Conference on

Teaching Large Classes

July 21, 2016

The Inn at Virginia Tech and Skelton Conference Center
Virginia Tech, Blacksburg, Virginia

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Letter from the Conference Committee

The 2nd annual Conference on Teaching Large Classes provides an avenue for national and international teachers and scholars to come together and share knowledge, skills, and research addressing teaching and learning in large classes. The conference is a showcase for best practices in teaching and learning in large classes, as well as the research that provides evidence of best practices. Ultimately, the conference provides knowledge and skills related to the teaching of large classes that participants will find immediately useful.

What is a large class? A "large" class is less defined by form (size) and more defined by function (action); that is, a class is "large" when it becomes challenging to engage students as individual learners. How is learning-centered instruction achieved in a large class? How can students be assessed in meaningful ways and how can valid grades be determined in a large class? How can technology be leveraged to assist in pedagogy, course management, and communication? The Conference on Teaching Large Classes brings together teachers, researchers, administrators, and students to address these issues/questions through the sharing of skills, research, and wisdom.

Large classes create a challenging teaching and learning environment, but not an insurmountable environment. Faculty across the country and globe are engaging students in large classes through innovative and creative pedagogical approaches and the Conference on Teaching Large Classes is the only national conference focused on sharing those approaches. We are excited that you have joined us and we look forward to engaging with you in increasing the efficacy of teaching large classes.

Peter E. Doolittle
Executive Director

Tiffany J. Shoop
Assistant Director

Stephan G. Munz
Professional Development Fellow

Veronica van Montfrans
Professional Development Fellow

Conference on Teaching Large Classes

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Hosted by

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Opening Keynote Address

8:30 – 9:30 am

Martha Olney
Adjunct Professor of Economics
Undergraduate Chair of the Department of Economics
University of California - Berkeley

Group Work in Large- (and Small-) Enrollment Classes

Engaging students actively is key to promoting learning. Many think that, short of "flipping" your classroom, active engagement is impossible in large classes. Not true. In this keynote address, Olney will demonstrate and describe several active learning tactics that she uses in her 720-student Principles of Economics class at U.C. Berkeley (and used in her 30-student Principles class at Siena College). Her strategies blend instructor-lecture and student-engagement and do not require faculty to flip their class. She will show how clickers or other classroom response systems can be used in a variety of ways to engage students. Questions or other prompts to be discussed in groups work in groups of 30 and in groups of 700. Come ready to participate and learn.

Closing Keynote Address

4:30 – 5:15 pm

Greg Justice
Associate Professor in the School of Performing Arts
Virginia Tech

The Art of Teaching Large Classes:
Using Acting Techniques in the Teaching/Learning Process

There are hundreds of parallels that exist between how performers communicate with their audience and teachers with their students. One definition of acting is when a live performer presents a story, subject, or topic to a live audience. Actors present their story multiple times and each time they perform they try to make the event seem as if it was happening for the very first time. The definition of teaching is very similar. Actors are able to make their audience stay tuned in on them for long periods of time and they can get audiences to remember material for long periods of time. Justice shares these acting techniques with teachers to accomplish the same results in the classroom.

Table of Contents

POSTER SESSIONS

Thursday

July 21, 2016

Presentation Sessions

http://www.teachinglargeclasses.org/conference/

Thursday

July 21, 2016

Session 1

09:50-10:40 AM

http://www.teachinglargeclasses.org/conference/

How a Professor's Intrapersonal and Interpersonal Characteristics may Affect Students' Learning in a Large Class

Gary T. Green, *University of Georgia*

Abstract: University professors are charged with the task of creating and teaching courses that will hopefully have long-lasting impacts on student learning. Hence, professors strive to provide creative, active, and stimulating learning environments and experiences for university students, which they often base upon pedagogical research and best practices. However, very limited research has examined how a professor's intrapersonal and interpersonal characteristics may impact their student's learning. Hence, this study examines student's perceptions of how their professor's characteristics may have impacted their learning in a large class setting.

Literature Review

Creating powerful learning experiences is particularly crucial in the natural resources field, where effective teaching can promote changes in behavior among students, promoting a sense of stewardship and an ethic of sustainability. Professors in this field strive to provide creative, active, and stimulating learning environments and experiences for university students. Professors often spend many hours keeping up-to-date with the latest research and trends in their field, drawing up lesson plans, and updating lecture and reading materials. They keep office hours, help students who are struggling, and incorporate student feedback. But little is known concerning what matters the most to students and their learning when it comes to their professor's intrapersonal and interpersonal characteristics (e.g., Freeman et al., 2014; Light, 2001; McKeachie, Pintrich, Lin, Y.G. and Smith, 1987).

Hence, given the complexities of teaching a large number of students in a single class, how does a professor's intrapersonal and interpersonal characteristics affect student learning? This research session will describe and share results from a study where students were asked to rank their professor's intrapersonal and interpersonal characteristics in relation to the impact this traits may have had on their learning. Hence, attendees of this session should expect to leave with some insights into how a professor's intrapersonal and interpersonal characteristics may impact student learning in a large class.

Methodology

A survey was designed to assess students' perceptions of how their professor's intrapersonal and interpersonal characteristics may have impacted their overall learning. Students in several previous classes were initially asked to provide a list of a professor's intrapersonal and interpersonal characteristics that they perceived impacted their learning. These lists were compiled and in conjunction with an extensive literature review a survey was subsequently designed. This survey was administered in three sections of an introductory survey course entitled "Forestry and Natural Resources 1100: Natural Resources Conservation." This course fulfills a university-wide core requirement for social science, and as such the course attracts a wide range of students from across major disciplines. All three sections took the same three high-stakes exams during the semester and were taught by the same professor. The enrollment for each semester was 113, 102, and 101, respectively. A total of 316 students completed pre-test and post-test surveys administered at the beginning and the end of the semester-long course. Students in all three sections ranked the importance of nine intrapersonal and interpersonal characteristics of their professor that they perceived impacted their learning and overall enjoyment in their class.

Data Analysis, Results and Discussion

Paired t-tests, ANOVA, ANCOVA, and factor analysis results were performed using Statistical Package for Social Sciences (SPSS 23). Significant findings will be presented, and implications for future teaching and learning techniques will be discussed.

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Understanding Faculty Experiences in Teaching Large Classes: A Pilot Study on Faculty Perceptions of Teacher-Student Interaction in Foundational Engineering Courses

Michelle Soledad, *Virginia Tech/Ateneo de Davao University*
Jacob Grohs, *Virginia Tech*

Abstract: This research session will report on the results of an ongoing effort to understand and document faculty experiences on teaching large classes. For this pilot study, we focus on the experiences and perceptions on the quality of teacher-student interaction in the large class setting of faculty teaching foundation courses in the engineering sciences. Data collection was conducted through semi-structured interviews. In this session, we offer key findings from the pilot study, explore opportunities for the expansion of the study to courses with large class sizes in other domains and disciplines, and encourage participants to consider how the study may inform the development of support services and resources that will ensure quality teacher-student interaction even in the large class setting.

Literature Review

Increasing costs and student populations in higher education (National Science Board, 2014) has resulted in the decision of institutions to teach some courses in large classes (Parry, 2012). Foundational courses, normally required of students across multiple disciplines, are more prone to large class sizes as it may be a cost-saving strategy for the institution. However, large class sizes have also been associated with classroom situatons that may be detrimental to student learning, including less opportunity for the instructor to interact with students and provide meaningful feedback (Cuseo, 2007). For this study, we define *student-faculty interaction* operationally as instances of personal communication between the faculty and the student, in the context of their involvement in a course. This may occur in various forms, in the classroom context and beyond, in the form of personal face-to-face and classroom context conversation, feedback given through assessment tools, and online-based forums, among others. Engagement, on the other hand, is defined operationally as behaviors exhibited by students that are beneficial to learning, such as participating in class, attending study groups, and utilizing office hours; this definition is based on how Chen, Lattuca, & Hamilton (2008) characterized student engagement.

Foundational courses in the engineering sciences are required in most engineering programs. These courses are normally taken by students during their second year, along with other anecdotally challenging courses in the engineering curricula, such as Physics and higher Calculus (e.g. University of Michigan, 2015). Foundational engineering science courses contain conceptually challenging material, the purpose of which is to develop students' knowledge and skills in, and build a foundation for, doing complex design; best practices for facilitating learning for this type of material include "organizing students in small groups" and "designing in-class activities to actively engage students" (Lord & Chen, 2014), practices that are challenging for faculty to implement in the large class setting.

Barr and Tagg (1995), however, posit that as long as an effective learning environment is developed, quality learning is possible regardless of class size. An effective learning environment is one where an instructor is able to engage in meaningful interaction with students. This study examines faculty experiences in order to explore possible ways to develop effective learning environments, focusing on improving the quality of student-teacher interaction, despite the challenges posed by the large, computation-based class settings.

Methodology

Semi-structured interviews with faculty of a large public research university were conducted. Participants self-selected into the study by accepting an invitation to be interviewed, but invitations were sent out to a purposefully-selected group of faculty who met the following criteria: a) have taught a foundational engineering science course; and b) have taught courses with class sizes of 50 or more students. The project secured approval from an institutional review board, and steps were taken to maintain confidentiality, including removing identifying information from interview transcripts. Phenomenological analysis of interview data was employed to make meaning from the collected data. A phenomenologically-informed approach to analysis was chosen as it aligns with the study's overarching goal of understanding faculty experiences; we acknowledge, however, that as a pilot study

with a small sample size, there are tenets of the phenomenological approach to qualitative research inquiry that this set of data may be unable to meet; that gap will be addressed by the succeeding studies that will follow as a result of this pilot (Hesse-Biber & Leavy, 2011). Interview transcripts were reviewed to identify both shared and unique statements of experiences on teacher-student interaction in the participants' classes. These statements were then categorized into clusters of meanings that were synthesized into a description of the faculty experience on teacher-student interaction in foundational engineering science courses with large class sizes.

Results

An iterative process of analysis to establish themes and categories out of interview data is currently being conducted and will be completed prior to the Conference. Initial analysis of interview data yielded the following shared/common experiences:

- The flow of interaction is mostly from teacher to student, with minimal student to teacher interaction
- The type of classroom, physical arrangement, and available multi-media resources matter
- Class size provides some students with a "cloak of anonymity;" gauging engagement can be challenging
- Class participation is minimal and can be limited to relatively the same set of individuals, usually those seated in the front rows
- It is difficult to personally monitor student performance real-time
- Personal feedback from instructor to student is preferred; electronic resources that may provide feedback is available, but faculty perception is that it is prone to being used incorrectly and is not as effective
- Missed opportunities for interaction include insufficient use of office hours; however, even if this was used to its full potential, faculty will still not be able to accommodate all students

These experiences all relate to diminished quality of interaction in the specific courses that they were teaching.

Discussion

This study seeks to understand the experiences of faculty teaching large classes in foundation courses in the engineering sciences, specifically in terms of their interaction with their students. For this research session, we will give a brief overview of the study and discuss the key findings and themes that emerged from the analysis of pilot data, which will then be used as impetus for a reflective conversation on (1) ways through which students may have quality interaction with an instructor in large, computation-based classes; (2) ways through which students may receive individualized, targeted and timely feedback in the large class setting and (3) opportunities for expansion of this study to other domains and disciplines.

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Storytelling in Large STEM Classrooms: Combining High and Low-Tech Methods to Keep Students Engaged

G. Keith Harris & Clint Stevenson, *NC State*

Abstract: Storytelling is basic to human learning. By telling stories across a number of class periods and then working with students to link those stories together, it is possible to turn an entire semester's worth of material into a cohesive whole. Narratives that challenge existing beliefs and engage students emotionally are especially effective at maintaining the attention of students in large classrooms. STEM disciplines can be intimidating to students, especially in STEM classroom environments. Storytelling is an effective tool for making STEM disciplines relatable and interesting to students who may otherwise view these courses only as obstacles to be overcome. Both high tech and low tech methods can be used to support narratives that reinforce the storytelling process. High tech options, such as TopHat, Mediasite, and 360 degree video, appeal to digital natives who are making constant use of social media and have come to expect immersive technology experiences. Low tech options, such as food-based demonstrations, and paper or dry-erase board active learning strategies, allow students to engage in course related stories in a hands-on fashion. Combining both high and low tech options allows for more opportunities to expand on basic stories and to assess the learning that occurs when they are well told.

Literature Review

Storytelling is basic to human learning. A review of the pedagogical literature published between 2012 and 2016 revealed over 17,000 articles dealing with the topic of storytelling in the classroom. By telling stories across a number of class periods and then working with students to link those stories together, it is possible to turn an entire semester's worth of material into a cohesive whole. Narratives that challenge existing beliefs and engage students emotionally are especially effective at maintaining the attention of students in large classrooms. STEM disciplines can be intimidating to students, especially in STEM classroom environments. Storytelling is an effective tool for making STEM disciplines relatable and interesting to students who may otherwise view these courses only as obstacles to be overcome. Over 2,000 published articles have been published on the use of storytelling in STEM classrooms since 2012. Both high tech and low tech methods can be used to support narratives that reinforce the storytelling process. High tech options, such as TopHat, Mediasite, and 360 degree video, appeal to digital natives who are making constant use of social media and have come to expect immersive technology experiences. Low tech options, such as food-based demonstrations, and paper or dry-erase board active learning strategies, allow students to engage in course related stories in a hands-on fashion. Combining both high and low tech options allows for more opportunities to expand on STEM-related stories and to assess the learning that occurs when they are well told.

Objectives

1. To describe the use of storytelling as a means to turn a semester's worth of material into a cohesive whole.

2. To describe the use of high tech methods, such as TopHat, and 360 degree video, to support a narrative and maintain student engagement in large classrooms.

3. To describe the use of low tech methods, such as food-based demonstrations and paper or dry erase board-based active learning strategies to support a narrative and maintain student engagement in large classrooms.

The goal of this session would be to

1. Challenge audience members with thought-provoking narratives.

2. Ask the audience to share narratives that have been effective in their teaching experience.

3. Describe, demonstrate, and discuss high tech narrative methods, such as TopHat, Mediasite, and 360 degree video.

4. Describe, demonstrate, and discuss low tech narrative methods, such as paper or dry erase board-based active learning strategies.

Participants would be asked to interact in the following ways

1. By providing thought-provoking narratives they have used in the classroom or that they have observed in social media.

2. By interacting with high-tech narrative methods and discussing their own use of high-tech methods.

3. By interacting with low-tech narrative methods and discussing their own use of low-tech methods.

Reference

G. Keith Harris, Clint Stevenson, and Helen Joyner. 2015. Taking an Attention-Grabbing "Headlines First!" Approach to Engage Students in a Lecture Setting. *Journal of Food Science Education*, Volume 14, Issue 4, pages 136–141.

What's the Problem?; Evidence-based Solutions to the Challenges of Large(r) Courses

Laura Cruz, *Tennessee Technical University*
Brian Smentkowski, *Queens University of Charlotte*

Abstract: Although large classes are not new to higher education, the rate and scale of change has grown dramatically during the past decade. With this rapid change we have seen a surge in efforts to design and redesign learning experiences that match the learning environments, but many of these efforts are teaching-centered and not learning-centered. In this session we delineate the challenges of learning in large classes by incorporating data on student perceptions of learning and engagement in such classes. By substituting evidence for assumptions and recasting the size question as a student experience challenge, we effectively reframe our understanding of the "problems" associated with transitioning to larger classes and the solutions. We share an inventory of strategies designed to enhance learning and engagement in large(r) classes, as well as a framework for investigating and addressing student perceptions of the large class experience. By rethinking the challenges of learning in larger classes, participants will be able to develop and apply creative solutions to problems associated with class size.

