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An approach to engaging students in a large-enrollment, introductory STEM college course

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Abstract: *While it is clear that engagement between students and instructors positively affects learning outcomes, a number of factors make such engagement difficult to achieve in large-enrollment introductory courses. This has led to pessimism among some education professionals regarding the degree of engagement possible in these courses. In this paper we challenge this pessimistic outlook through a case study involving a large-enrollment introductory, general education, STEM college course. Several pedagogical approaches related to social constructivist theory offer possibilities for increasing student engagement in the learning process, but they may be difficult to implement, particularly in environments yielding little or no reward for classroom innovation. Here, we present an approach to developing an engaging learning environment by hybridizing aspects from a range of pedagogical approaches varying from the didactic (e.g. traditional lecture) to the more constructivist (e.g. peer instruction, project-based learning). We describe the course in question and our pedagogical approach, provide evidence for its effectiveness, and discuss contextual factors affecting the development of our approach and its adoption to other subjects and institutions. We also discuss important remaining challenges regarding the adoption of our approach and similar practices.*

Keywords: large enrollment, STEM, student engagement, constructivism, hybrid

Introduction

A recent article posted on the website of the Chronicle of Higher Education entitled "A Caring Professor May Be Key in How a Graduate Thrives" touted the positive impact of engaged professors on the learning outcomes of their students (Carlson, 2014). While such findings are not necessarily new, what was interesting to the authors here, as co-instructors, was the insight gained from the thread of comments that followed, ostensibly largely from higher education professionals, discussing the pros and cons of the article. A commonly expressed opinion was that one couldn't have interactions in large introductory courses that would lead to the types of interpersonal engagement between students and professors that the article promoted.

As instructors of a large enrollment class, the remarks in the comment thread that followed the article spurred reflection on the idea that achieving relational engagement in large enrollment classes is not probable if even possible. In 2010, the lead instructor inherited an introductory, large enrollment course that was developed primarily on the "traditional" approach to such a course; that is, being highly didactic and overwhelmingly composed of lectures. After several semesters

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of development by the lead instructor, we found ourselves teaching that course with a different approach, and by all accounts we were observing some evidence of success with respect to cultivating engagement among students and instructors, despite the large lecture format. This led to an introspective examination of how it is that we do what we do, culminating in this case study.

Even restricted to scholarly and educational contexts, the term "engaged" has many meanings (Christenson et al., 2003). Boyer and others, influentially, have considered the "scholarship of engagement" to describe how scholars work with and for communities, participating in activities that cross disciplinary boundaries, teaching, research, and outreach (e.g. Boyer, 1996; Barker, 2004). The article motivating this case study focused on relational aspects of engagement between students and instructors, but we take a slightly broader view that to a degree integrates with the "scholarship of engagement" promoted by Boyer and others. We find that relational engagement is associated with interest in and accessibility of course content and related themes, which is itself associated with students' perceptions of the applicability of course material to matters of civil discourse. As such, we treat interactions with students, classroom instruction, and opportunities to connect with a broader conversation outside the classroom as intrinsically linked and mutually reinforcing.

The aforementioned Carlson article is far from the only one to identify engagement between students and instructors as a positive influence on educational outcomes (e.g. Klem & Connell, 2004; Umbach & Wawrzynski, 2004; Jones, 2008). However, large introductory courses can pose numerous barriers to developing this sense of personal engagement (e.g. Cuseo, 2007; Mulryan-Kyne, 2010; Hornsby et al., 2013). While perceived by many to be cost-effective from an institutional perspective, large enrollments may place constraints on classroom activities and assessments, and the student body composition runs a higher probability of unevenness in prior knowledge and individual student motivation. Even though such large general introductory courses can be difficult to teach, they are also critically important. Particularly in the STEM fields, these types of courses cover subject material that many of today's college students need exposure to, not only to fulfill area requirements, but also to become well-rounded, informed citizens. More immediately, an engaging introductory course can inspire students to pursue further coursework within a major or minor. Consequently, as the integration of advances in educational psychology, new technologies, and economic realities are challenging "business as usual" in higher education, a critical problem is how to improve student outcomes and experiences in such high enrollment introductory courses. We believe that one significant barrier to improving engagement in these courses is the heavy emphasis on an instructor-centered classroom, within which instructors talk and students listen to receive the desired information (e.g. Ebert-May et al., 1997; Prosser & Trigwell, 2014).

This paper aims to challenge the conventional wisdom that engagement cannot be achieved in large-enrollment introductory courses by sharing an approach to creating an engaging classroom environment in a large, introductory STEM course in conservation ecology. Conservation ecology is a dynamic field, focusing intently on connections and flows between components of coupled human-natural systems. It is also an intrinsically collaborative field, wherein offering a holistic introduction to the field requires going beyond transferring mere factual knowledge to exposing students to the teamwork and ancillary skills necessary for successful collaboration, and an appreciation of how each individual (and each issue) is connected to a larger context. As researchers who collaborate across disciplines and across the divide between academics and practitioners, it was a natural extension to scaffold this coursework with this type of systems thinking. As we refined our pedagogy and interacted with colleagues across the university, we

came to realize that our approach is philosophically consistent with social constructivism (e.g. Vygotsky, 1978).

