al. (2010) performed a meta-analysis of 50 empirical studies in order to determine factors that limit student contributions. They defined limited as a student that provided few or zero postings during the week. Their findings revealed that grouping a class of students into one large entity for collaboration could cause individual students to minimize their participation for several reasons. First, if students did not receive immediate feedback or response from others, including the instructor, their participation would decrease. Immediate feedback was considered a response within 24 hours. In addition, in the whole class discussion forum setting, students had trouble keeping up with the discussion. Because multiple discussion posts were available, some students became confused. Posts would appear in the wrong threads, sub-discussions arose, and students were unable to keep track of which discussion thread they posted in previously, thus leading to "infor-

mation overload” (Hew et al., 2010, p. 575).

Andresen (2009) concurred that different discussions occurring on a given topic may not have a linear progression and could thereby contribute to confusion. Students may post a response that is not correlated to the original idea but instead to a sub-theme introduced in a different strand, and thereby lead the specific post off topic. Having too many posts to navigate can cause a student to disengage.

Cox and Cox (2008) and Cheung, Hew, and Ng (2010) suggested that student participation in asynchronous discussions would increase if forums were established with small groups of three to four students. However, studies are needed to determine if this is in fact true. Thus, this study sought to investigate whether smaller community forums would produce more substantive postings than large community forums.

METHODS

This study sought to determine whether small group collaboration vs. whole class collaboration would affect the quantity of substantive posts in an online doctoral course taught by one of the authors. Based on the findings from the literature review, this study specifically examined the outcomes related to minimizing the number of posts that a student would navigate. In the course included in this study, the curriculum was centrally managed and the discussion questions were developed by the teacher in a centralized manner. Although students were required to post a response to the initial query, the researchers hoped that having multiple small groups instead of one larger group would result in more than just an initial response and lead to multiple substantive posts related to the original topic.

PARTICIPANTS

The participants in this study were doctoral candidates enrolled in their first specialty class of their degree. This course falls within the first year of the program and is an online only class. Prior to the study, the students were given an introductory letter about the study and were asked to volunteer to participate.

Twenty doctoral students were enrolled in the course, and all but one agreed to participate in the study. The 19 participants were each assigned a

random number, and a random numbers table was used so that each individual had an equal likelihood of being chosen to participate in small group forums. Twelve learners were selected to participate in four small groups of three students each. The seven remaining students and the one non-participant were placed into a large control group. By randomly selecting the participants in this manner, the differences in the control and test group were left to chance and not determined by selection bias. The reason for having a control and test group was to ensure that the intervention (the small group collaboration) would have a causal effect.

DATA COLLECTION

Data were collected weekly during an 8-week period that covered eight instructional modules. The primary data collector was the instructor of the course, who determined whether each member of the small group had posted two initial responses to the discussion questions and at least one response to another learner in the group. Only substantive postings (i.e., initial or ongoing, and must be a minimum of 150 words in length, include appropriate foundational knowledge, be factual, enhance the ongoing dialogue, and include support from scholarly literature) were included in the data collection. Non-substantive postings were excluded. This same type of data was collected within both the small test groups and the large control group. The data were placed into an Excel worksheet and then transferred into SPSS for analysis.

DESIGN

The design of this study was a quantitative correlation methodology. This methodology was chosen because the researchers wanted to explore the relationship between two variables—small group collaboration vs. large group collaboration—through a correlational analysis. The intent was to determine if and to what degree the variables were related but without implying that one caused the other.

Internal validity was maintained because all participants taking the course were mandated to do so to fulfill a degree requirement. In addition, the researcher teaching the course responded to all individual group members’ initial discussion postings in both the control and test groups. Finally, all

participants in the test group had the opportunity to vacate their group at any time during the study.

RESULTS

Data were collected from each module for both the large group and the small groups to determine the central tendencies for each module. Table 1 reveals the average number (mean) of responses (substantive posts) from the large group and the collective small groups. In Modules 1-6, the collective small groups submitted more postings and responses than the large group. In Modules 7 and 8, the large group posted more responses than the collective small groups. However, the differences in the number of responses were not significant, as will be discussed in the next paragraphs.