Literature Review

The challenge of teaching and learning in larger courses is not a new one. As early as the 1970a, practitioners were seeking to address some of the challenges in managing large lecture halls (Gaynor & Millham, 1976; Gleason, 1986). This is perhaps not chronologically coincidental, as many of the same financial and political pressures that characterized the landscape of higher education in the 1970s have begun to reappear in new guises in the current decade. The growing pressure to increase class size has triggered large-scale course redesign projects, often at the program, department, or university level. These projects are based on mapping course redesign to institutional priorities, including retention, efficiency, and assessment (Twigg, 2000: Twigg, 2005). In addition, large course redesign projects have often focused on the integration of technological solutions, notably including clickers and flipped (and other hybrid) models, which touch on the hot-button issues of equity and quality that are associated with on-line solutions (Rosenthal & Weitz, 2012; Russell, 1999). The impetus to change has largely been administratively or externally driven and tied to strategic goals or imperatives that supersede the student or instructor.

In a seminal article in the Scholarship of Teaching and Learning (SOTL), Randy Bass challenged scholars to not make assumptions about how and why we ask questions about teaching and learning (1999). In particular, he suggests that too often we move to implement a solution before clearly delineating the problem that we are solving. This presentation suggests that Bass' admonition may apply to the solutions presented for the challenge of large course design and redirects our attention to focus on the classroom experience itself. In an effort to more clearly define the problem, or learning challenges, of a large course, the researchers developed an administered a survey to students enrolled in large courses at a regional comprehensive university in 2012 (immediately after that university quadrupled class sizes of virtually all introductory freshman courses), and then again in 2016 (four years after the transition and subsequent administrative responses to student feedback). The results suggest that the assumptions made by faculty and administrators about large courses do not always match the student experience. This variance will serve as the basis for rethinking our approach to teaching and learning in larger courses.

Goals and Objectives

The goal of this session is to reframe the challenges of student learning in larger courses in order to develop and integrate a broader range of pedagogical interventions. Participants in this session will be able to accomplish the following objectives:

- Discern the challenges of larger-course instruction through the lens of student perception, motivation, and learning.
- Apply the lens of student perspective to challenges inherent in teaching large courses
- Devise multiple solutions to student learning challenges in the context of larger courses

- Strengthen their ability to identify and implement creative solutions to pedagogical problems in larger courses

Description of the Practice

The practice to be modeled is creative problem-solving by viewing a pedagogical challenge through multiple perspectives. The session will be divided into 3 sections:

- Section 1: Evaluation of the student data. In small groups, participants will compare and contrast their own assumptions with the evidence gathered from students in order to answer the question: what is the problem?
- Section 2: Case Studies. In small groups, participants will evaluate case studies that model large course teaching and learning challenges. After identifying the problem(s) for each case, the each group will engage in a guided inquiry process in which they will develop as many possible solutions to those problems as possible within the given time limit.
- Section 3: As a whole group, participants will integrate the solutions developed during section 2 into a collective 'toolbox' of pedagogical solutions. The session will close with a whole group discussion about the alignment between problem/challenge and solution in the context of larger courses.

Discussion

This workshop is intended to provoke further conversations about how we delineate problems in the scholarship of teaching and learning, how we empower faculty to have a greater sense of agency or self-efficacy when faced with the challenge of teaching in new ways, and what models we can use to facilitate creative problem-solving in any classroom.

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Conversation: Teaching More with Less: Managing Very Large Classes with Scarce Resources

Steve Trost, *Virginia Tech*

Abstract: Many large classes rely heavily on support from graduate student teaching assistants. But what if you do not have a large pool of graduate labor on which to rely? As someone who has taught very large numbers with very little TA support, I will go through some strategies to minimize work load while maximizing the impact and effectiveness of the class and of the available resources. Topics discussed will include student interaction and communication, the use of technology, and how to best use any assistance that might be available. This topic is ideal as a "Conversation" session since I am sure others have been in the same position and have valuable ideas to share.

Goals and Objectives

The goal of this session is for instructors of very large classes to share their experiences with and ideas concerning managing large classes when resources (TAs, space, time, etc.) are scare. While I will start the conversation by presenting my experiences and ideas, I have no doubt that others will quickly join in.

Description of Topic to be Discussed

Many aspects of teaching large classes become problematic when TA and other resources are not sufficient. Potential areas of discussion will include student communication, "office hours" etiquette and strategies, TA support, and e-mail correspondences.

Facilitation Techniques

This will be an open conversation. I will get the ball rolling but will invite others to share their ideas and experiences throughout the session.

Thursday

July 21, 2016

Session 2

11:00-11:50 AM

http://www.teachinglargeclasses.org/conference/

Faculty Voices- How instructors' perceptions and educational needs guide the development of CIDER's large class initiative.

Tiffany Shoop & Stephan Munz, *Virginia Tech*

Abstract: This research session presents highlights from a survey of 98 large class instructors from a large, land grant university. The results of the survey, which was conducted in the fall semester of 2013, reveal: (1) the top instructional strategies and assignments large class instructors are currently incorporating in their classes, (2) the top instructional strategies and assignments the instructors want to learn more about for their classes, and (3) the top concerns/ challenges the instructors encounter in their classes. The research session will share the results of the survey as well as how the findings have informed faculty development opportunities for large class instructors.

Literature Review

Managing large classroom settings continues to be a challenge for many teachers. Administrators' and senior faculty, however, often overlook the teaching development process for faculty of large classroom settings. The need for effective large classroom instructors in higher education is overwhelming (Stanley & Porter, 2002). Although there is a wide variety of research and guidebooks that focus on tools, strategies, and techniques for large class faculty (e.g. Carbone, 1998; Heppner, 2007; Stanley & Porter, 2002), there is a lack of research on which strategies and principles the current faculty of large classes use and which tools they would like further education about. CIDER's large classroom initiative focuses on a holistic approach that includes faculty input via surveys and interviews, current empirical research, and large classroom observations, as well as hosting the first conference on teaching large classes.

Methodology

A During the fall 2013 semester an online survey was sent to large class instructors at Virginia Tech who taught courses with 100+ students. 98 instructors who responded to the survey represented a range of ranks and class sizes.

1. Rank:
    - Instructor = 17
    - Assitant = 11
    - Associate = 26
    - Full 23
2. Class Size:
    - 100-299 students = 71
    - 300-599 students = 18
    - 600+ students = 2
3. Experience Teaching Large Classes
    - < 5 years = 18
    - 5-10 years = 30
    - 10+ years = 43

Survey asked large classroom instructors about their top instructional strategies and assignments they incorporate in their classes, the top instructional strategies and assignments they want to learn more about for their classes, and the top concerns/ challenges they encounter in their classes.

Results

Large class instructors indicate that lectures with PowerPoint/ Keynote/Prezi and video clips/ films are the most common used tools and technologies in their large classroom settings. On the other hand, flipped classroom approaches, student presentations, social media interaction, peer learning, and blogs are the least used pedagogical and technical tools that faculty use in large classroom environments. In addition, faculty point out that they would like to learn more about flipped classroom approaches and in-class learning strategies and classroom distractions, space limitations, and cheating have been identified as the top challenges in large class setting.

Discussion

The findings show a difference between the more traditional strategies and assignments respondents reported using in their large classes (i.e., lecture with visual aids, in-class test/exams, homework) and the more active learning-based approaches they expressed interest in using in their large classes (i.e., flipped classroom activities, in-class active learning strategies, experiential learning projects).

There is a need for more faculty development programs for instructors of large classes that focuses on current strategies based on principles of active learning and student engagement.

Future programs should also include concerns/challenges that instructors encounter in their classes such as classroom distractions, classroom space, cheating, student engagement, and attendance.

www.teachinglargeclasses.org

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Teaching Ethical Reasoning in Large Classes

Charles M. Harris & Shenghua Zha, *James Madison University*

Abstract: Mitigating the practice of and potentially problematic effects of cheating in higher education will continue to be an ongoing process. Various studies continue to approach the problem from the perspectives of institutional climate, classroom management, and students' motives for cheating. In 2013, James Madison University initiated the Madison Collaborative: Ethical Reasoning in Action, a structured attempt to further students' ethical reasoning skills. In this study, involving students enrolled in large classes, we explored the feasibility of a one-trial intervention effecting incremental change in applied ethical reasoning when one knows the identity of a fellow student who committed plagiarism. This study implemented a Solomon-Four-Group design with students enrolled in four eighty-student, hybrid sections of an introductory psychology course. The independent variable was a scenario depicting plagiarism, within a group paper, by a member of a five-student group. Thinking from the perspective of one who knows the identity of the student who committed the plagiarism, the dependent variable was students' selection of one of five possible reactions to knowing of a violation of the Honor Code by a fellow student. A one-way analysis of variance yielded no statistically significant differences in SAT scores among the four groups, $F(3, 214) = 1.196$, $p = 0.312$, 0.016 ES. Data analysis showed no main effect between pre-tests and post-test; however, there was a significant interaction between the sections and the tests, $F(1,88) = 5.179$, $p < 0.05$, 0.056 ES. Specifically, Section 1, the experimental group, showed a significantly greater probability of exercising ethical behavior than Section 4, the control group. Because we were successful in effecting significant change in ethical reasoning, by means of a one-trial intervention, other instructors can be optimistic about advancing ethical reasoning by their students within a single-semester time frame.

"At present, opinion is divided about the subjects of education. People do not take the same view about what should be learned by the young, nor is it clear whether education should be directed mainly to the intellect or to moral character." Aristotle, Politics, Book VIII

Teaching ethical reasoning in large classes is aligned with the American Psychological Association 2.0 Comprehensive Learning Goal #3, ethical and social responsibility in a diverse world, and with the mission of James Madison University. To that end, beginning with the 2013-2014 academic year, James Madison University implemented the Madison Collaborative: Ethical Reasoning in Action as a campus-wide educational program designed to facilitate students' development of ethical reasoning skills. The Madison Collaborative is operationalized within a flexible and open framework of eight key questions that are associated with the following eight core values: liberty, rights, responsibilities, character, authority, empathy, fairness, and outcomes. In this study, involving students enrolled in large classes, we explored the feasibility of a one-trial intervention effecting incremental change in applied ethical reasoning when one knows the identity of a fellow student who violated the Honor Code by committing plagiarism.

Literature Review

Ethics and academic integrity in higher education are continuing areas of research and discourse (e.g., Barber & Bagsby, 2011; Bertram Gallant & Drinan, 2006; Blum, 2009; Engler, Landau, & Epstein, 2008; McCabe, 2005; McCarron & Stewart, 2011; Prohaska, 2013). Collectively, themes of the foregoing cited research can be categorized under institutional climate, classroom management, or students' motives for cheating. In a 2001 review of a decade of research on cheating in academic institutions, McCabe, Trevino, and Butterfield reported a lower percentage of students cheating in institutions with academic honor codes. In institutions without honor codes, twenty percent of students reported having committed plagiarism one or more times compared with only ten percent of students in institutions with honor codes. James Madison University has an academic honor code and an active Honor Council staffed with approximately 100 students and faculty.

Methodology

This study implemented a Solomon-Four-Group design with students enrolled in four eighty-student, hybrid sections of an introductory psychology course. Section one, the experimental group, regularly met only on Mondays. Section four, the control group, regularly met only on Wednesdays. The role of sections two and three was in relation to internal and external validity. The independent variable was a scenario depicting plagiarism, within a group paper, by a member of a five-student group. Thinking from the perspective of one who knows the identity of the student who committed the plagiarism, the dependent variable was students' selection of one of five possible reactions to knowing of a violation of the Honor Code by a fellow student.

Data Analysis and Results

A one-way analysis of variance yielded no statistically significant differences in SAT scores among the four groups, $F(3, 214) = 1.196$, $p = 0.312$, 0.016 ES. Data analysis showed no main effect between the pre-test and post-test; however, there was a significant interaction between the sections and the tests, $F(1,88) = 5.179$, $p < 0.05$, 0.056 ES. Specifically, Section 1, the experimental section, showed a significantly greater probability of exercising ethical behavior than Section 4, the control group. Additional data analysis will be included in the presentation.

Discussion

Cheating in higher education continues to be a significant problem for all members of the academic community. As evidenced by this study and espoused by others, effecting the development of students as civic-minded members of society must include education in concert with individual and institutional commitment to ethical and moral standards for a civil society. Because we were successful in effecting significant change in ethical reasoning, by means of a one-trial intervention, other instructors can be optimistic about advancing ethical reasoning by their students within a single-semester time frame.

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Using Group Posters in the Sciences to Evaluate Student Engagement and Inquiry Based Learning

John Chermak & Kimberly Filer, *Virginia Tech*

Abstract: Posters are a popular way for scientists to communicate information and research at their annual meetings in various technical sessions. Poster sessions have been used in Chermak's Introductory to Resources and the Environment courses (GEOS-1024) for the past 3 semesters in 5 different sections and evaluating student engagement, teamwork and inquiry. This practice session, will highlight how poster sessions were used to promote teamwork, engagement and inquiry in large general education classes ranging in size from 75 to 250 students. Preliminary data on student engagement and learning is currently being evaluated, and very preliminary student response data have shown increased interest in the topics that were investigated and transferring of their knowledge to other systems.

Literature Review

In the Department of Geosciences at Virginia Tech a "Resources and the Environment" course has been taught to both Geoscience majors and non-majors in a large lecture format for more than 10 years (average class size of approximately 200 students). Since 2011, Clicker student response systems have been used in this course (Immerwahr, J. 2009) and since Spring 2015 a group poster and associated group poster session has been added.

Methodology

This study utilizes student Group poster sessions to evaluate student engagement, teamwork and inquiry. Two different types of posters have been created, 1) Energy Resources, Cradle to Grave and 2) 19 different Countries summarizing the current state of resources, the environment and people. The energy sources evaluated included the fossil fuels, nuclear, and renewables and countries evaluated ranged from developing to developed countries.

Data Analysis

Analysis of student posters, peer external and internal evaluations and student impressions were recorded using the iCLicker response systems. Initial data from the Spring 2015 Energy, Cradle to Grave project of 75 students (80% freshman, 12% sophomores, 5% juniors and 3% seniors) where approximately 50% of the students had never participated in a poster session and 48% had participated in less than 3. Students responded that their overall impression of the poster session was 70% excellent, 29% good and no responses for average or below average and 1 student responded their impression was bad. 60% of the class said they were much more comfortable and 31% were more comfortable applying and using the cradle to grave approach to evaluate energy issues. As a final assignment, students individually applied the cradle to grave approach to a new energy source (biogas from landfills) and overall performance was quite good and continues to be assessed.

Data collected in Spring 2015 along with data compiled in Fall 2015 and Spring 2016 will allow the continued evaluation of student engagement, inquiry and learning.

Discussion

Students' engagement in a general education science class and inquiry based learning is being evaluated in several large classes using complex issues using group posters. These subjects of resources, the environmental and people are not only important to scientists but also the broader citizenry.