In an educational context, social constructivism implies that learning occurs via groups interacting through shared experience to co-develop knowledge and interpret the meaning and implications of the knowledge gained (e.g. Lave & Wenger, 1991). Several pedagogical approaches reflecting characteristics of social constructivism have been developed elsewhere; these include Project-Oriented Guided Inquiry Learning (POGIL) (Moog & Spencer, 2008), Problem-based learning (Savery & Duffy, 1995; Savery, 2006), Project-based learning (Thomas, 2000; Dym et al., 2005; Bell, 2010), and Peer Instruction (Mazur, 1997). Such "student-centered" practices have yielded gains in student learning, and particularly in student motivation and interest, in a variety of educational contexts (Hein, 2012; Opdecam, et al. 2014; Conway, 2014). However, some researchers have noted faculty resistance to adopting these innovations related to perceptions about their practice and discipline or department norms, despite ample evidence of these approaches' effectiveness (Rogers, 2003; Gess-Newsome, et al. 2003; Bunce, et al. 2008; Mulryan-Kyne, 2010; Seymour, et al. 2011). Reasons for this faculty resistance include but are not limited to discomfort and anxiety with breaking away from traditional approaches; the additional work required in creating a more active learning environment; a lack of knowledge of alternative approaches; and the risk that the students may not be receptive to these new approaches (Mulryan-Kyne, 2010). Furthermore, the investment of time and energy required to incorporate, evaluate and disseminate these new approaches as part of a faculty member's teaching portfolio is often perceived as not worth the return to that person's professional advancement. As Richlin (2001, p.61) effectively states, "the sad truth is that many departments and institutions do not count pedagogical scholarship as part of the faculty members' scholarly production."

In the fields of environmental sciences, sustainability science and development studies, there is an ever expanding number of calls for engaged scholarship that provides larger society with the necessary transdisciplinary research and education to contribute to the transformation, resilience and sustainability of our societies (e.g. Crow, 2010; Whitmer et al., 2010; Yarime et al., 2012). It is within this context that the spirit of this particular Conservation Ecology course was reconfigured. In spite of the aforementioned realities of regarding a lack of perceived value by units within institutions of Higher Education, we share our experiences with a hybridized approach to engaging students designed to increase the accessibility of course content.

Our approach is best described as a hybrid between a more traditional lecture format and adaptations of more recently developed pedagogical methods including the aforementioned "constructivist" pedagogies and the flipped classroom (Bergmann & Sams, 2012; Herreid & Schiller, 2013; Bishop & Verleger, 2013). The efficacy of hybrid and adaptive approaches has been documented (Carrió et al., 2011; Chase et al., 2013). Carrió et al., (2011), for example, found that use of a hybrid problem-based learning approach to the teaching of biology resulted in no statistically significant differences in the acquisition of factual knowledge when compared to the use of more traditional lecture-based learning. However, with their hybrid approach Carrió et al. (2011) documented increased student satisfaction as well as an enhancement of critical thinking, cooperative work, information management, and communication skills when compared to a lecture-based classroom. We assert that our model creates opportunities for engagement between students and instructors in a large lecture environment and that this opportunity for increased engagement generates gains in student interest and satisfaction. Furthermore, we contend that our approach may be more easily implemented than wholesale adoption of other classroom innovations, owing to its flexibility, as has been noted elsewhere (e.g. Gidley, 2012).

Our intent is neither to denigrate nor to replace any pedagogical tools (e.g., POGIL, PBL, Peer Instruction, the flipped classroom) that have proven effective in other settings. Rather, we aim to present an approach that has been effective in our particular context as a means of sharing experiences and perspectives that might be of value to others. Our approach will be contextualized relative to our institution and grounded in the larger field of the scholarship of teaching and learning. In addition, quantitative and qualitative evidence supporting the effectiveness of the approach will be presented. Finally, we discuss key challenges faced by instructors of this and similar courses, as well as contextual factors that may affect the adaptation of our approach to other situations.

Course Description and Contextual Factors

The course, "Conservation Ecology: Biodiversity and Beyond," is a three credit-hour 2000-level course offered in the College of Arts and Sciences at the University of Virginia. It has been offered four times from 2010 to 2013 (one section each fall semester) and has met in both three days/week × 50 minutes and two days/week × 75 minutes formats during the middle of the day (either 1300-1350 or 1100-1215). In 2010-2012, the course was taught with a single instructor and in 2013 was co-taught between a professor and an experienced graduate teaching assistant while having the same lead instructor in all four years. The course is designed to meet the general science elective course requirements for students in the College of Arts and Sciences. Enrollment is ca. 180 students spanning a wide range of majors/intended majors and stages of their college career. See Table 1 for a statistical characterization of student composition. It is no secret that many students taking gen-ed science electives are looking for courses that appear to be (as one student put it) "less painful scientifically." However, there is also a segment of the student population in the course that is highly motivated, skilled, and deeply versed in issues of environmental science and ecology. A great challenge, therefore, is how to create an engaging classroom atmosphere given that the levels of prior understanding and degree of motivations are often quite disparate at the beginning of the semester.