Table 1

Comparison of Average Number (Mean) of Responses from Large Group and Collective Small Group Forums

	Module							
	1	2	3	4	5	6	7	8
Large Group	7.5	5.375	5.5	6.125	5.375	5.875	5.625	6.0
Small Group	9.66667	7.66667	6.16667	7.33333	7.16667	6.25	5.16667	4.5

Data collected from each module were analyzed using the one-way analysis of variance (ANOVA) Dunnett Procedure to compare the significance of response rates between the large and small groups. The reason for using this particular type of ANOVA was that the Dunnett Procedure is restricted to comparing the experimental groups (in this case, the small groups) against a single control group (i.e., the large group). This particular test does not compare the small groups against each other.

Table 2 shows the results of the Dunnett test run for each module. As the table illustrates, there was

not significant evidence ($p\text{-value} < .05$) to suggest that placing students in small discussion groups of three to four people increases their likelihood of responding more frequently to discussion questions.

DISCUSSION

The purpose of this study was to determine whether participants in small group discussion forums posted more frequently than their large group counterparts. Although it appears that the small groups in the one class included in this study did submit more discussion responses and postings on average than the large group over the 8-week period, statistically speaking, there was no significant difference between the two groups' participation. Research by Cheung and Hu (2010) suggested that structuring forums with the group as one large entity could cause individual students to minimize their participation; however, the results of this study do not support this previous research.

LIMITATIONS

There are several limitations to this study. The first is that this study was conducted in only one doctoral class. The second limitation is that most doctoral learners are accustomed to using a large group discussion forum, and as such, in this case, participants may have been biased against the smaller groups because they felt that they could miss out on other learners' knowledge and resources.

FUTURE DIRECTIONS

Based on the study limitations, the researchers recommend that this study be extended to additional doctoral as well as graduate-level classes to determine if, in fact, the current literature supporting the use of small group discussions to increase substantive postings is valid. This knowledge is neces-

Table 2

Dunnett Procedure Results

	Module							
	1	2	3	4	5	6	7	8
Sum of Squares	20.000	27.250	12.278	7.750	21.667	23.700	15.000	16.000
Degree of Freedom	10	9	9	7	8	9	9	8
Mean Square	2.000	3.028	1.364	1.107	2.708	2.633	1.667	2.00
F-Statistics	.720	1.706	.417	.367	1.277	1.236	.556	.759
Significance (p value < .05)	.693	.209	.898	.911	.345	.371	.805	.645

sary to determine whether changes to the current standard format of whole group discussion forums should occur in order to increase student engagement and learning.

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Pam Epler earned her Master of Education in special education from Mc Daniel College and her PhD in curriculum and instruction from Capella University. She currently teaches special education courses at Grand Canyon University in the graduate and doctorate programs and is a dissertation chair as well as a Master methodologist. She has published and proffered internationally, at the Canadian International Conference on Education, and presented nationally at the Council for Exceptional Children (CEC) and on the state level at the Kentucky Association of Teacher Educators. She has been an administrator in both the public and private sectors from elementary thru high school levels. Her research interests include Response to Intervention (RTI) strategies, special education teachers' roles in RTI, special education service delivery models, and pre-service teachers' perception of special education students. She has authored two books *Models for Effective Service Delivery Models in Special Education Programs* and *Examining Response to Intervention (RTI) Models in Secondary Education*.

Bruce Bennett earned his Bachelor of Science in Business Administration from University of Phoenix, Tucson, Arizona in 1985. He then received his Master of Education Secondary Education from Arizona State University, Tempe, Arizona in 1993. In 2001, he joined the doctoral program in Education at the Graduate Theological Foundation. Dr. Bennett is currently conducting PhD research in the area of socialization ramifications within the asynchronous discussion forum model of online delivery. He is a curriculum developer responsible for the creation of doctoral courses for Grand Canyon University. He is also an adjunct on-line professor for Grand Canyon University where he teaches education courses in College of Education graduate programs.

Rorie Ross earned her Bachelor of Science in Secondary Education Social Studies from Southern University, Baton Rouge, Louisiana in 1995. She then received her Master of Arts in Secondary Counseling from Southern University, Baton Rouge, Louisiana in 1997. In 2002, she joined the

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