Herding without Hovering: Honor System Practices that Work in Large Classes

Tay Keong Tan, *Radford University*

Abstract: A university's honor pledge typically mandates that all students are to hold themselves and others "to the highest moral and ethical standards of academic integrity and good citizenship." Studies have shown that cheating behavior and academic misconduct are commonplace in colleges and schools. Large classes are not conducive to close supervision and regular and constructive interaction between instructors and students that might prevent violations of the honor code. How can instructors safeguard the integrity of the learning experience in large classes? Just as learning analytics and the science of teaching can improve instruction, what evidence-based best practices can build integrity? How can honest learning be fostered without resorting to Draconian methods of policing and punishment? Following a one-year study on this topic with a team of students during the Fall Semester 2015 and the Spring Semester of 2016, research outcomes will be discussed in the form of a set of teaching practices that prevent malpractice and foster a culture of integrity. The discussion will delve into course design, class culture, and assessment strategies that can reduce the incentives and opportunities for cheating – without resort to punitive measures that are not consistent with a safe and open environment for learning.

My university's honor pledge mandates that all students are to hold themselves and others "to the highest moral and ethical standards of academic integrity and good citizenship." Studies have shown that cheating behavior and academic misconduct are commonplace in colleges and schools (McCabe, 2012; and Gallant, 2008). I caught seven students in my classes for cheating, plagiarism, and forgery of attendance records over two semesters.

1. *How can I, as an instructor, do in my classroom to safeguard the integrity of the learning experience?*
2. *Just as learning analytics and the science of teaching can improve instruction, what evidence-based best practices can build integrity?*
3. *How can instructors foster honest learning without resorting to Draconian methods of policing and punishment?*

I conducted a study using in-depth interviews, focus group meetings and documentary review during the Fall Semester 2015 to answer these questions. The outcomes will be a set of teaching and testing practices that prevents malpractice and nurture a culture of integrity. Integrity strategies may include course requirements, assignment design, test administration and scoring methods can reduce the incentives and opportunities for cheating. Where applicable, these integrity practices have been tested in my classes during the Spring Semester.

Literature Review

Some of us work in universities that use honor codes to ensure academic integrity. Like many smaller colleges with a sense of community, most students and faculty members know one another well and have a strong sense of identity and belonging. The code is part of the identity and ethos of the college or school. It is supposed to "encourage a culture of fairness and integrity, promote individual and collective responsibility, and foster strong bonds of trust between students and faculty." (Lipson, Doing Honest Work in College, 2008, p.32). Yet, many problems exist in its practice and implementation.

In the honor system, we the faculty member and students take responsibility upon ourselves, individually and collectively, for maintaining ethical standards and the honor code. How can we make it a reality in our classrooms, especially in large classes? Carol Dweck's Growth and Fixed Mindset studies postulated the belief that intellectual ability is not fixed but it can be developed by learning and practice. Brain changes result from effortful learning, rather than in-born fixed intellectual capacity. Does this theory only apply beyond improving competence to shaping character? Dweck's research (2003, 2007 and her 2006 book, *Mindset: The Psychology of Success*) does not specifically address ethical competence.

Why do students come to college to learn and improve themselves often set themselves up for ethical failure by engaging in risky malfeasance? Are those integrity lapses the result of insufficient effort or ineffective strategy? Are large classes more susceptible to violations of the honor code? If so, what can faculty members do about them, without resorting to close policing and deterrent punishment that can derail an errant student's academic career and

poison the atmosphere of safety and openness in the classroom? This session will present answers from a research on teaching, especially in large classes in a university.

Methodology of Research and Presentation

The study uses in-depth interviews, focus groups and literature reviews of past cases and global practices to seek feedback and ideas on the following questions:

1. What can instructors in their classrooms to safeguard the integrity of the learning experience?

2. Just as learning analytics and the science of teaching can improve instruction, what evidence-based best practices can build integrity?

3. How can we foster honest learning without resorting to Draconian methods of policing and punishment?

This participatory, facilitated session is designed to provide a time and space for teachers and researchers to discuss the intellectual, theoretical and instructional issues relating to the topic. How can teachers and researchers comprehensively and pragmatically address the all the risks and responsibilities of managing the honor system in a course? It is hoped that the discourse will offer insights and solutions for educators to shape their classroom practices and curricula.

Early Results

The early results of my interviews and focus group meetings revealed that there are great misconceptions among students and faculty members about the practice of the honor system, and what constitutes cheating, stealing (plagiarism) and lying. Some practices are practically costless and are very welcome by students – e.g. developing a code of conduct collaboratively with students and facilitated discussion of its implications for student and teacher behavior. Another is the study of past cases involving students and faculty members and their missteps. Research is ongoing through this Fall Semester, 2015.

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Conversation: Using Teaching Assistants in Large Classes

Scott W. Dunn, *Radford University*

Abstract: The teaching assistant (TA) is a common fixture in large classes, but there is no standard understanding of how to best use these graduate or upper-level students to facilitate learning in large classes. Models range from extremely hands-off approaches (such as having TAs essentially fulfill clerical functions) to much more hands-on (such as having TAs teach their own recitation or lab sessions). This conversation will proceed from the assumption that TAs should be used for more than just reducing the instructor's workload. Rather, they should help the instructor move beyond the lecture-and-test approach that often characterizes large classes toward more engaging pedagogical approaches. TAs should also be used in ways that will benefit them personally and professionally, which is unlikely to happen if the instructor sees their sole purpose as reducing his or her workload. Achieving these goals can be difficult, as TAs are, virtually by definition, less experienced and knowledgeable than the professors they work for. Those professors often struggle to give up control of some aspects of their classes (such as grading) to TAs and to ensure that TAs receive the training and guidance they need to be successful. Additionally, TAs are often the same age or only slightly older than the students they are supposed to be helping, a situation that raises concerns about confidentiality, respect, and professional boundaries. The purpose of this conversation is to help instructors come up with ways to best use TAs in their large classes and to share experiences about what works and what does not work. The facilitator of the conversation will share his experiences (both positive and negative) from using graduate TAs in an introductory class of 160 to 200 students. Attendees are encouraged to bring their own ideas and experiences to share.

Literature Review

Undergraduate and graduate teaching assistants (TAs) are often assigned to assist instructors of large classrooms. These TAs can provide valuable assistance to instructors and can also gain experience that will help them in their careers (Weidert, Wendorf, Gurung, & Filz, 2012). However, instructors can also struggle to find ways to effectively use TAs who likely have limited knowledge of the discipline and no teaching experience (Parker, Ashe, Boersma, Hicks, & Bennett, 2105). While there is some research examining training for TAs who will be taking on more active roles teaching as instructors of record or leading recitation sections or labs (e.g. Parker et al., 2015), little scholarly research looks at the use of TAs as assistants in large classes. This conversation proceeds from the assumption that effective use of TAs can allow large class instructors to engage students more deeply and assess students in more meaningful ways. For example, Cooper, MacGregor, Smith, and Robinson (2000) argue that well-trained TAs can allow instructors to engage their large classes in group discussions and projects that allow for more in-depth learning than traditional lectures. Similarly, Yang (2008) demonstrated that using TAs to facilitate online discussions can help students develop stronger critical thinking skills. Working as a TA can also be an invaluable experience for students, especially for those who "will become the next generation of faculty" (Parker et al., 2015, p. 84). Even for those who have no intention of pursuing careers in teaching, an assistantship can help students develop leadership skills and confidence. Instructors have a responsibility to use TAs in ways that are beneficial both to the students enrolled in the class and to the TAs themselves. This session is designed to help large-class instructors find ways to better fulfill that responsibility.

Goals and Objectives

The overarching goal of this conversation is for the participants (including the myself) to come away with ideas for using TAs both to reduce the workloads involved with large classes and to allow for more engaging pedagogies. This session is intended to be a conversation rather than a presentation because I have only limited wisdom to share with the group, but I suspect that the session will attract participants who have wrestled with some of the same challenges I have and can provide good advice about what works and what does not work.

My relevant experience comes from teaching a large (160-200 student) Introduction to Communication class for a total of eight semesters over the last six years, with one graduate (master's level) TA helping me each semester. During the first semesters that I taught the course, I was unsure how to effectively use the TA, both because of my

own assumptions about large classes (which I could only picture as almost exclusively lecture-based) and because I was not comfortable enough with my ability to effectively mentor graduate students with little or no teaching experience. Over time, I have discovered that the value of a TA for a large-class instructor is not so much to reduce the instructor's course load, but to expand the available toolbox of pedagogies beyond lectures and multiple-choice tests. I have used my TAs to grade short writing assignments, informal in-class reflections, and social media posts that have made the course more engaging to students. I have also had them hold office hours, respond to student questions and concerns over email, and teach class sessions when they felt comfortable doing so. Although I am using my TAs more effectively, I am always looking for ways to be more effective, and I believe that a conversation with colleagues from various disciplines would help us all as we share experiences and brainstorm ideas for using TAs.

Description of Topic to be Discussed

This conversation is designed to give participants time to share ideas about how teaching assistants can be and have been used. The specific topics addressed will depend on the participants' interests and experiences, but will likely include questions such as the following:

- What are some ways that TAs can allow instructors to reduce reliance on lectures and adopt more engaging pedagogical approaches?
- What qualities should TAs possess that will ensure that they will be effective assistants in large classes?
- How can we effectively train TAs for their roles in the classroom?
- How can we manage issues with confidentiality, respect, and professional boundaries that potentially emerge when using TAs (especially TAs who are close to the students' age)?
- How can we make sure that the TAs have positive experiences that will benefit their personal and professional growth?

Facilitation Techniques

I will begin the session by introducing myself and briefly sharing my experiences working with TAs in large classes. I will then ask the participants to introduce themselves, briefly share their experiences with TAs (if any), and explain what they hope to get out of the conversation. Based on these responses, I will outline the topics that we plan to address during the conversation. I will get the conversation moving by sharing some of the ways that I have used my TAs in my Introduction to Communication class. Throughout the session, I will use the questions in the previous section, along with other questions raised by the discussion, to keep the conversation moving in a way that will be conducive to drawing on the group's collective experience.

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Thursday

July 21, 2016

Session 3

1:00-1:50 PM

http://www.teachinglargeclasses.org/conference/

Clickers in Large Classroom Environments- A Systematic Content Analysis

Stephan Munz*, Virginia Tech*

Abstract: Classroom or Audience Response Systems (Clickers) are increasingly implemented in large classroom settings, seeking to improve academic performance through student engagement. While researchers have examined the degree to which clickers promote engagement, some of the findings concerning cognitive learning outcomes are mixed or inconclusive. Researchers argue that these inconclusive results exist due to the absence of pedagogical frameworks explaining the implementation and usage of clickers in large classroom settings. This research session reports on the findings of a systematic review that was conducted in December of 2015. The analysis focuses on the relationship between clicker outcomes and the description of success factors for efficient clicker implementations. Fifteen quantitative, qualitative, and mixed-methods studies, meeting eligibility criteria, were coded and analyzed to identify outcomes of clicker usage, quality concerning the description of clicker usage, and success factors for efficient clicker implementation.

Literature Review

Research indicates that Clickers have received increasing acceptance among educators in order to improve student involvement and active engagement (Flies & Marshall, 2006). The instructional potential of clickers has gained substantial interest from researcher, teachers, and pedagogues in various disciplines (e.g. Boscardin & Penul, 2012; MacArthur & Jones, 2008). Clickers are signal transmitters that can be implemented in large classroom settings in order collect students responses to teachers' question in the classroom (Boscardin & Penul, 2012; Chien, Chang, & Chang, 2016). In classroom environments it is the goal to enhance student motivation and learning outcomes. Research shows that active engagement can bring in-depth understanding, knowledge retention, increased levels of processing, and critical thinking skills (e.g. Mareno, Bremner, & Emerson, 2010). As a result, mastering the art of engaging students inside of learning environments is critical. Supporters of clickers argue that this technology can improve the engagement process of students and ultimately improve the performance levels in large classroom environments. It is the goal of clickers to monitor students' understanding and to foster cognitive interaction between students and their instructors (Caldwell, 2007; Kay & LeSage, 2009).

However, the question whether clicker-integrated instructions are more effective than conventional classroom settings has not been settled (Chien, Chang, & Chang, 2016). For instance, little empirical work was done in the early 2000's and the most frequently used data collection method of empirical work is based on self-reported measures (Fies & Marshall, 2006; Kay & LeSage, 2009). Although early research indicates that clickers boost attendance and are received in a positive way by students and faculty, a clear explanation of why the implementation of clickers is effective to foster academic learning outcomes remains absent. Chien and colleagues (2016) showed that early studies and reviews called for more rigorous empirical studies, better explanations for academic learning outcomes, and the development of a theoretical framework that can identify the features of successful clicker integrated instruction (e.g. Boscardin & Penuel, 2012; Fies & Marshall, 2006; Kay & LeSage, 2009). Therefore, this systematic review focuses on the success factors of efficient clicker implementation, as well as the descriptions of clicker usage based on current empirical studies in order to identify pedagogical features of successful clicker implementation processes.

Methodology

A systematic literature review was conducted on empirical research studies up until December 2015. Based on the selective literature search and the criteria for study inclusion, fifteen quantitative, qualitative, and mixed methods research studies have been identified

1. Criteria for study:
    - The study is represented in peer-reviewed journals.
    - The article investigates the outcomes, effectiveness, and/or implementation strategies of clickers in large classroom environments.

- The article is based on either quantitative, qualitative, and/or mixed methods research approaches.
- The article addresses validity, trustworthiness, or quality issues in the study.

2. Literature Search:
Studies were identified by database searching (EBSCOhost, APAPsychNet) citation searching, and reference list checking. In a first query studies were identified with the search terms “Clickers” and “Audio/Classroom Response Systems”. In a second query additional search terms (effectiveness, outcomes, implementation strategies) were added to ensure an extensive subsequent literature search.

3. Coding:
The coding dictionary included four variables that were coded and analyzed. The variables include 1. Outcomes (perceptions, performance, participation, higher order thinking, and others), 2. Description of Clicker usage (not mentioned, spare explanation, adequate explanation, detailed explanation, and sophisticated explanation), 3. Participants (not mentioned, natural sciences, social sciences, other backgrounds), 4. Success factors (not mentioned, instructors technology, organizational strategies).

Results and Discussion

Results indicate that the outcome variables of the majority of studies are still based on perception variables of students and instructors. Ten out of fifteen studies focused on perception variables. This is in accordance with the findings of Chien and colleagues (2016), which criticized that a majority of studies are only focusing on perception outcomes. Furthermore, the analysis also shows that most current clicker studies do not have clear guidelines of how clickers are implemented in large classroom setting. Only thirteen percent of the analyzed studies give sophisticated explanations of how clickers are utilized. Further studies should apply clear clicker usage guidelines in order to improve the implementation process. It can be argued that clear implementation guidelines could also improve the reliability and validity of future studies, especially if cognitive performance variables are assessed.

This analysis also identified a variety of success factors based on the reports and discussion sections of the identified studies. Three sub-factors occurred: 1. Role of Instructor 2. Technology 3. Organizational Strategies. For instance, in terms of the sub-factor of technology it became clear that proper implementation, functioning technology, and perceived ease of use a critical factors for a successful implementation process. In addition, findings of the studies pointed out that the experience of the instructor, faculty development resources, expert-blind, as well as assessment interventions play a pivotal role to increase the likelihood of successful implementations of clickers. Studies also reported on the importance of active feedback loops as well as the promotion of interactions between peers as well as students and instructors. However, creating a judgment free culture is crucial in order to foster interactions and engagement.