Table 1: Statistical characterization of course student population. Total indicates the number of students that enrolled in the course. M:F indicates the ratio of male to female students. Majors are grouped by Humanities and Social Sciences, Physical and Natural Sciences, Other, and Undeclared. Majors grouped as "Other" include architecture, nursing, engineering, the Curry School of Education, the Batten School of Leadership and Public Policy and the McIntire School of Commerce.

			Academic Standing				Major			
Year	Total	M:F	1st Year	2nd Year	3rd Year	4th Year	Hum/ Soc.Sci	Phys/ Nat. Sci	Other	Unde-clared
2010	176	0.81:1	39.8%	26.1%	18.2%	15.3%	22.2%	10.7%	7.4%	59.7%
2011	207	0.95:1	30.9%	33.8%	23.2%	12.1%	29.5%	10.1%	2.9%	57.5%
2012	165	0.74:1	47.9%	29.7%	12.7%	9.7%	18.9%	5.5%	1.8%	73.9%
2013	166	0.77:1	34.3%	30.1%	18.7%	16.3%	21.1%	10.2%	6.0%	62.7%

Factual content focuses on an introduction to key ecological concepts involved in making sound decisions about conservation at scales from the population to the global biosphere. We go beyond the traditional concept of conservation (i.e., the protection of an individual species) to focus on understanding the larger concepts and contexts of entire landscapes and the processes that support them. We highlight the complex and collaborative nature of conservation and use abundant group work to not only encourage critical thinking and expose students to skills needed for effective collaborations, but also to provide opportunities to model those skills. The course is structured to achieve the following learning goals: 1) make students aware that nature is constantly changing; 2) increase awareness and understanding of the concept of socio-ecological systems and their often non-linear and cyclical patterns; 3) make students aware of how they are connected to these systems and how these systems are connected to each other across various scales; 4) understand how changes to a system can impact other systems at different spatial and temporal scales; 5) develop collaboration and teamwork skills; and 6) for each student to have sufficient understanding of key concepts to be able to conduct fifteen minutes of intelligent conversation (i.e., "cocktail party conversation;" Lesgold, 1984) about ecological conservation.

Pedagogical Approach

As instructors, our overall goal is not merely facilitating the acquisition of knowledge, but rather encouraging their active participation and generating knowledge in a collaborative fashion, a goal more in line with the student centered approach described by Prosser & Trigwell (2014). To accomplish this, we focused on the creation of a learning environment that fostered the exchange of information, critical thinking, and perhaps most importantly, encouraged engagement. In many ways what we aimed to do with our large classroom experience is what others in the field are trying to do in theirs: to move from the purely didactic toward a more student-centered learning environment fostering active learning (e.g. Gibbs, 1992; Biggs, 1999; Mulryan-Kyne, 2010).

Though our approach was born organically of the experiences of the authors as learners and teachers, we have (often unknowingly) adapted elements of pedagogical approaches associated with social constructivism such as POGIL, Problem-based and Project-based learning. While these individual methods have developed out of different fields and have certain unique features, common elements between these approaches include the use of cooperative social interactions to build conceptions of course material and a shift in the role of the instructor(s) toward that of facilitator as opposed to lecturer (Eberlein et al., 2008; Woods, 2013).

We have identified five key features of our approach that are summarized here and discussed in greater detail below: 1) use of small-group activities to facilitate student-student and student-instructor interactions in the classroom; 2) consideration of multiple perspectives and knowledge sources through the use of a diversity of instructional media; 3) leveling of the classroom hierarchy to invite broader participation; 4) creation of cognitive dissonance as a platform for engagement; and 5) high instructor availability to create opportunities for face-to-face interaction.

Semester Structure

The overarching semester structure of the course reflected a tradeoff between the objective of fostering critical thinking and the challenge of incoming students having a wide range of motivation and prior knowledge. Accordingly, we transitioned over a continuum from an initial condition in which the instructors carried the load with respect to the transfer of knowledge, to a final condition in which the students bore responsibility for acquiring and generating knowledge and sharing it with members of the course (Figure 1). At the beginning of the course, the instructors' initial focus was to introduce a common language around the field of conservation and to produce a common platform of student knowledge and engagement. Here, we leaned more heavily on lecture and in-class activities were more closely guided than later on in the course, though they were still used regularly to develop a participatory classroom environment. We emphasized key principles of the ubiquity of environmental change and the connectedness of ecological and socio-ecological systems through relevant case studies. The instructors purposefully endeavored to relate each concept to other majors/disciplines and areas of student interest, from personal economics to sociology to popular culture, demonstrating that there is much to learn from this course that is applicable to other areas of life. Consistent with our student-centered philosophy, we encouraged students to begin making these connections independently by voluntarily sharing articles and news pieces that related to course concepts with the instructors. We frequently opened class sessions by discussing with the whole class current events that had been sent us by students.