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Does the introduction of feedback of compulsory activities have an effect on students' grades in large classes?

Irene Buseth Raaum, Berit Overå Johannesen, & Magne Arve Flaten,
Norwegian University of Science and Technology

Abstract: The effect of feedback on compulsory activities was investigated in large classes of up to 600 students in introductory psychology courses. Prior to 2011 there were no compulsory activities in the courses, and a common complaint among the students was that they did not receive feedback on performance. To remedy this, compulsory activities in the form of essays or answering previously administrated exams were included in three of the largest introductory psychology classes. For three other courses, compulsory activities were not introduced. Hence, students in these courses did not receive any feedback on performance. Our hypotheses were that feedback on compulsory activities should improve grades and reduce failures to pass the course. Grades were monitored for 2 – 3 years before and 4 – 5 years after the introduction of compulsory activities. The data (N = 24808) showed that there was no positive effect of compulsory activities on the amount of "A's" for any course, but feedback slightly reduced the amount of students that failed. Several sources of error could explain the lack of effect of feedback on grades. In conclusion, feedback on mandatory activities had only weak effects.

Literature Review

The effect of feedback on performance is generally positive, although the effectiveness of feedback is dependent on the type of feedback (e.g., Harks et al., 2014). In the present naturalistic study, feedback on performance was introduced in three large introductory psychology classes. Feedback was given on mandatory activities such as essays and answers to more specific questions. Feedback was in the form of "pass/fail" (summative evaluation), or it was descriptive for how the student could improve performance (formative evaluation (e.g., Anastasya & Smith, 2009). Feedback was not introduced in three other introductory psychology courses. Thus, we could monitor the development of grades before and after the introduction of compulsory activities, in groups that did or did not get feedback on compulsory activities. It was expected that the introduction of feedback on compulsory activities would increase the amount of "As", and decrease the number of failures to pass the exams.

Methodology

Grades for six courses in introductory psychology were monitored from 2008 or 2009 to 2015 (N=24808). Each course had a load of 7.5 ECTS, i.e., each course was 25 % of one semester (30 ECTS). Grades were on a six point scale from A (best) to F (fail). The percentage of exams receiving each grade was the dependent variable. The six courses were introductory studies in personality, social, biological, and developmental psychology, as well as introductions to the history of psychology and psychological methods.

For three of these courses (methods, and biological and developmental psychology), compulsory activities were introduced in 2011 in order to provide feedback on performance, and thus improve grades and reduce failures to pass. Compulsory activities were either short essays, or more specific questions in e.g. methods and biological psychology. Students who did not comply with compulsory activities were not allowed to take the exam in that course. In the three other courses, no compulsory activities were introduced, hence no feedback was provided.

For all six courses exams were in the form of multiple choice until the spring 2011 when this form of exam was terminated, and exams in the form of short or longer essays were introduced in the fall 2012.

Results

There was no increase in "As" after the time of introduction of compulsory activities. There was an increase in percent failures in the period after the introduction of compulsory activities, but the increase in failures was even higher in the courses with no compulsory activities (figure 1).

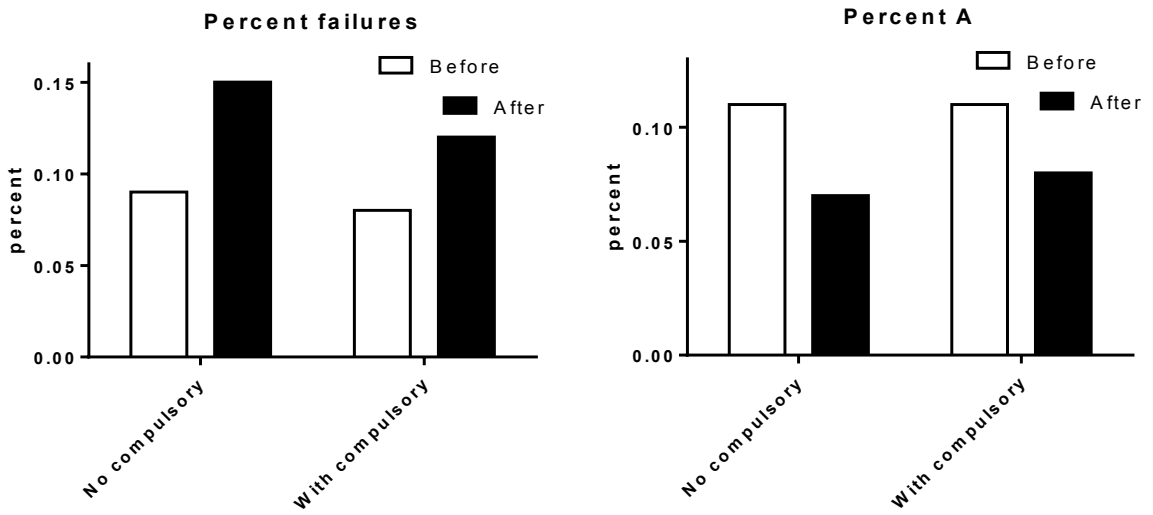

Figure 1: mean percent failures to pass exams (left panel) and mean percent exams receiving "A" (right panel) before (white bars) and after (black bars) the introduction of compulsory activities with feedback in three courses in introductory psychology (two right bars in each panel). Three courses with no compulsory activities are to the left in each panel. For those courses, "before" and "after" refer to the same time period as in the group who received compulsory activities.

Discussion

The most conspicuous finding was that percent failures increased and amount of As decreased in both groups, probably due to the termination of multiple choice exams. The data did not support the hypothesis that introducing compulsory activities and providing feedback on these would increase the amount of "As". There was, on the other hand, a slight reduction in the amount of fails in the courses with feedback on compulsory activities. This hypotheses did, thus, receive partial support. There was no clear effect of summative vs. formative evaluations. There are, however, sources of error that could partly account for the results: the guidelines for grading of the exams show that typically ca. 10 % of students receive an A, 15 % a B etc. This may have influenced examiners to use this distribution in their grading. Thus, there may have been an increase in the quality of students' performances, but this improvement would not be reflected in an increased amount of better grades. However, this is probably not a major factor in explaining our results. Another and possibly more important factor is that the students who did not submit the compulsory assignment, were not allowed to take the exam. This probably decreased the amount of students not passing the exams in the courses with compulsory activities. In conclusion, although several sources of error most likely influenced the results, the effects of feedback on academic performance were weak in this study.

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Blending Large Classrooms-A strategy for flipping while trying not to completely flop

Deborah J. Good, Dane Fausnacht, Justin Sperringer, Jihad Alwarith, Carolyn Greene, Justin Morello, Taylor Vashro & Kathryn Wingfield, *Virginia Tech*

Abstract: Research in many fields accumulates exponentially, such that there is no way to teach students everything they need to know before they leave your class. One alternative is to teach students how research new findings themselves, providing them with a skill they can take to their workplace. To do this, a blended classroom format was used, which included online videos of the easier course materials, a single traditional lecture period, and a second class period each week, where student groups delved deeper into the scientific literature and investigated topics that were controversial or not fully answered. This practice session will provide an overview of the course structure, course materials, and how the TopHat™ classroom response system was used to facilitate the group work. Student responses to the course structure, obtained both at mid year and at the end of the course will be discussed, as will anecdotal evidence of improved confidence in using scientific databases, improved keyword searches in online databases, improved writing skills on short answer questions, and improved grade performance.

Literature Review

In a "flipped classroom", the lecture and homework components of a traditional class session are reversed. Students read or listen to content at home while completing activities in student groups during the scheduled class periods. This works well in smaller classrooms where groups can easily be formed and managed. However, in many STEM disciplines, the traditional lecture is used in the larger classrooms [1]. Why? There are several valid reasons for traditional lecture. First, lectures can provide core content to hundreds of students at once with one professor. In addition, traditional lectures are economical to a professor's time as the professor only needs to prepare one PowerPoint file and then lecture during class time. Finally, many of the large lecture halls have immoveable seating and these are usually not very amenable to student group work. There are also downsides that need to be considered for a flipped classroom. First, multiple professors or professors with teaching assistants (TAs) are needed to walk around and assist students that are working on the class assignments—the more students in the class, the more personnel needed. Next, professors need to spend extra time preparing not only the outside classroom activities, such as the videos to go with their PowerPoint files, but also the in-class activities. Lastly, classrooms with moveable chairs, or tables, rather than traditional flip desks are not usually available to accommodate over 200 students. In addition to these barriers, for STEM professors to adopt a flipped classroom, students are often resistant to this type of change, stating that they want their traditional lectures back [2].

Given these barriers, why would anyone want to try to change their traditional large lecture into a flipped classroom? For the instructor of Metabolic Nutrition, a junior/senior level course with over 200 students, the answer was simple. Multiple studies have shown that active classroom engagement and critical thinking/problem solving skills can lead to enhancement of student learning, by an increase in grades, student engagement in the subject material, and a reduction in content misconceptions [3]. Furthermore, the professor wanted to provide the students with skills that they could use in their future careers-namely using the scientific literature to investigate question and seek out new answers. To do this, the blended classroom model was used. Blending learning describes an educational model where classroom time (synchronous/face-to-face learning) in a lecture format is combined with online learning (asynchronous/video or other internet material), and in-class group activities [4]. This practice session will describe the experience of using a blended model for increasing active learning in a nutrition course. To evaluate this course, the professor, graduate and undergraduate teaching assistants will provide course materials, a discussion of development of these materials, challenges that were overcome, evidence of grade and writing improvements and student responses on the course from surveys taken at mid year and at the end of the course.

Goals and Objectives

It is not easy to flip a course when one has been using a traditional lecture. Thus, we hope to provide a forum for discussing our successes and challenges, and helping others decide if they want to make the investment in reformatting their large classrooms. As a result of attending this practice session, participants will:

- Discuss the benefits and problems with using a flipped or hybrid approach in the classroom.
- Evaluate how the course evolved as a result of student and TA feedback during the semester.

- Discover tools such as Camtasia, Jing, and TopHat that help with this course format and group discussions.
- Consider how to implement the blended approach in their own classrooms.
- Hear from students who served as teaching assistants for the course as well as survey responses from students who provided blinded analysis of the model at the beginning and end of the course.

Description of Practice

The Metabolic Nutrition course, which meets on a Tuesday/Thursday schedule with 1 hour, 15 minutes per class, focuses on the biochemistry of vitamins and minerals. The current professor, who has been teaching this class since 2012, decided this year to redesign the instruction to incorporate an active learning component in flipped class model. The course is taught in a traditional large lecture hall, with immoveable stadium seating. Students had online material to prepare for a once per week for the traditional lecture and then applied their knowledge during group activities during the second class period of the week. The course had 226 students, two full-time graduate teaching assistants (GTAs) and had five undergraduate teaching assistants (UTAs) who received a two credit hour independent study. The TAs helped design and discuss the active learning materials for the group activities and moderate student groups during the in-class activities. All of the UTAs had previously taken the Metabolic Nutrition course. A one-hour meeting was held each week between the TAs and the professor to discuss the upcoming group activities and review the outcomes and pitfalls from the previous week. During the semester, the group activities were modified such that the group activity started with an open-ended question where students researched their answer using a credible medical website. The question was such that the answer was not directly covered in any course material (lecture or online), but rather expanded on their past knowledge in the previous lecture. Approximately 10 minutes was given for groups to complete the research and then TopHat Discussion boards (https://tophat.com/) were used for students to post their answers. Then, an additional 10 minutes were used to discuss findings, and students volunteered to present to the class. The professor then summarized the findings. The rest of the class period was devoted to open ended review questions from the material for the week. Students answered using TopHat™ and received extra credit points for the fastest and most complete answers. After class, students were required to write a weekly reflection that further expanded the Thursday discussion material by having them search a little more or expand in a different direction individually. A mid-term assessment and an end of year survey were used to collect student comments about the blended/half-flipped class, and were used to improve the format mid-way through the semester. These and other student comments collected at the end of the year will be discussed during the practice session.

Discussion

During the session, background on the flipped and blended models for courses will be compared to the traditional lecture teaching style. The overall design of the Metabolic Nutrition course will be explained, followed by examples of the videos, lectures and group activities that were used in the course. An analysis of student comments on the flipped classroom and a discussion of student learning styles (collected via survey) will be presented. Anecdotally, both the GTAs and the professor noticed increased proficiency in short answer questions on exams, problem set grades, and final grades, which will be compared to previous years. One of the UTAs mentioned that students improved their use of key words in PubMed searches as the semester progressed. Time will be left for participants to discuss the format, challenges, and achievements of this model, as well as to discuss how the professor plans to continue this course for the 2017 semester.

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A Model for Teaching Large Classes: Facilitating a "Small Class Feel"

Rosealie Lynch & Eric Pappas, *James Madison University*

Abstract: This workshop presents a model for teaching large classes that facilitates a "small class feel" to counteract the distance, anonymity, and formality that often characterize large lecture-style classes. One author (E.P.) has been teaching a 300-student general education social psychology course for nine years, and both authors (who have worked together in this course for four years) will present a model they have developed in their classroom to make their large class more active and conversational, and characterized by stronger relationships between students and instructors. As a competency-based course with individual behavioral change as one of the primary learning outcomes, this course requires no tests or quizzes; all assignments are narrative-based, and the course depends upon a staff of 15 graders who grade the narrative assignments each week. Graders also serve as mentors to their students, greeting them in class every day, emailing them regularly, offering personalized feedback on assignments, and facilitating small-group discussions of roughly 20 students several times each semester. Other class practices characterize the small class atmosphere, including regular access to the instructors, an informal environment, many opportunities to talk (or ask questions) in class, impromptu panel sessions, and a quick turnaround on assignments.

Literature Review

Hornsby and Osman (2014) address the debate about whether large class environments are "a problem for student learning and quality education" (p. 711). Not all scholars criticize the massification of higher education, and some have even noted the positive role this trend plays in terms of the democratization of higher education—i.e., that higher education is a public good, offering the means for breaking down elite power structures, and that increasing access to higher education is a matter of social justice (p. 715).

In an analysis of 50 large first year classes, Prosser and Trigwell (2014) found that students are "more likely to adopt surface approaches to study if their teachers are adopting less of a conceptual change and student-focused approach to teaching" (p. 791). Others argue for a conceptual change: a student-focused model that is superior to an information transmission and teacher focused model when it comes to "challenging students to think deeply, critically and creatively in large classes" (Hornsby and Osman 2014, p. 716).

Winestone and Millard (2012) propose that introducing active learning and formative assessment in large classes can be beneficial for both students and teachers in terms of their engagement and development. Their findings indicated improved student 1) engagement, 2) retention of material, 3) consolidation of understanding (p. 36), and 4) motivation (p. 37).

In research conducted in this same James Madison University class, Pappas and Pappas (2011, 2012) found that these large class instructional approaches supported the behavioral foundations for developing metacognitive awareness, intentionality, and individual well-being.

Goals and Objectives

Participants should be able to do the following at the end of the session:

- Develop a practical understanding for the classroom strategies that facilitate a "small class feel"
- Discuss and determine which methodologies/strategies lend themselves best to their specific disciplines and/or courses
- Conceptualize a new large class model, or plan a restructuring of their large class according to the organizational, instructional, and methodological strategies presented in this session

Description of Some Large Class Practices to be Exemplified

The facilitators will present, and elaborate on, the following organization and strategies they employ in a large class lecture-style course as a model for supporting active student engagement and learning:

Instructors—During class, the teaching assistant is normally in front of the auditorium alongside the professor, and reinforces his teachings from a student's perspective.

Large and Small Group Discussions—Each week, students engage in large group and small group conversations with specific deliverables.

Grading Staff—Trained undergraduate graders are responsible for grading narrative and behavioral homework assignments and act as mentors to their students.

Student Engagement—1) Students receive informal contact with their graders daily, when they sign in for attendance or turn in assignments; 2) The professor and teaching assistant arrive early and stay late after class to give students access to instructors (to supplement office hours); 3) Students engage each other during regular small-group and large-group discussions.

Assignments and Grading—Virtually all homework requires students to practice behavioral change, critical thinking, and reflection skills. Graders offer personalized feedback.

Other Practices—Other practices include 1) mandatory attendance with sign-in each class, 2) a strict no technology use policy in the classroom, 3) in-class writing assignments, and 4) impromptu panel sessions.

Discussion

Following the presentation, the facilitators and participants will discuss any or all of the following: 1) The challenges presented by large group instruction (class topics, students, physical location limitations, etc.), 2) The limitations of large class instructional methods, 3) The benefits and problems associated with student use of technology in the classroom, and 4) Methods for transitioning to characteristics suggested in this presentation.

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Conversation: Examining Assumptions about Assessment and Feedback in Large Classes

Jacob Grohs, *Virginia Tech*
Michelle Soledad, *Virginia Tech/Ateneo de Davao University*

Abstract: This session hopes to engage participants in a conversation about seemingly unquestioned assumptions and compromises made when teaching large classes. Motivated and framed by our collective research and teaching experiences with large engineering mechanics courses, we aim to use this conversation session in order to (1) visualize the ideal student-teacher interaction in a course, especially in terms of feedback and assessment; (2) discuss compromises to this ideal that faculty teaching large classes inevitably make; and (3) identify possible gaps, unrecognized areas of concern, and untapped opportunities for improving the quality of student-faculty interaction as it relates to assessment and feedback.

Literature Review

Large classes are becoming an increasingly necessary phenomenon in higher education in order to accommodate increasing student populations and rising operational costs (Parry, 2012; National Science Board, 2014). A study conducted by Astin (1993) on the effect of the college experience in undergraduate students indicates that students value frequent interaction with faculty, and that "low student-faculty ratio is associated with a high degree of satisfaction." Results from the same study also indicate that students percieve higher student-faculty ratios as having a negative effect on the quality of instruction that they receive and on their overall college experience.

While much discussion has focused on the prime importance of the learner in modern educational environments, it is sometimes difficult as a practitioner to know how to best focus one's limited energy to teach more effectively. Research has shown that faculty play important roles in fostering student engagement not only through their involvement in the development of the educational environment and college curriculum but also in the quality of interaction with their students (Ambrose et al., 2010; Chen, Lattuca, & Hamilton, 2008; Lattuca & Stark, 2009). One especially critical type of interaction involves faculty giving timely, targeted feedback appropriately scoped for individual learner expertise (e.g., Balzer, 1989, McKendree 1990).

Yet, quick and individualized feedback is exceedingly difficulty in the context of large classes. Further, declining quantity and quality of opportunities to interact with students and offer expert feedback is among several negative impacts of increasing classroom size on student learning (Cuseo, 2007). Indeed, we are especially captivated by the foreboding sentiment of Boud: "Students can, with difficulty, escape from the effects of poor teaching, they cannot (by definition if they want to graduate) escape the effects of poor assessment" (Boud, 1995). Despite sounding doomsday, there is evidence that this could be true – drawing from studies in our context (Engineering), investigations with validated physics and mechanics concept inventories have identified that student conceptual understanding is in stark contrast to student achievement in courses (e.g., Hake 1998, Halloun 1985).

Keeping this reality in mind, this session hopes to discuss opportunities to overcome the barriers to quality faculty to student interaction in the large class setting by unpacking assumptions about feedback and assessment. This proposal is anchored on the belief by Barr and Tagg (1995) that quality learning is possible regardless of class size, through the development of an effective learning environment despite the limitations inherent in large class sizes.

Goals and Objectives

During their participation in this conversation, attendees should be able to:

- Pose and discuss common compromising assumptions about the teaching and learning environment of large classes (with a specific focus on assessment and feedback)
- Discuss existing, untapped opportunities that may be leveraged towards improving faculty ability to give targeted individualized feedback without placing unreasonable demands on faculty time
- Articulate and consider the challenges faced by faculty in engaging in quality interaction with students around critical assessments (and the associated opportunities for formative and summative feedback)
- Suggest future research domains with respect to assessment and feedback within large classes

Description of Topic to be Discussed

The brief initial framing will discuss (1) the stark contrast between "ideal" learning environments and the "reality" of large classes; (2) the seemingly implicit assumptions about this disconnect as it leads to compromises in teaching and learning; and (3) a specific focus on unquestioned compromises as it related to assessment (formative and summative) and timely, targeted feedback. Because this framing will be strongly influenced by research and teaching experiences in our own context (large foundational courses in engineering), we will seek to quickly open to discussion to explore nuances and commonalities across multiple domains and disciplines. We hope such interdisciplinary conversation will help spark sharing of ideas to improve practice as well as to generate future research questions. As an example of one such assumption/compromise to be posed and discussed:

> In foundational engineering courses, some combination of policies/practices (e.g., FERPA, worry about past years koofers) has created a situation where exceptionally few students retrieve (if allowed) or schedule time to view graded tests or discuss errors. Hallway conversation by faculty says "if students really cared, they will come by"… but do we really believe so few students care?

Facilitation Techniques

We will use the initial framing described above to set the stage of the interactive discussion that will follow. The number of attendees will influence our specific facilitation approach but generally it will follow two phases: (1) Reactions and Re-Framing and (2) Critical Discussion. The Reactions and Re-Framing phase will use either think-pair-share or interactive whole group discussion to encourage participants to comment on, react to, and provide insights regarding the front-end framing we offer – this is critical to invite in the wealth of experience in the room and to understand similarities and differences across classrooms, domains and disciplines. Having established a more collaborative and inclusive framing of the conversation, we will divide into small groups with each group focusing on a specific assumption/compromise in order to more thoroughly question it and propose potential untapped opportunities to limit any associated negative effects. Depending on number and size of groups we will either save time to report out or have groups collaboratively edit a document (link shared in session) so that others might later read and benefit from the discussions of the other groups.

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Thursday

July 21, 2016

Session 4

2:10-3:00 PM

http://www.teachinglargeclasses.org/conference/

VITAL: Evaluation of a digital learning object to enhance student learning of VITamins and minerALs

Deborah J. Good, *Virginia Tech*
Sina Gallo, *George Mason University*
Jeremy Akers, *James Madison University*
Deyu Hu, & Lujean Baab, *Virginia Tech*

Abstract: Traditionally, micronutrients are taught using a nutrient-by-nutrient approach, even though they interact within body systems. In addition, nutrition classes are often large lecture classes without a means for students to "practice" what they've learned, or delve deeper into materials outside of the classroom. To address these dated pedagogical approaches, researchers from three institutions developed an accessible online Digital Learning Object (DLO) for the study of micronutrients. The skeletal-system based DLO, called VITAL (*VIT*amins and miner*ALs*), freely available at http://vital.tlos.vt.edu, provides links to scientific research articles, government and other factual dietary information. In a study examining learning in a control class with only traditional lectures, and a test class that was enhanced with VITAL, students exposed to VITAL had a 2.7-fold increase in learning on topics in the DLO. Additionally data from Google Analytics indicate that worldwide users found and used VITAL. Plans are in place to improve the interface of VITAL and conduct focus groups to evaluate learning potential for VITAL outside of the classroom. These next steps will result in a 21st century DLO that impacts students and interested stakeholders worldwide, providing scientifically accurate, engaging, free, and accessible digital learning, and significantly improve the teaching of micronutrients.

Literature Review

The development of an e-learning object (also called a digital learning object) utilizes emerging technologies to enhance a traditional classroom, including large lecture classes. If an instructor assumes that all students learn the same way, that the same teaching approach can connect with all students, or that all students want the same depth, they will likely miss a portion of the class with their delivery methods. This concept is especially important in a large classroom where the anonymity of students can lead to disengagement with material (Ives, 2000; Schroeder, Stephens, & Williams, 2013). For large lecture classes, including the use of guided activities to enhance learning outside the classroom can be difficult, if not impossible. An online digital learning object (DLO), in a freely accessible platform could solve this issue, by visually and interactively providing a fact-based learning tool students can use to understand concepts through engagement in a guided activity outside of the traditional classroom.

Kolb's Learning Style Inventory identifies visual versus verbal learning, and has been recently validated (Manolis, Burns, Assudani, & Chinta, 2013). In studies using Kolb's Inventory for technology assessment, e.g. (Nguyen & Zhang, 2011), differences have been found with student satisfaction of technology based on learning style. Our study, using pre- DLO control groups and post-DLO experimental groups allows for an examination of learning styles in response to the DLO. Specifically, interest in educational DLOs can be compared with interest in technology, and learning styles can be compared with learning from the DLO.

Departments in biology, nutrition and other fields develop core courses to teach the fundamental concepts in vitamin and mineral actions and biochemistry. Most of these courses, and the textbooks available for them, present the micronutrients one-by-one. However, most vitamins and minerals play extensive roles and interact in multiple body systems and functions, such as energy metabolism, immune response, vision, the skeletal system, and development, etc. Presenting one vitamin or mineral in isolation during each lecture period results both in repeated material, as systems that are influenced by multiple vitamins and minerals are presented multiple times, and in disjointed lectures, as multiple organ systems and processes are presented in one lecture. In 2014, co-author Good's 3000-level Virginia Tech (VT) Metabolic Nutrition course was reorganized so that each lecture was constructed to introduce all of the vitamin and minerals involved in one or more organ systems and/or metabolic processes. This allowed students to link body processes, such as bone metabolism, with the specific micronutrient(s) involved in these complex systems, and has improved clarity of the course, resulting in improved understanding of the interrelated roles of micronutrients within body systems. The skeletal-system based DLO is called VITAL (*VIT*amins and miner*ALs*), and is freely available at http://vital.tlos.vt.edu. It was developed using a small education grant from 4-VA (http://4-va.org/), and with a team including the Technology-enhanced Learning and Online Strategies (TLOS) group, particularly Dr. LuJean Baab, Senior Director, Learning Experience Design (LED), and Dr. Deyu Hu, Director, Research and Project Management, LED. The TLOS-LED team also included a graphics designer, a web

designer, database and coding programmer, and instructional designers to round out the available expertise to develop this e-learning object. In addition, we have collaborated with faculty at two Virginia universities, Dr. Jeremy Akers at James Madison University (JMU) and Dr. Sina Gallo at George Mason University (GMU), both of whom provide content knowledge in the area of vitamins and minerals, and use the DLO in their undergraduate and graduate-level classes. Research examining student learning using the DLO, and compared to non-exposed students, as well as student interest in educational technologies used outside of the classroom will be presented.

Results

In phase one of the project VITAL was developed, and the 2015 Metabolic Nutrition Class was surveyed as a "control" group for the study (no access to the DLO). Survey questions included an assessment of interest in digital media, overall computer literacy and internet use, and most importantly, student learning on questions specific to the skeletal system. Some of the questions were garnered from course content and covered during class, while some were new material, and later programmed into the DLO (2016 post-DLO students only). In addition to Virginia Tech nutrition students, students from nutrition classes at GMU and JMU were assessed in 2015. A total of 183 students agreed to participate as the 2015 control group (pre-DLO) [152 (VT), 5 (JMU) and 26 (GMU)]. This year, students in the 2016 VT Metabolic Nutrition class were given access to the DLO, and an assignment where they had to use VITAL to complete a problem set. Additionally, the 2015 survey questions were repeated, now with access to VITAL, and a user experience survey was integrated to gather additional information on utility of the DLO in understanding bone metabolism. Data from Virginia Tech students, shown in **Figure 1**, identified a 2.7 fold significant increase ($p<0.001$) in learning between years 2015 and 2016 for one of the questions that is not taught in class but was on the DLO (calcium/normal diet/dairy products). We have also collected Google Analytics data on VITAL since April 2016. In a 12-day period, VITAL had close to 2,400 individual events, with most of these on the hotspots (buttons leading to more information). In addition, visits to the site from the US and four other countries were tracked. These data suggest that VITAL may be a valuable tool to enhance instruction of nutrition worldwide.

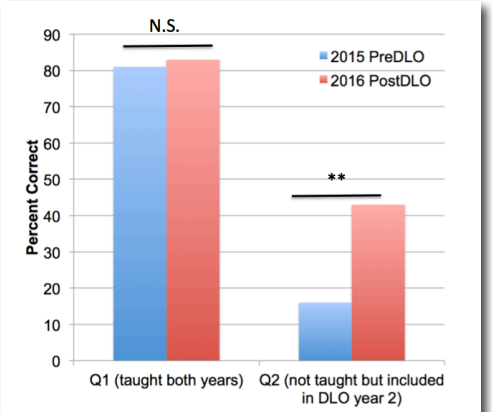

Figure 1: Comparison of Metabolic Nutrition course with and without exposure to DLO. Question 1 (Q1) was taught during lecture for both years, while Question 2 (Q2), was not mentioned in lecture either year, but included in the DLO pop-up dots. N.S. not significant. ** $P = 0.01$

Discussion

Additional results will be available for the conference presentation, including comparison of graduate and undergraduate use of VITAL, learning style analysis of students, comparison of learning style with interest and use of VITAL, and specific quotes from student users on their interest in VITAL. The applicability of our data to large and small classrooms from science and non-science disciplines will also be examined, keeping in mind the design principals of Clark (Clark, 2005). During the presentation we will discuss whether guided discovery assignments as part of VITAL can supplement classroom face-to-face instructional learning. Of interest is the question of how much instruction needs to occur for the student to achieve the learning objectives. One study has clearly shown that guided discovery is superior to unassisted discovery (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011). Overall, early research results indicate that VITAL is an effective teaching tool for the study of micronutrients.

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Design and Implementation of Online-Learning platform with a large class size. Case study at University of Energy and Natural Resources-Ghana.

Peter Appiahene, Christopher Ninfaakang Bombie, & Takyi Augustine, *University of Energy and Natural Resources-Ghana.*

Abstract: An experimental use of web based platform to supplement and enhance the teaching and learning of the course UENR103–Computer Literacy and Information Technology at the University of Energy and Natural Resources, Sunyani-Ghana was carried out between Octobe - December, 2014 and also September–December, 2015 to a combined class of over 300 students in each academic year in the school of Natural Resources. The course was taught in a one-hour class, with an-hour lab sessions every week for each student. The face-to-face sessions were supplemented with course outline, lecture notes, presentation by lecturer, group discussions, group/individual assignments, laboratory manuals, quizzes, and online tutorial using the developed Learning Management Software called UENR103_toolkit. The laboratory sessions was basically done using UENR103_toolkit and sometimes the Google Classroom platform. This paper looks at the areas of application of online-Learning for large classes and how it was applied at the University of Energy and Natural Resources, Sunyani-Ghana UENR103 course, students and tutors view of the course, as well as experiences from its use.