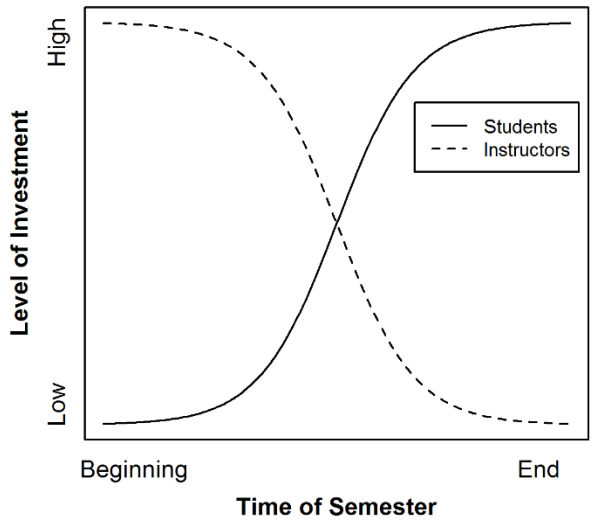

Figure 1. Illustration of how investment, or input, of instructors and students changes throughout the course.

During the middle of the course, the instructors began in earnest to transition toward the final condition in which students carry the load for acquiring and sharing knowledge. We found that a powerful tool in accomplishing this was to support students in embracing greater ownership of their learning. Although we continued some lecture to formalize new concepts, in-class activities gradually became more central to the course. The questions discussed also changed in nature from focusing on content comprehension to more complex modes of thinking. On reflection, our in-class activities somewhat resembled POGIL activities in that they guided students through a progression of concept formation and application, but were less open-ended than one might find in a Problem-Based Learning classroom.

Approximately halfway through the semester, the course took on characteristics of Project-Based Learning as we introduced a final project in which groups of students collaboratively research a contemporary real-world environmental issue of their choosing and prepare a 10-minute presentation (in which all members speak) and short paper that describes the chosen issue, analyzes it in the context of key course concepts (such as ecosystem resilience, the adaptive cycle, and panarchy[3]), and suggests solutions that are informed by their knowledge of the connectedness of socio-ecological systems. One component of the project is the articulation of three to four key points that their fellow students should "take away" from their presentation. With this in mind, the students are aware from the outset that they have to keep the needs of the end user community front and center prior to the development of any project concept an approach referred to as people first, process second and then the product (Allen et al., 2014).

For the final project, the instructors assign student groups of approximately seven to eight students somewhat randomly, with adjustments made to ensure a general evenness of student ability and engagement between groups. Groups work together to propose ideas, which go through initial vetting via brief pitches of the idea in-class to an instructor one week after the project is

[3] An helpful text concerning the concepts of ecosystem resilience, the adaptive cycle, and panarchy is: Gunderson, L.H., & Holling, C. S. (2001). Panarchy: Understanding Transformations in Human and Natural Systems. Washington, D.C.: Island Press.

introduced. During the following weeks, project groups also receive formal mentoring in at least one progress meeting between an instructor and each project group outside of class. These meetings consist of 30 to 60 minutes of back-and-forth discussion to aid student groups in formulating and articulating their ideas and to suggest additional lines of thinking and other areas for improvement.

By the end of the course, students have taken on the lion's share of responsibility for acquisition, processing, and transmission of collaboratively generated knowledge. The role of the instructors has shifted from being the predominate source of information/knowledge authority to largely one of mentoring student groups and supporting them through access to resources and as serving as sounding boards to provide critical feedback in the development of their final presentations. Lecture and in-class activities are tapered off and class time is mainly allocated to providing project teams with time to meet with each other and hold brief discussions with instructors. The semester culminates in two and a half weeks of formal student presentations, in which the students themselves fulfill the role of instructor/knowledge authority.

As stated previously, we had objectives for our students related to interpersonal connectedness and the development of skills to enhance collaboration and teamwork. As instructors, we firmly believe in the value of modeling these expected behaviors for our students. Not unlike those lecturers profiled in Bannink & Van Dam (2013a), we had an objective to initiate the development of instructor-student relationships as early in the semester as possible, and it has been our experience that by developing these relationships early the students feel more confident in independently accessing educational resources as the semester progressed. We made ourselves available to students by arriving to the classroom early and lingering for a few minutes afterward. We also kept regular office hours; at least one co-instructor was available for at least one hour, four out of five days of the week. While office hours were not always used, they were always available, and we maintained this level of instructor availability throughout the semester.

Course Materials

One key feature of our approach is the use of a diversity of instructional media to present students with multiple perspectives and sources of knowledge. These included lectures, scholarly and popular texts, and videos. This diversity of instructional media underscores the validity of multiple perspectives and sources of knowledge, and also creates cognitive dissonance by presenting students with perspectives different from their own. We chose texts for the course that we believed students would find more accessible and engaging than a traditional textbook[4]. We assigned weekly readings from the two main course texts, and supplemented those readings with additional articles. These articles brought in additional perspectives regarding historical, social, and ethical perspectives on conservation. These readings seemed to speak to a large number of students, particularly non-science students who did not feel that the readings were intellectually intimidating. We also assigned short videos (e.g. TED talks, PBS Frontline presentations, etc.). These were used to provide additional perspectives and to introduce difficult concepts before other instructional activities (e.g. discussion, lecture, or additional reading) unpacked and clarified new

[4] Shugart, H. H. (2004). *How the earthquake bird got its name and other tales of an unbalanced nature.* New Haven, CT: Yale University Press; Walker, B., &Salt, D. (2012). *Resilience Practice.* Washington, D.C.: Island Press.

concepts. Assigned readings and videos frequently were the subject of small-group in-class activities.

Class Sessions

Class sessions were viewed as an opportunity to share knowledge, interact with our students, and encouraging their active participation. Additionally, we took an approach to lecture and group activities that attempted to take a large room and make it feel smaller. With respect to presentation of content, we purposefully took principles we were discussing on a given day and investigated relationships and analogies to them, often invoking systems that at first glance appear to have nothing in common with 'natural' systems. In retrospect, our approach was philosophically consistent with Nisbet et al.'s (2010) vision of how the 'four cultures' of environmental sciences, creative arts and professions, philosophy and religion and the social sciences can engage each other to facilitate new synergies to foster of more effective societal responses to the challenges of rapid global environmental change. What we did was to couch the more technical information and conceptual models arising from environmental sciences in the language and context of philosophy and religion, the social sciences and the creative arts and professional studies (e.g. business, commerce, engineering and medicine). As instructors, it was our perception that by doing so we made our technical content more accessible to the average, non-science undergraduate student. We modeled for the students how one can make connections and that one should get curious about these concepts and explore and apply them to their own particular contexts. We reinforced students making connections independently by listening to the student's explanation of the connection and why it is appropriate to their context. We deliberately started with this approach in the first lecture and built upon it throughout the semester until the students became comfortable with making and articulating these connections on their own. This is, essentially, the basis of the final group project and is the foundation of the "cocktail party conversation" learning goal.

One avenue for students to begin making their own connections occurred at the beginning of each class, during which the instructors shared and briefly discussed relevant current events. After the first week of class, the instructors frequently received unsolicited emails from students with recent news pieces and topics for discussion. By sharing these with the class, we reinforced students' curiosity and motivation to seek out interesting topics and identify connections between real-world events and course content.

A primary means of prompting students to independently make connections to course content, as well as interact relationally with their classmates and instructor(s) was in-class group activities. In approximately half of class meetings, groups averaging eight students were assigned by counting off to twenty and students were required to move to assemble with classmates sharing their number. One of the ways that the instructors took advantage of the large lecture hall space was to point to general areas of the room for the groups to form and left it to the students to get organized. Initially, the process required a good deal of cajoling from the instructors, but students quickly became comfortable with the process and made the transition efficiently. Groups were generally allowed fifteen minutes to discuss and answer a short series of questions while the instructors circulated throughout the room to be present with each group and, when necessary, facilitate discussion. In-class activities generally focused either on application of a concept from lecture in new ways, or on responding to an assigned reading or video. Following the group discussion period, the instructors led a brief re-cap with the full class by soliciting answers from the different groups. During this time, we could encourage further discussion between groups who

may have responded differently to the prompt, and, importantly, gauge student understandings and offer feedback to correct misconceptions. Perhaps more importantly, these group activities also provided venues for instructors to engage with students on a more personal level than would be possible behind a lectern. We found one welcome outcome of such an approach to be the reinforcing (or in some cases the reconfiguration) of the notion of the nature of a professor-student relationship.

When group activities focused on alternative perspectives, often introduced through readings or videos, the activities became an avenue for grappling with cognitive dissonance. During group discussions and the re-cap discussions that followed, we allowed students to refine their conceptions of ecological and socio-ecological systems. Throughout, the instructors provided hands-on mentoring to act as guides to the iterative process of creating an understanding, sharing that understanding, defending that understanding in the face of questions and then reconfiguring that understanding as the generated information is re-communicated. We found that this approach propelled students toward the critical thinking required to accommodate new ideas and entertain other possible ways of being. In this way, we differed somewhat from a pure interpretation of constructivism and followed an approach of creating a continuum of engagement that may be thought of along the lines of an educational guild (Swap & Wayland, 2014).

To the extent that we do use lecture as a teaching tool, we reject the attitude of the "sage on the stage" approach, leveling–to the extent possible–the classroom hierarchy and opening the exchange of knowledge and opinions among all those present. This is often embodied through small but symbolic actions: for instance, moving out from behind the podium and out into aisles and between the rows of the larger classroom. Moving throughout the lecture hall helps to make the class feel smaller by not allowing people to “hide” in the back and also symbolizes a greater degree of openness between student and professor by deconstructing the physical space that can become a barrier to interaction. We also make a point of frequently pausing to read faces and to invite questions (e.g. Bannink & Van Dam, 2013b), and polling the class to gauge their knowledge, opinions, and degree of engagement. These moments of “taking the pulse” of the class have allowed the instructors to tailor class time, for example to reinforce a poorly understood concept or to build upon an example that engendered strong student response. We aimed to carry ourselves and to foster relationships in such a way that students became comfortable in approaching us and ultimately in accessing a variety of educational resources available to them (instructors, co-instructors, reference librarians, speakers/seminar series, as well as using the internet more broadly).