Literature Review

Since the establishment of the University in 2012 the Information Technology Directorate and the department of Computer Science and Informatics is spearheading the Online-Learning initiative to enhance teaching and learning with appropriate use of Information and Communication Technologies (ICTs) at the University.The definition for Online-Learning used by the University is as follows: *"the proper organization of information and communication technologies (ICTs), for advancing student-oriented, active, open, and life-long teaching-learning processes".* This definition is inclusive, encompassing all forms of ICTs such as overhead and digital projectors, power point presentations, video conferencing and online learning, using the UENR103_toolkit, to name a few. During the past few years, the world has witnessed a phenomenal growth in ICTs. Development of new broadband communication services and convergence of telecommunication with computers have created numerous possibilities to use a variety of new technology tools for teaching and learning system. The integration of computers and communications offers unprecedented opportunities to the education systems with its capacity to integrate, enhance and interact with each other over a wide geographic distance in a meaningful way to achieve the learning objectives.

It has the potential to transform the nature and process of the learning environment and envision a new learning culture. Interactivity, flexibility and convenience have become the order of the day in the ICT supported environment. As we become increasingly supported by ICT, teaching and learning will not be the same as before. We will have to make use of the rich and exciting opportunities offered by the new technologies in education to reach our training goal and mission. One of the objectives of the present paper is to provide better understanding and appreciation of the role of ICT in teaching and learning system. Lucas & Hoffman (2000) quoted Moore & Kearsley (1996) as contending that the medium removes some of the less pleasant aspects of face-to-face conversations. Students can ask questions online without disrupting a class. For large classes, eLearning seems to be a solution where students can feel closer to the materials and lecture.

Larsen (2000) says one of the major benefits for large enrolment of courses is the help that can be provided for the 'administrative side' of a offering course. It provides a great help in assessment management. Some of the highlighted benefits of electronic submission of assessment materials include easy tracking, time stamped enforced deadlines and easy return to students (Douglas & McNamara 2002). The issue of students claiming they submitted scripts when they did not will be eliminated. This was another major problem faced in previous offerings of the course, and another motivation to use eLearning.

For large classes, eLearning seems to be a solution where students can feel closer to the materials and lecture. Furthermore, they have the opportunity to practice outside the laboratory hours. Students with "techno phobia" now have a chance to go over and over the materials till they are confident.

Methodology

The methodology used in the research was simple and concise .An extensive review of existing and current works related to the topics was done in order to acquaint ourselves with the current issues in the field and also do a good work. Analysis of previous models and online learning platforms was carried out to find out the drawbacks and if possible make the necessary suggestions. The model was developed which was later used to develop the software application called UNER_toolket. The toolkit was piloted using a class size of 300 students with 3 lecturers and one demonstrator. A questionnaire was design for the assessment of the toolkit which was done by students and lecturers who were selected purposefully. UNER_toolkit kept track of students' visits and activities on the Web.

Results

Students were also divided into groups to discuss on various applications of computers based on their laboratory group using the discussion forum. Each student was expected to post a minimum of 1 item to the discussion group. All students at least posted and commented on the platform. The table shows the details of postings done by the students.

Table.1

No. of Postings(Modules Item)	Frequency
1	70
2	30
3	80
4	70
5	50
Total	300

Self-Assessment Tests

The Self-Tests are designed as a set of about fifteen (15) multiple choice quizzes to be used after each module. Students are given immediate feedback on wrong and right answers. Self-tests are used to help the students know how well they have grasped the concepts. Table 2 shows that most of the students (91.4%) used the self-test less than four (4) times. There were no scheduled times to use the self-test. It was not compulsory. Students had to do it at their own convenience. This was probably not fully utilized due to lack of enough computing resources.

Table.2

Frequency	Percentage
0.00	22.9
1.00-2.00	52.4
3.00-4.00	16.1
5.00-6.00	4.9
7.00-8.00	2.3
9.00 and above	1.2

Discussion

Online-Learning is no auxiliary for what is done in normal classroom lectures but is a very useful support tool especially in managing large class size. The used of Online-Learning platform for the class did support the views in literature on the benefits found in literature about large classes. Some advantages it provided were based on the fact that activities are independent of time and place. This created greater freedom for students. Apart from during classes, they could log in any other time and examine their course and laboratory session as well as take part in any available online discussion.UENR_toolkit also provided the ability to track assignments submitted and assessed. It also provided a way of easy feedback for the students. Other advantages from using the course included more interaction with the students through email and online discussion. It was easy to manage students' assignments. There was also enough evidence that students felt it added value to the course. There was also a strong correlation between its use and overall course results.

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Gajarag Dhanarajan" OBJECTIVES AND STRATEGIES FOR EFFECTIVE USE OF ICTS"

Flipping Organic Chemistry: A Broadly Applicable Method for Flipping a Large Science Class

John B. Matson & Richard D. Gandour, *Virginia Tech*

Abstract: In the past few years, instructors have increasingly become aware of the benefits of a flipped classroom, but it is rarely practiced in large science and engineering classes. In this Practice Session, we will demonstrate our flipped classroom approach for organic chemistry, which can be extended to other large science and engineering classes. The approach relies on concise video lectures paired with specifically designed in-class worksheets that students complete alone or in small groups. In this Session, we will demonstrate how it works by conducting a mock class for attendees. Based on student survey data, we find that this approach is effective in teaching complex material and that the students enjoy it more than a traditional lecture.

Literature Review

The term 'flipped classroom' describes a teaching strategy in which students view video lectures before coming to class and then spend time in class primarily discussing, problem-solving, working in groups or doing some combination of these. First described in 2000 for a college setting (Lage, Platt, & Treglia, 2000), the flipped classroom has several advantages over the traditional classroom. First, students can gain more from video lectures than traditional lectures because they can pause a video lecture to seek clarification from a textbook on points confusing them (Bergmann & Sams, 2012). A video lecture prevents delivering content too quickly for students to keep pace. Second, students benefit from working problems in the classroom under the guidance of an instructor rather than working problems alone for the first time on a homework assignment. This immediate feedback, which is often absent in the classroom, accelerates learning (Pellegrino, Chudowky, & Glaser, 2001). Third, students can talk in class to their peers, who may be better able than instructors to explain concepts that they have just learned (Lasry, Mazur, & Watkins, 2008). In an effective flipped classroom, students achieve mastery before class at home in the lower levels of Bloom's Taxonomy and tackle higher level skills during class. In contrast, a traditional classroom addresses these higher level skills, mostly via homework problem sets (McGivney-Burelle & Xue, 2013).

Despite the advantages of the flipped classroom, it is rarely done for large science and engineering classes. Other than the upfront time required to flip a class, we suspect that three main challenges limit instructors from flipping large science classes: 1) Producing class-length video lectures is tedious for the instructors, and watching long videos can be equally tedious for students; 2) Working problems in class can make class time feel like a recitation section, providing little incentive for students to attend; 3) Teaching concepts frequently requires students to manipulate formulas and equations, which do not lend themselves easily to iClickers. We address these challenges using an approach that integrates key concepts to be taught and specific problems, which develop skills related to those concepts. This approach relies on combining concise videos—animated slides with voice narration—with in-class worksheets that function as lecture outlines, guiding students smoothly through these concepts.

Goals and Objectives for Practice Session

The goal of this Practice Session is to convey our flipped classroom approach to other instructors of large science and engineering classes. To accomplish this goal, we will actively demonstrate how we use the flipped classroom approach in organic chemistry classes, where sizes range from 50–180 students. In this Practice Session, we will first discuss how our classes function on a daily basis in terms of pre-class assignments and how we spend time in class. Next, we will conduct a mock class that will include a short video lecture on a basic topic in organic chemistry followed by participants working in groups through a short worksheet, based on these concepts. After each question we will select one person to volunteer his or her solution to show the group; we will then comment and make corrections as we do in class. Finally, we will discuss what we have found to be best practices and pitfalls, enabling others to modify our approach as needed to flip their classes.

Description of Practice to be Modeled

Our classes include both the chemistry majors and the non-majors sections. We have had broad success with this flipped-classroom approach in terms of student satisfaction and passing rates. Two days before each class meeting students receive an email with links to videos and a worksheet that we will go through in class. We ask students to watch the videos and briefly review the worksheet before class. Videos range in length from 4–8 minutes, with 2–3 assigned before each class period. No class credit is given for watching the videos, but in our experience most students watch them without further incentives. After a brief introduction to the topic, we go through the in-class worksheet question by question, interspersing brief explanations between questions. We give students, individually or in small groups, a few minutes to solve each question. No specific groups are assigned, but most students work with their peers at least part of the time. During this time, the instructor and 1–3 TAs walk around the room answering questions, helping students get started, and encouraging reluctant students. For each question, we choose one student's solution to show to the class, and the student receives an extra credit point. We correct any mistakes, add any additional explanation, and then move to the next question. The in-class worksheets are designed to guide students through new concepts and to increase their skills by raising the level of difficulty throughout a series of questions on a given topic.

Discussion

We think that these techniques are broadly adaptable to all science and engineering classes. While we do not have long-term data on grade distributions compared with traditional lecture sections of our classes, we have assessed student attitudes toward our flipped classroom approach through surveys administered at the end of the semester. Survey results (Table 1) for the most recent semester available for one non-majors section support our enthusiasm for this approach.

Table 1. Survey Data of Students in Flipped Organic Chemistry Class

	Strongly agreed or agreed	Strongly disagreed or disagreed
I was more engaged in this class than in a traditional classroom.	78%	15%
I feel the flipped classroom helped me learn the material better than a traditional classroom.	83%	8%
I enjoyed the flipped classroom approach more than a traditional lecture style.	75%	14%

Note. Student response rate was 55% (103 of 187 who started the course)

In summary, our flipped classroom approach has been effective in teaching organic chemistry. In this Practice Session, we will convey our approach in a way that it can be adapted by other instructors of large science and engineering classes.

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Storytelling and Calling Names

Windi D. Turner, *Utah State University*
Oscar J. Solis, *Virginia Tech*

Abstract: The nuances of effective teaching in higher education are seldom taught. In a context where large classes are becoming more frequent, it is important to consider strategies that will achieve the same outcomes desired in small classes. In this session, participants will explore the power of developing positive student-instructor interactions in large classes through the pedagogical techniques of self-disclosure and making the class feel smaller. The facilitators will incorporate their research on teaching large classes and share examples from their experiences at R1 Universities.

Literature Review

Frisby and Martin (2010) explained, “An instructor’s behavior dictates the type of learning environment that is constructed, the type of relationships that bloom, and the academic outcomes that students achieve” (p. 160). Further, a stimulating and encouraging classroom enhances student participation, attendance, and comprehension of course content (Williams, Childers, & Kemp, 2013).
Albeit appropriate self-disclosure can communicate a likeness between the instructor and students (Rocca, 2010), self-disclosure can either help or hinder students’ communication in the classroom. When students perceive that the instructor’s self-disclosure is relevant, they are more likely to participate in class and ask questions relative to the course material (Cayanus, Martin, & Goodboy, 2009). In the course of storytelling, an instructor’s personal stories and experiences can lead to connections with students (Lowenthal, 2008). Personal and relevant stories shared by both instructors and students are influential and engaging strategies for teaching and learning. Stories can help students create meaning from their experiences (Bruner, 1996; Schank, 1990), which are key to learning (Schank; Zull, 2002). Furthermore, stories enhance memory skills and connect to prior knowledge (Schank). Students in large classes tend to be motivated to learn and attend class regularly when the instructor shares personal experiences and stories that are relative to the course material. When the course material relates to real world experiences, students have a greater sense of knowledge and understanding. Furthermore, linking current events, personal stories, and storytelling promotes positive student-instructor interactions so long as the instructor remains on topic (Solis & Turner, 2016).

While teacher authority and class size may discourage student participation, several strategies can make a large class feel smaller. Student-instructor interactions outside the classroom setting can lessen obstacles to communication and subsequently nurture overall participation (Weaver & Qi, 2005). This personal communication outside of the formal roles held by instructors and students creates an interpersonal relationship that in turn formulates respect and trust (Frymier & Houser, 2000). Furthermore, an instructor’s caring attitude cultivates a level of commitment from students that drives motivation and discipline which are both essential for an effective classroom environment (Wilson, 2013). This will also help build a supportive classroom climate which has been shown to increase student participation (Solis & Turner, 2016).

An effective engaging instructor can make a large class feel smaller by addressing students by their name when they ask or answer questions. During an interactive lecture, questions initiate and stimulate instructor-student and peer-to-peer interactions which in turn motives and encourages student engagement. Using students’ names also exemplifies caring leadership. However, learning students’ names in large classes can be difficult. To remedy this, the instructor can say, "Thank you for answering that question; please tell me your name." Then the instructor can mention that student’s name when addressing the question or transitioning to other course material. Another strategy is for instructors to briefly interact with students before class to confirm his or her name and to ask what they learned from the reading material or the last class. Not only do these interchanges engage students and encourage participation, they also establish connections with others in the large classroom. The instructor’s initiative to engage one student simultaneously sends direct and indirect messages to the entire class: the instructor cares enough to interact with each student; the instructor knows students’ names and will refer to them by their name; and that students should be prepared to answer questions and participate in class discussion (Solis & Turner, 2016).

Goals and Objectives

Participants attending this session can expect to (1) identify self-disclosure strategies that will achieve the same outcomes desired in small classes; (2) participate in interactive activities intended to better understand how to make a large class feel smaller; and (3) understand how to develop and incorporate strategies for positive student-instructor interactions in their own classes.

Description

In this session, self-disclosure and making the large class feel smaller will be introduced throughout a series of interactive activities. Attendees will further gain a better understanding of these strategies as they relate to positive student-instructor interactions in large classes.

Discussion

In large classes, engaging students can be challenging due to the number of students. However, applicable and concise self-disclosure by means of storytelling can lead to a connection with students. Through storytelling, instructors can supplement a traditional lecture by submerging the class in an intellectually in-depth, applicable illustration that relates to the subject matter (Lowenthal, 2008). Thereby, instructors need to consistently articulate stories and personal experiences that are relevant to the course and relate to students' current and future situations. Encouraging students to be prepared to share their personal experiences further builds connectedness (Solis & Turner, 2016).

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Conversation: Let's talk tools….

Erin M. Berman, *Radford University*

Abstract: Successfully facilitating social presence in large classrooms is not impossible, but it can seem daunting. Research supports the correlation between creating social presence and learning, which is amplified in an online course. By incorporating opportunities for social presence within the design of the class the instructor is providing a space for students to successfully engage with each other, the content, and the instructor, the three pillars of interaction that help to define a quality learning experience (Garrison, Anderson, & Archer, 2000). This session will explore the use of electronic tools that promote social presence by discussing tools that help to promote the learner to content engagement, learner-to-learner engagement, and learner to instructor engagement.

Literature Review

Globalization drives the rich learning experience many classrooms (virtual or otherwise) now reflect. Specifically, the online learning experience is composed of multi-national and multicultural learners, which highlights the importance of finding various ways that will engage the diverse learner and help to create a sense of community, which is essential to a successful learning experience (Garrison, Anderson, & Archer, 2000 & Dzubinski, 2014).

Ability to create a sense of presence or encourage learner to content interaction does not need to be bound by the LMS- rather, facilitators have a rich repertoire of options from which to choose, many of which are free and attract the learner in a way the LMS cannot replicate. Social presence, or the ability to project oneself as a real person (Greyling, F. & Wentzel, A., 2007), is essential for both instructors and learners. Student success in online learning is correlated to the learner's social presence (Orit, 2012), so it only makes sense to draw on tools, such as Twitter, Facebook, Google, and other virtual tools to provide avenues for creating that presence. By doing so, instructors remove the idea of technology as control and embrace the idea of technology as a tool.

As research has clearly demonstrated, a quality learning experience involves engaging in the learner in three specific ways- encouraging a relationship between the learner and the content, learner to learner interactions, and learner to instructor interactions (Garrison, Anderson, & Archer, 2000; Kearsely, G. & Shneiderman, B., 1998). Social presence weaves its way through all of these forms of engagement and finding tools that allow learners to present themselves as unique an individual has been linked to more successful experiences (Cobb, 2011).

Much research has been done concerning the need to meet the learner where they are in order to effectively create the learning community and promote learning. Tools, including both asynchronous and synchronous options can be used to do just that.

Objectives:

By attending this session, learners will:

- Summarize the Elements of the Educational Experience (Social Presence, Cognitive Presence, and Teaching Presence)
- Identify tools that can be used to facilitate learning within the Educational Experience framework
- Discuss benefits to the use of tools outside of the LMS
- Describe limitations to be aware of when selecting tools
- Create a resource document that identifies tools discussed for later use

Description of large class practice to be exemplified

Research espouses the need for the learner to engage in three ways to be successful, these three ways involve engaging with content, with one another, and with the instructor/facilitator. Yet, the standard LMS does not always provide for such engagement or the options within the LMS are limited. This session will challenge participants to

discuss what tools they are currently using to help promote engagement between learners, from learner to content, and between learner and instructor and to share such tools with one another, while also identifying potential benefits and drawbacks within the framework of the Elements of an Educational Experience (Garrison, Anderson, & Archer, 2000).

Facilitation Techniques

In this session, the facilitator will discuss the Elements of an Educational Experience, as espoused by Garrison, Anderson, and Archer (2000), which include the need to blend cognitive presence, social presence, and teaching presence. After a brief 10 minute introduction and review of the research, participants will be asked to participate and discuss tools and their uses. Specifically, participants will be asked to identify virtual tools that can encourage social presence, cognitive presence, and teaching presence. After identifying such tools, participants will be asked to discuss, in small groups, how they have used them and the results in terms of effective facilitation within their courses. Then, a spokesperson will be chosen from each group to share the tools the group discussed and a common document will be created to house all virtual tools discussed and a brief synopsis of how those tools can promote social presence, cognitive presence, and or teaching presence for later review and use.

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Thursday

July 21, 2016

Session 5

3:20-4:10 PM

http://www.teachinglargeclasses.org/conference/

A Conversation about Teaching Future Faculty to Teach Large Classes

Donna W. Bailey, *University of North Carolina-Chapel Hill*

Abstract: Teaching large classes continues to be a rite of passage for new faculty in many colleges and universities. While senior faculty often opt to teach these classes, their other responsibilities interfere with this preference. Thus, the problem to be addressed is how we prepare future faculty for teaching the large class. The purpose of this conversation session is to share current approaches in participants' settings and compare those approaches to what the literature and evidence from the internet suggest as best practices. The outcome for the session is to leave with at least one idea/strategy that can be explored in a setting with attention to sharing the outcome on a website dedicated to this topic. The literature review did not find specific sources that addressed the problem of teaching future faculty to teach large classes. Although there is a reasonable amount of material available about teaching in general and suggestions for teaching large classes, it is not directed to the newly minted scholar and the needs they might have in relation to walking into a classroom of 100+ students. The conversation will be facilitated to foster identification and sharing of ideas and approaches from the participants. The result of the conversation will be the currently identified best practices that are being used to assist future faculty in the transition to the large classroom in the hopes that these practices will be explored for their value in preparing the next generation of faculty.

Literature Review

A brief review of the literature on preparing future faculty was conducted to determine the current state of future faculty development in particular and on teaching large classes specifically. The review of the literature took two primary approaches, first, a review of material on the internet using the key words, "preparing future faculty" resulted in 4,330,000 hits. Reviewing the first five pages indicated that the search in Google provided mainly teaching and learning center programs. The second approach using Google Scholar and the keywords, "preparing future faculty, resulted in 747,000 hits. Reviewing the first five pages of this set of returns reveals that most of the material was from the early 2000's. Finally, a search in the database, Education Full Text, resulted in 44 hits with a few sources from 2014-2015 that were specific discipline related sources especially representing the sciences.

A summary of the literature reviewed from these sources revealed that preparing future faculty is a spotty effort today that is mainly taken up by specific discipline focused faculty with support from their campus wide teaching centers. Several of the articles explore the perspectives of graduate students as they begin to teach (Meanwell & Kliner, 2014; Smollin & Arluke, 2014). Other authors and researchers address the perceived influence that a developing future faculty program has or might have on the teaching experiences of new faculty (Koblinsky, Hrapczynski, & Clark, 2015; Lockwood, Miller, & Cromie, 2014; Pfund et al., 2012). Interestingly, there were no resources in these sources that directly spoke to teaching future faculty to teach large classes.

Goals and Objectives

At the conclusion of this session, you will be able to:

1. Describe the current state of education and training for future faculty to teach large classes,
2. Explain how future faculty from your setting are specifically prepared to teach large classes,
3. Examine the key elements identified from the literature and internet that should be included in the education and training of future faculty to teach large classes,
4. Propose an outline of the basic key elements that a new junior faculty member might need to know to be able to teach a large class using an adaptation of the Educause framework of "7 Things You Should Know About"….

Description of Topic to be Discussed

In the early 1990's through the early 2000's, many academic settings developed programming to facilitate the transition from being a graduate student to the role of new faculty. Funding was available for these projects and resulted in a number of graduate student programs that continue to exist today. Unfortunately, the number and breadth of these programs has declined and graduate students who want to be future faculty may not have an opportunity to experience the full breadth of the faculty role. The changes in preparing future faculty programs since the mid-2000's may specific hamper graduate students from understanding the challenges faced when teaching a large class. Teaching large classes is not an unusual first assignment for new faculty since most general curricula outline foundational courses in a variety of disciplines that undergraduate students are required to take.

Facilitation Techniques

Facilitation will be accomplished using the following strategies, a brief overview of the objectives, an individual written activity to probe background information, followed by paired exchange between participants, large group debrief, and a summary of what we have learned. Following these activities, we will summarize an outline of strategies we have associated with teaching future faculty to teach large classes.

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When the Class is the Crowd: Capturing the Wisdom within a Mass Class to Increase Student Engagement and Creativity in Applied Problem Solving Assignments

Jane Machin, *Radford University*

Abstract: Drawing on industry crowdsourcing best practice, this teaching innovation replaces the *group project* with the *crowd project*. The crowd project is an assignment that embraces, rather than struggles against, the vast quantity of students in a mass class. Moving between individual and collaborative phases, the method captures the wisdom of the crowd while holding students accountable for their personal contribution. The application of a crowd project in an entry level business class is described. Results from a post course survey suggest that, compared to a traditional group project, the crowd project led to a greater quantity of more creative solutions and helped students understand course concepts better.

Goals and Objectives

After attending this session, participants will recognize what a crowd project is and how it differs from other collaborative pedagogies such as group projects. Participants will comprehend the benefits of using crowd projects in their mass classes and be equipped to effectively plan and implement their own crowd project.

Literature Review

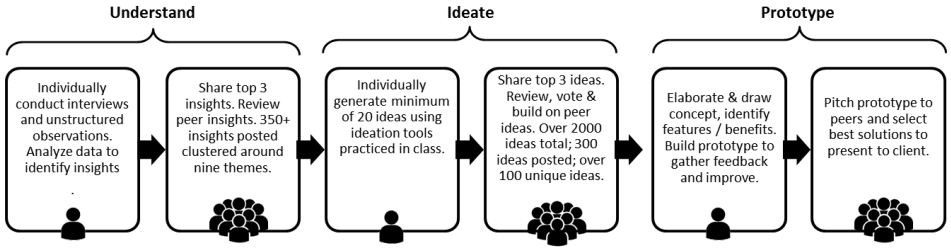
To produce graduates who are more than walking dictionaries, we need applied assignments that demand creative solutions to ambiguous, unstructured problems. In large classes, however, the workload to implement and grade such projects quickly becomes unfeasible. A common solution is to refashion an individual assignment into a group project (Tomcho and Foels 2012). Implementing group work out of convenience, however, is not pedagogically prudent, not least because common issues with group projects (e.g. member conflicts, social loafing, inconsistent skill development) all increase with the larger group sizes typically seen in mass classes (Tomcho and Fuels 2012). Poor assignment quality is often the end result (Batra et al 1997). More importantly, however, this approach misses an opportunity: rather than resisting the large number of students in a mass class, why not embrace them? Mass classes are, effectively, crowds. And outside of academia crowds are not evils endured because of resource limitations; they are valued as intelligent forces that can achieve positive societal change and business growth (Suroweiecki 2005). Drawing on crowdsourcing best practice, I propose replacing the *group project* with the *crowd project* in mass classes.

Crowdsourcing occurs anytime a project is distributed across a vast collection of users with different skills and abilities. Crowdsourcing is not simply a buzzword. It is a strategic model, proven to deliver solutions in all fields that are superior in quality and quantity to those provided by traditional models (Brabham 2011). Inside the classroom, current applications of crowdsourcing cluster in two areas: (1) crowdsourced assessment, where students review and grade peer assignments and (2) crowdsourced content between instructors (e.g. course material such as syllabi and exam questions) or between students (e.g. class wikis or social learning sites such as Brainly). Neither of these applications captures the unique problem solving capabilities of crowdsourcing. A literature review reveals only two instances where crowds were used to problem solve in the classroom and in both the crowd was external to the class (Way, Ottenbacjer and Harrington 2011; Dow, Gerber and Wong 2013). In a crowd project the students *are* the crowd and, through their collective wisdom, I expect a greater quantity of more creative solutions to emerge compared to a traditional group project, when individuals only collaborate with their immediate team members.

Methodology

The crowd project was introduced in an entry level business class with a total of 124 students. After a real-world client briefed students on a problem, the project progressed through three stages, broadly following IDEO's design thinking principles (Brown, 2008). In every stage, the students first worked individually. For example, each student conducted two interviews in the research stage and generated twenty unique solutions in the ideation stage.

Figure 1: Overview of Process



Students then shared their work with the crowd (i.e. the whole class; Figure 1). Stormboard, an online whiteboard, was used to manage the vast amount of data this process produced. Using virtual "sticky notes," students posted highlights from their individual work to the board. They also voted and commented on peer findings (Figure 2). In class, students continued to discuss findings in small groups and with the whole class. The instructor moderated the latter exercise, capturing recurring themes. These emergent themes formed the basis of the next stage. For example, ideation was conducted around the nine themes that emerged from the 350+ individual insights discovered in the research stage.

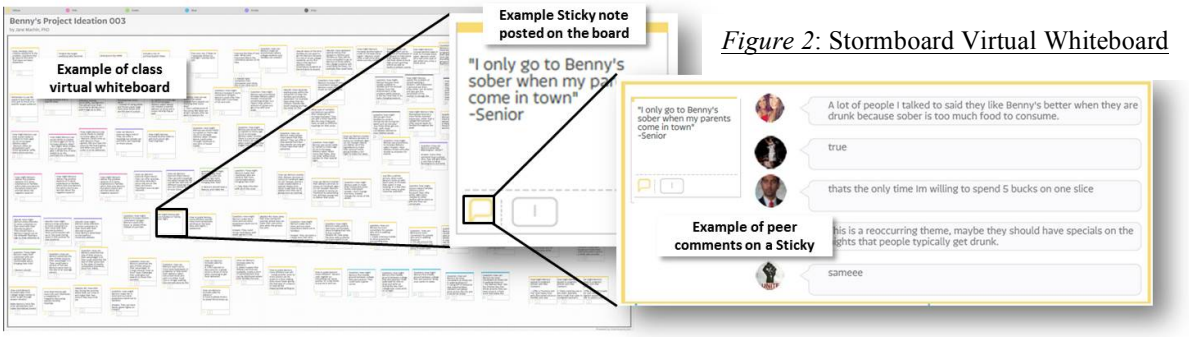


Figure 2: Stormboard Virtual Whiteboard

Discussion

In this project, the class was the crowd. Sharing information prompted peer to peer learning, generated more solutions than a typical group project and culled duplicate solutions. The independent stages limited social loafing and held students accountable. Multiple report options from Stormboard made grading the individual work easy and efficient. A semester end study identified other benefits, summarized in Table One. Anecdotal evidence indicates the students were particularly motivated by the peer voting and feedback loops. Certainly, replacing the group project with a crowd project will not work for all exercises. A large pool of contributors is necessary and strong classroom management skills are required to coordinate the information flow and help interpret the results. Project management tools such as Stormboard are also a necessity. In many instances, though, the crowd project offers promising opportunities to increase student engagement and learning. It is time to use the intelligent forces of the mass class to our advantage.

Table 1: Student Perceptions of the Crowd

	Mean (SD)
Led to a greater quantity of solutions	6.10 (1.01)
Led to more creative solutions	6.08 (0.96)
Led to more effective solutions	6.02 (0.98)
Felt less threatening than other project work	5.47 (1.34)
Felt less competitive than other project work	5.28 (1.31)
Helped me understand the concepts	5.80 (1.30)
Was enjoyable	5.83 (1.22)
Was valuable	5.92 (1.08)
Was inspirational	5.74 (1.23)

Agreement with statement from 1 (completely disagree) to 7 (completely agree).

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Blended Learning for Large Classes: Practical Teaching Tools and Models

Bucky J. Dodd & Rob Reynolds, *University of Central Oklahoma*

Abstract: The aim of this session is to outline several evidence-based models for improving student success in large classes using blended learning. Blended learning combines in-person and online instruction in a cohesive and strategic learning environment. This practice session prepares participants to incorporate blended learning methods in their teaching using an interactive and visual method for designing large classes called Learning Environment Modeling (LEM). Participants will apply techniques for simplifying course design experiences, learn how to use practical teaching tools for improving student success in large blended learning classes, and learn how to use a modeling toolkit for creating and sharing ideas for teaching large classes using blended learning.

Literature Review

The use of large classes for teaching and instruction has been a hallmark of the modern higher education system. For many people, the mention of the college or university experience brings images of large lecture halls and chalkboards filled with complex equations and formulas. Large classes have been particularly well-leveraged for teaching large numbers of students in an efficient format; however, this model has historically favored information delivery over personalization of learning experiences (Arum & Roksa, 2011).

Blended learning offers educators new possibilities for planning and facilitating learning experiences at scale while still personalizing the learning environment to the needs of learners. Blended learning leverages multiple learning spaces (physical or digital) in a unified learning environment that supports a defined purpose (The National Center for Academic Transformation, n.d.). One of the common challenges with the adoption of blended learning methods in higher education is mastering the process of combining different learning spaces together in intentional and purposeful ways. The popularization of methods like the flipped classroom and active learning (Lambert, 2012) have increased awareness of possibilities; however, there are still notable barriers between blended learning concepts and the practical adoption of these models in actual learning environments.

One of the primary reasons for this innovation barrier is that we generally lack the needed tools for designing and facilitating blended learning environments successfully. Learning Environment Modeling (LEM) is a method that has shown promising for successfully meeting these design challenges. LEM was created to help educators enhance their understanding of learning environments, make effective design decisions, and communicate effectively with others (Dodd & Bogner, 2015).