When lecturing, we used call-and-response and poll-style questions to encourage the attention of a large group of students, while other questions allowed individuals to share an answer or an opinion. We choose to use a 'show of hands' rather than clickers for these types of questions. Although clickers have some advantages with respect to the ability to quickly collect data, we are conscious of two key points: their monetary cost to students, and the placement of yet another inanimate object between student faculty interactions; it is our opinion that using a show of hands is more intimate and personally engaging. One type of question that we have found particularly effective in engaging students is to ask where students are from or had visited, and to use the students’ own geographic knowledge of a place or a system (e.g. proximity to the Chesapeake Bay, Blue Ridge Mountains, the coastal beaches, etc.) to help illustrate a point. Doing so reflects our “asset based” approach of building off of existing knowledge and skills, often showing students that they knew more than they thought merely through their own personal experiences. It is important to note here that the types of questions that we ask in this setting are more open-ended

and designed to gauge experience and knowledge of context rather than questions that had a definitive 'right/wrong' answer in the context of factual knowledge for the course. Furthermore, it was our experience that the numbers and diversity of those raising their hands increased over the course of the semester.

In our hybrid method, we frequently used class time to actively discuss learning materials read or viewed outside of class. This would more typically be found in a small seminar-style course, and is consistent with the flipped classroom approach, although in our experience such elements are rarely found in a large ecology course. The group activities used in this course also bore some resemblance to Peer Instruction (Mazur, 1997). Groups of students worked interactively to reach consensus on conceptual questions, and re-cap sessions allowed the instructor to assess understandings immediately. However, our activities differed from a more typical form of Peer Instruction (PI) in that PI uses smaller groups (three to four students) and questions interspersed throughout a lecture rather than all at once. The two methods are likely to produce similarly positive results, although one potential advantage of our method is that randomly assigning groups forced students to interact with more of their classmates throughout the semester than if groups had been formed based on proximity.

Evaluation of Students

Evaluation of students was based on two mid-term exams, a final exam, the final project, class participation and attendance, and extra credit. Different modes of evaluation are appropriate for the assessment of different learning goals and using multiple methods allowed the instructors to assign grades based on a more holistic criteria that goes beyond a student's ability to "spit back" facts and includes indicators of critical thinking and engagement (Fink, 2003; Nilson, 2010). Midterm exams were given during the first two-thirds of the course and consisted of approximately 70 multiple-choice questions each. Although multiple-choice questions are best suited to evaluating factual knowledge, in order to elicit higher-level understandings, we also crafted questions that required students to apply concepts in novel situations; for example, students were asked read a scenario and relate it to a theoretical concept in the study of environmental resilience known as the adaptive cycle. The final exam was similar in format to the midterm exams, consisting of multiple-choice questions focusing on content from the last third of the course; hence, the majority of questions covered the final project presentations. The final projects were graded based on a combination of instructor perceptions of the overall quality of the group oral presentation and short paper, instructor perceptions of individual performance, as well as student evaluations of team member contributions. Class participation and attendance were assessed based on a combination of in-class activities and instructor perceptions of aspects of student participation, for example asking/answering questions or volunteering opinions during lecture and recap of in-class activities.

Opportunities to earn extra credit were announced during class, with credit being awarded to students who took the initiative to attend lectures and other educational events relevant to but outside of the course. Students could propose additional activities that they thought were applicable for extra credit by contacting an instructor with supporting intellectual rationale prior to the activity, allowing students a further opportunity to exercise their agency and build equity in the learning process. To receive credit, students were required to spend at least one hour at the event and to produce a coherent one-page summary and reflection on the event. The amount of extra credit earned was at the discretion of the instructors.

Evidence of Effectiveness

This case study being motivated by recently observed trends in the discourse surrounding large introductory courses such as the one we describe, we did not approach our course with consideration toward collecting data regarding the efficacy of our teaching methods. However, quantitative and qualitative data available to us, such as anonymous, on-line, end of term, student course evaluations, can offer some insight into the value of our methods (Emery et al., 2003, Feldman, 1977; Wachtel, 1998). That said, we are limited in the strength of conclusions we can draw regarding how effectively our approach leads to improvements in student engagement or learning. Despite these constraints, which are discussed in greater detail below, in this section we use a selection of quantitative and qualitative data to support the assertion that our course has effectively engaged students.

End-of-term student evaluations, developed by the institution, are made available to all students for all courses at the University of Virginia. Student ratings from those completed evaluations indicate that the course instructor(s) and overall course compare favorably to the cohort mean (Figure 2). Here, the cohort is considered to include all other courses at the undergraduate level taught in the same department for the same semester. Course evaluations used the Likert scale and were implemented institutionally during the last several weeks of each semester. Evaluations were submitted online outside of class and participation was voluntary. Instructor and overall course ratings have improved over time, though it is notable that the lowest course ratings occurred in 2011, when enrollment was largest and the course was taught with a single instructor. We acknowledge that mean scores for our course are not statistically different from cohort averages, and that other comparisons would yield stronger inference regarding the value of our approach—for instance, between sections of the same course taught concurrently using lecture-based and hybrid approaches. However, such data do not exist, and foibles of institutional reporting of course evaluations preclude making other potentially informative comparisons, such as between our course and other introductory-level courses in Environmental Sciences. Moreover, the validity of student evaluations of teaching effectiveness is a topic of debate (Emery et al., 2003; Feldman, 1977; Wachtel, 1998). Thus, we next present additional data supporting the value of our course.

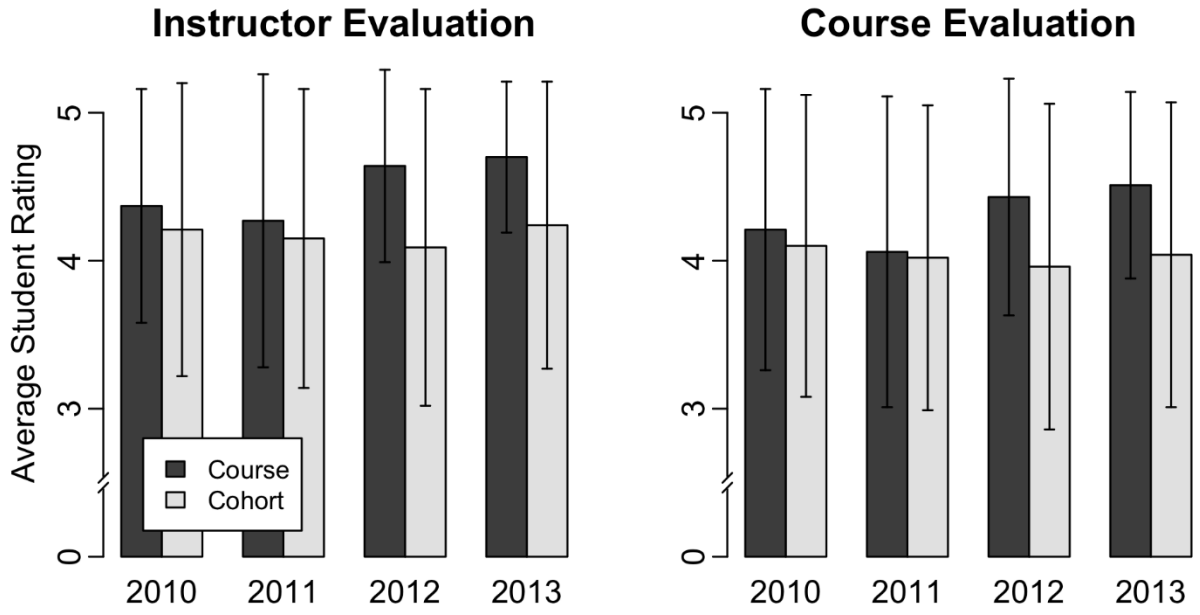

Figure 2: Results of student evaluations for Conservation Ecology: Biodiversity and Beyond taught at the University of Virginia during 2010-2013. "Instructor Evaluation" indicates responses to "overall teaching effectiveness of instructor" and "Course Evaluation" indicates responses to "overall course effectiveness." The evaluation criterion used on a Likert scale: (5) = excellent and (1) = poor. Error bars indicate one standard deviation from the mean. Other courses offered by the department are used for cohort comparison. Response rates for the course were: 89/174, 86/205, 85/162, and 82/162 for 2010 to 2013, respectively. Sample sizes for cohort exceeded 1000 responses to each question.

With the on-line, end-of-term student evaluations, respondents had the opportunity to leave anonymous comments in response to a series of questions concerning the course and its instructors. Qualitative responses from those student evaluations indicated a generally high degree of satisfaction with the course and its instructor(s) although such satisfaction was not unanimous. Generally, students commented positively on the efforts of the instructors to engage students, foster meaningful interactions, inspire interest in ecology and the environment, and connect environmental issues to students' lives. Many respondents noted that the instructors and the course were successful in "facilitating interest and participation in a very large class. Group activities and questions kept the class moving and interesting" and that the instructors "thoroughly engaged the entire class." Furthermore, some students asserted that the instructors and their approach "know(s) how to intrigue [their] audience and made [us] want to come to lecture every day!" One student noted that the instructors have "taught me to question everything, see the connections between ideas and variables, and [have] inspired in me a greater curiosity for the world." Yet another student respondent noted how "[the instructors] and the readings really pushed for students to think in different mindsets about the environment, and realize how things are very interconnected at all levels." Some indicated that our course prompted personal growth or a meaningful shift in the way a student thinks about environmental issues. A commonly expressed student sentiment found throughout the anonymous survey responses that seems to corroborate that assertion was that the

course and its instructors "taught us overall life and academic skills through the class, such as public speaking, how to learn/study effectively, and how we as students are more connected to what is happening around us than we realize" and that they "inspire(s) people to take what they learn and apply it outside of the classroom."

We also measured classroom attendance as an index of student engagement based on participation in-class activities. The logic behind including these statistics is that engaged students are likely to attend class, so high attendance rates should signify high levels of engagement (Handelsman et al., 2005). Although we did not formally take attendance or require students to sign in, students wrote their names on in-class activities to receive credit for their presence and participation. In-class activities were conducted most weeks during the semester (for example, in 2013, activities occurred in eleven out of fifteen weeks), were not announced in advance, and could occur on any day of the week. Thus, participation in these activities is a representative sample of attendance throughout the semester. In 2010, daily attendance averaged 84.7% of students, 80.7% in 2011, 83.8% in 2012, and 86.1% in 2013.

We were unable to find directly comparable reports of attendance at the whole-course level in either the literature or records at our own institution; however, the literature on relationships between individual attendance and course performance (Crede et al., 2010), and a study asking whether posting lecture notes online affects class attendance (Hove & Corcoran, 2008) suggest that average attendance of over 80% in a course of this size is above the norm, even when attendance is required and/or graded. Although this rate of attendance might be typical in courses with smaller enrollments, such as an upper-level course or even introductory-level courses at many primarily-undergraduate institutions, attendance of this course appears to be high relative to other similarly sized introductory courses.