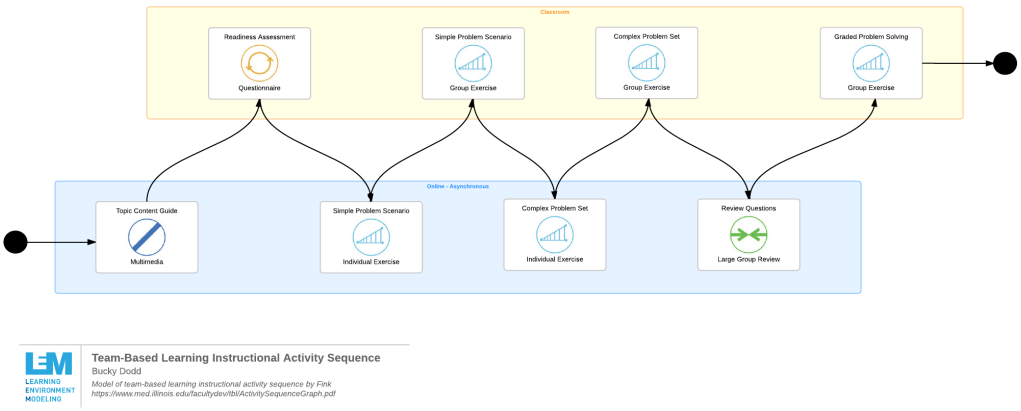

Figure 1. Example of a learning environment model for blended learning.

Goals and Objectives for the Practice Session

The goal of this session is to help participants create successful design plans for large classes using blended learning strategies and Learning Environment Modeling.

Through participating in this session, participants will:

- Identify prospective uses for blended learning models in large classes
- Evaluate blended learning models for large classes using Learning Environment Modeling
- Create a blended learning model for a large class using Learning Environment Modeling

Description of Large Class Practice

The goal of this session is to help educators successfully plan large classes using blended learning methods. Participants will be introduced to a design method called Learning Environment Modeling. Learning Environment Modeling is a visual method for designing learning environments and will be used to help participants create a visual blueprint of the design of a large class using a shared language.

Participants will experience first hand how to create learning environment models for designing large classes and how to gain confidence in this process by adapting existing evidence-based design models. Visual models will be shared to support the adoption of innovative blended learning approaches in practice. Participants will also have access to an online modeling course, toolkit, and examples to support application of their new knowledge and skills following the session.

Discussion

Blended learning offers many innovative opportunities for combining the advantages of in-person interaction and technology to personalize learning experiences and improve student success. This also requires educators to successfully plan learning environments that incorporate multiple types of spaces, technologies, and interactions. Learning Environment Modeling helps to manage this design experience confidently and with ease.

Learning Environment Modeling provides an important advantage over more commonly used approaches to course design and planning. First, typical course design approaches are typically invisible, meaning that many of the decisions about the design of the learning environment remain in the mind of the educator. Second, many course design experiences limit knowledge sharing and interaction with other educators because there is a lack of a common design language. Often, the emphasis is placed on the content rather than on the design of the learning environment. Finally, due to invisible nature of the design experience and the lack of a shared language, there is often a challenge when collaborating with others about the design of the large class. This is particularly relevant given the need to involve people from diverse backgrounds and talents in the design of technology-enriched learning environments.

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Conversation: Lessons Learned from Teaching Large Classes

Mary A. Marchant & Kim Morgan, *Virginia Tech*

Abstract: Teaching large classes can be intimidating, especially for new faculty who may have never taught before. This Conversation Session is presented by two faculty in the Department of Agricultural and Applied Economics (AAEC) at Virginia Tech (VT). Both Marchant, a Professor who has taught classes since 1989, and Morgan, an Assistant Professor who is new to academic classroom teaching, are graduates from VT's Center for Instructional Development and Educational Research (CIDER) certificate programs (http://www.cider.vt.edu/development/). Marchant completed CIDER's "Large Class Teaching Certificate Program," while Morgan, completed CIDER's "New Faculty/Early Career Teaching Certificate Program." Both teach large AAEC classes, which include students from a variety of majors. Thus, key challenges include teaching logistics for large student numbers, as well as maintaining student interest in course content for non-majors. This Conversation Session begins with a presentation on highlights of key lessons learned through these CIDER teaching certificate programs and their own classroom experiences—both general lessons on course design, lesson plans, evaluation and student engagement, as well as specific large class management strategies. Next the Conversation Session provides a forum for participants to share their successes and challenges with teaching large classes. Results from this Conversation Session include teaching tips that participants can immediately use in their large classes.

Topic Description

This Conversation Session begins with a brief presentation by Marchant and Morgan on highlights of key lessons learned through CIDER teaching certificate programs and their own classroom experiences—both general lessons on course design, lesson plans, evaluation and student engagement, as well as specific large class management strategies. Example of lessons learned include the following:

General Lessons:

- To take a systematic, strategic approach to teaching. All items should align and be connected: the purpose of the course, learning outcomes and objectives, lesson plans, and assessment. "Instructional Design involves systematically planning, developing, evaluating, and managing the instructional process, based on principles of learning and instruction" (Doolittle, 2014).
- Evaluate based on what the instructor wants students to learn and align with specific course learning objectives. Evaluations should place the greatest weight on the most important learning objectives. Grading should be based on student performance demonstrating knowledge of these learning objectives. The main function of assessment is to improve students' learning (Doolittle, 2015c). However, improved instructor awareness of the individual students' goals for final course grades provides additional motivation for concise communication of course assessments and associated grade weights at the beginning of the term.
- Student engagement amplifies student learning. Learning is based on the ability of students to process course material, e.g., in-class "think-share-pair" or out-of-class group projects (Doolittle, 2013a and 2013b). "The single most important variable in promoting long-term retention and transfer is "practice at retrieval" (Halpern and Hakel, 2003)."
- Break up the class session into segments. Use active learning activities during class to reinforce lecture. Employ different physical senses—think/listen/physical movement (Doolittle, 2015a; Halpern and Hakel, 2003; Heppner, 2007). Audience response systems (ARS), or "clickers" are an increasingly popular tool used to deliver curricula and educational content across diverse, heterogeneous audiences while providing instant data on learner understanding. Using ARS data during a lecture provides the instructors with the opportunity to encourage guided discussions based on "teachable moments" while minimizing the risk of "tangent" or "off-topic" discussions which tend to plague larger audiences and disrupt workshop timetables. (Morgan and Maples, 2015).
- Include activities to create a "sense of community," ownership and accountability, particularly for large classes. Examples include learning students' names, developing a rapport with students, being responsive

to student e-mail, talking with students before and after class, out-of-class review sessions and demonstrating support for students (Doolittle, 2015b; Marchant, 2014 and 2007).

Specific Class Management Lessons:

- Always begin class with an engaging and enlightening example that is related to covered material
- Clearly describe course objectives and schedule of assignments listed in the syllabus that do not change throughout the course
- Do not offer extra credit or participation points
- Use a point system for grades (e.g., 1000 total points) so students know their scores throughout the semester
- Choose graded assignments that motivate students to review their notes and readings
- Restrict the use of laptops and/or electronics devices in class. Consider creating an "electronic zone" in the back of the room to avoid distracting neighboring students.
- Implement a peer review evaluation system for group projects that affect individual student grades.
- Provide partial class handouts posted prior to class and completed during lecture. This frees up time for more in-class discussion and encourages attendance.

Next the Conversation Session will provide a forum for participants to share their successes and challenges with teaching large classes. Our intent is to foster lively discussion through shared experiences as well as synergies to discuss challenges, e.g., what works, what doesn't. The take-home message will include a list of "teaching tips" to support faculty teaching large classes that can be implemented immediately.

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Thursday

July 21, 2016

Poster Session

05.30-06:30 PM

http://www.teachinglargeclasses.org/conference/

Class Size and Academic Outcomes: Do Grades Differ because of Course Scheduling, Subject Matter, or Faculty Characteristics?

Eric G. Lovik, *Institutional Research, Radford University*

For many years, researchers and practitioners in higher education have raised concerns about student retention and graduation, and have developed and refined evidence-based theories about student success (Seidman, 2012; Tinto, 1993). Pascarella and Terenzini's (2005) review of the college impact literature identified the importance of students' grades on retention and completion. "College grades may well be the single best predictors of student persistence, degree completion, and graduate school enrollment" (p. 396). There are mixed findings about the importance of class size on academic performance, but the general consensus is that smaller class sections tend to promote faculty-student interaction, and thus, with greater student participation comes improved student performance. Colleges and universities deliver instruction in a wide variety of locations, delivery modes, and class meeting times. Research provides evidence that increased class size has a negative effect on students' grades (Kokkelenberg, Dillon, & Christy, 2006) as well as students' perceptions of the quality of instruction (Monks, Schmidt, 2010). However, it is unclear whether class size impacts academic outcomes based on where and when instruction occurs. This researcher analyzed multiple years of data on courses and grades in a face-to-face setting at a public master's university to determine the relationship between class size and academic performance. Results point to a significant, negative correlation between class size and average grades of students. However, the impact of class size differs depending on the instructional location, day of the week, start time, subject matter, and faculty characteristics. In order to ensure timely and effective use of these findings with faculty and advisors, the results of this study are provided to academic affairs professionals and retention specialists.

Using Mini-Communities in Large Classes to Enhance Instruction While Building 21st Century Skills

Veronica van Montfrans, *Virginia Tech*

In addition to content, teachers are tasked to foster "21st Century Skills" in their students as well. Students must not only master subject matter content, but they must be critical thinkers, collaborate well with others, be able to synthesize a variety of information, and develop evidence-based solutions to problems (just to name a few). This daunting task in large classes can be made simpler by grouping students into mini-communities that must learn to collaborate, rely, and bounce-ideas off one another in order to succeed. Mimicking the team-based work environment and initiatives many employers actively seek in university graduates today, mini-communities seek to not just develop these skills in the student, but decrease the work load of the instructor as well. This is done through the conscious support of readily available technology and clear expectations set forth by the teacher, as well as a commitment to spend a solid amount of time before the semester begins to structure the communities effectively.

Before and After: A Professional Development Program in a Large EFL Class

Ming Li, *Sias International University, Virginia Tech*

The purpose of this study was to explore how a professional development (PD) program impacted Chinese college EFL teachers' instruction. The researchers interviewed the EFL teachers at the beginning and the end of the ten-week program. After analyzing the interviews, we formed three fundamental themes: EFL teachers improved their instructional capabilities by implementing group work in classes. They realized the importance of empowerment of students in instructional design. Their beliefs in teaching methods changed from lecture to student-centered. However, they still had doubt about the effectiveness of this new method. We concluded that full PD takes time and EFL teachers cannot develop their profession immediately. Furthermore, it is necessary to provide the EFL teachers with social learning theories and educational psychology in future PD program. The role of the president, the administrators, and the financial officers in a faculty development program was also discussed.

Taming the Large Class Beast by Levering Technology in your Favor

Maria Gallardo-Williams, *North Carolina State University*

Large class instructors face educational design challenges that are unique to their teaching and learning environments. Simple techniques such as in-class discussion or group work become a logistical challenge in the large classroom, and can interfere with the design of activities that foster critical and/or creative thinking. It is important to address these issues and to recognize that using technology may provide different avenues to facilitate a personal relationship between the instructor and the students, as well as between members of the class. This poster presents techniques that have been found successful in large chemistry classes, and that could be adapted for use in other disciplines. Those techniques range from enhanced group e-mail communication, use of on-line asynchronous discussion spaces, use of video, all the way to innovative classroom polling techniques such as Padlet and Twitter.

Differentiated instruction in large classes

Windi D. Turner., *Utah State University*
Oscar J. Solis, *Virginia Tech*

In response to the diverse needs of individual students, with their varying abilities, interests, learning styles, and cultural backgrounds, K-12 teachers have been using research-based differentiated instruction for decades. While differentiated instruction has produced positive results in K-12 education, the literature to support differentiated instruction in higher education as a strategy to help students achieve a greater level of individual growth and academic success remains controversial and inconclusive. By and large, instruction in higher education is dominated by one-size-fits-all methods, which poorly serve diverse student bodies (Ernst & Ernst, 2005). Given that a high percentage of college students repeat at least one academic course, there is seemingly a mismatch between instructional methods and students' academic needs (Dosch & Zidon, 2014). Moreover, little work has thoroughly examined differentiated instruction in large classes. Although some faculty in higher education have embraced differentiated instruction, the assumption remains that most instructors will focus on the traditional lecture format (Chamberlin & Powers, 2010). This study examined the use of differentiated instruction at a large research institution situated in the southeastern United States. Qualitative and quantitative data were collected by means of an online survey with 20 instructors teaching large classes within 11 departments and two schools of an academic college that encompasses the arts, humanities, and social and human sciences. Participants offered their interpretation of differentiated instruction, their training in differentiated instruction, and their use of differentiated instruction in large classes. The findings suggest that differentiated instruction in large classes at a research university is challenging. Moreover, instructors teaching large classes need a better understanding of differentiated instructional strategies.

Technology in active learning: the TA perspective

Julia H. Roberts, *Duke University*

Active learning increases student success in STEM fields when compared to more traditional lecture based methods (Wenderoth, 2014). Technology is a useful tool to enhance the active learning experience and can create a new space for a TA to act as a communicator of knowledge and expectations between the students and the professor. This poster will describe the perspective of a graduate student tasked with implementing technology in both introductory chemistry and biophysical chemistry classrooms over seven semesters. Two types of technology were utilized through out the various courses: iClickers and peer evaluation surveys. In addition to streamlining quiz grading, iClickers were utilized to poll the class in real time to ensure all groups and students were progressing through the group activities at similar speeds. This feedback allowed the TA and professor to ensure key concepts were being understood as the activities were being completed rather than waiting until assignments were graded. Peer evaluation surveys were given after every unit of active learning (8 in the introductory chemistry courses and 4 in the advance biophysical course). The use of surveys allowed for consistent feedback on many levels

(student/student, student/TA and student/instructor) that allowed for constant awareness of issues with the structure of the course. Synthesizing and transferring this information between the professor and students allowed the TA to gain a unique understanding of the student experience and expectations, facilitate real time calibration of the course and create a new role in the active large classroom.

Experience on Teaching Business Internet Technology for Economics Students

Tetiana Pryhorovska, Olena Kornuta, *&* Khrystyna Kocherzhuk,
Ivano-Frankivsk National Technical University of Oil and Gas (Ukraine)

Abstract: In less than two decades, the Internet became vital necessity for business providing. It causes emerging the new disciplines on information technology, media and communications.
The disciplines on information technology, social media and communications are among the most dynamic and exciting in recent years. Classroom methods of delivery would need to change to accommodate changes in learning. This work discusses the approaches for "Internet Technology in Economics" course teaching. They are: E-learning tools, web communication means, online testing, team works, and case studies.

The Art of Teaching Large Classes Using Emotional Intelligence

Robert L. Overstreet, *Dalton State College*

Whether your title is professor, assistant professor, adjunct professor or lecturer, your students will spend countless hours in your classroom looking to you for wisdom you have gained from your studies, educational background and maybe even your overall intellect. Nonetheless, being an effective instructor does not solely depend on your intellectual quotient (IQ); it also depends on how well you can use your emotional intelligence (EI). As a great college instructor who may teach 25, 50 or 100 students at one time, we must recognize the differences in teaching and learning styles, as well as being able to connect with students in order to have the greatest outcome.

Author Index