Taken together, these data are consistent with the assertion that this course and the pedagogical approach taken by the instructors were effective at engendering students' engagement. We reiterate that this evidence must be received cautiously. For example, student course evaluations have been shown to be affected by many factors besides instructor effectiveness (Feldman, 1977; Wachtel, 1998). Using the data available to us, it was not possible to control for such factors, and we are unable to isolate the effect of our pedagogical approach irrespective of other influences. Further study—particularly a designed experiment comparing student outcomes in concurrent class sections taught using traditional vs. our hybrid method—could yield stronger inference. That said, the data do indicate that our course was comparable to and perhaps better than courses offered concurrently in the same department, and that a number of students had strongly positive experiences resulting in substantial engagement and continued interest in conservation ecology.

Discussion: Contextual Factors and Remaining Challenges

Contextual factors

Though the course has been largely successful, it has developed throughout its offering and continues to do so. Certain contextual factors that may be somewhat unique to our situation have influenced the development of the course and deserve consideration when adapting our approach to other contexts. An important consideration in applying our approach to other contexts is to what extent this, or any other pedagogy, is appropriate for the learning goals and subject matter of any particular course (Fink, 2003; Nilson, 2010). We feel that one reason for the efficacy of our

approach is that we are able to model key conceptual themes in our course, for example connectedness, transdisciplinarity, and the adaptive cycle, in the way we teach. In this way, our content and approach are mutually reinforcing, but a different subject matter may suggest different approaches to engaging students and demonstrating important themes. We encourage others to intelligently borrow from our approach and others that encourage active learning and to continually evaluate, adjust, and experiment to find the approach that best suits each instructor and course. Relying on quantitative indicators, assessments planned *a priori*, and designed experiments, not merely instructor intuition, is encouraged.

In any course, the student body has a wide-ranging influence. In our context, we have found that University of Virginia students are generally beneficiaries of great access to resources and as a result are generally skilled and intellectually engaged, at least in their chosen field of study. As a result, it has been our experience that they often enter a course having high potential for making connections, and a powerful tool for motivating our students has been to tap into existing areas of engagement by drawing connections to those fields. Other bodies of students may have differences in skill and engagement, and strategies for increasing student engagement in learning should be tailored to the characteristics of the students. In spite of the opportunities afforded by the academic skill and engagement of University of Virginia students, this does present a challenge. Namely, we find that student thinking can be "siloed" in their field of study and is sometimes infected with a degree of intellectual arrogance. Furthermore, as discussed in Allen et al., (2014) and Swap & Wayland (2014), there is a strong tendency among many of our students to be product focused even at the expense of not understanding process. These patterns of thought must be challenged and a degree of "unlearning" must take place to allow students to then consider alternative perspectives and make the sort of diverse connections that the course asks of them; hence, our emphasis on cognitive dissonance. One question that arises is what is the source of this narrow-mindedness, and to what degree the academic environment and other modes of instruction foster it.

Remaining Challenges

In spite of the growing popularity of active learning pedagogies, there are still broader challenges to implementing them. Accordingly, we pose three "big questions" which we offer some perspectives on based on our understandings and experiences: 1) How big is too big for a course like this to work? 2) How many instructors does it take to effectively teach a large-enrollment introductory college course? and 3) Do institutions see value in this type of approach, or will schools continue to tend toward predominantly didactic forms of instruction?

How big is too big? Though our approach increased the interactivity of a large lecture course, it was still stressed by large enrollments. It is likely not coincidence that we received the lowest average course evaluation in fall of 2011 when enrollment was largest. A key way in which we were able to interact personally with students was by briefly visiting with each group during in-class activities. It was our experience that an increase in class size on the order of 25% led to an increase in both the number of student groups and students in them as well as a reduction in both the time an instructor can spend with each group as well as in the student-student interactions within the group. Taking into account improvements made as our approach developed, the course appeared to be most successful with enrollments under 180 students, but further adaptations could facilitate interactions in even larger class sizes.

How many instructors? The issues of "how many instructors" and "how big is too big" seem related given the apparent importance of face time. We partly overcame the strain of large enrollment by adding an experienced graduate teaching assistant as a co-instructor in 2013. The co-instructor was present throughout the course, lecturing, facilitating activities, and meeting with students, and we suggest that the addition of a co-instructor may have led to increases in student learning and engagement given that course ratings were highest in the year with two instructors (2013). Since face time appears to be critical, adding instructors should increase the number of students able to be effectively taught in a given course section, but some consideration should be given to the level of instructor: an experienced undergraduate or inexperienced graduate student can likely help facilitate group work and offer students extra help, but may not be able to share responsibilities for lecturing, designing activities, and writing exams. An added benefit of having multiple experienced instructors is that each will inevitably have different strengths and areas of expertise, which can increase the breadth of knowledge instructors are able to share with students. This may be especially effective in courses such as ours that explicitly focus on connections within and across disciplines.

Do institutions see the value? Individual instructors often have considerable ownership over how they teach their courses, but without institutions seeing the value of more student-centered or constructivist pedagogies for improving student learning and engagement, didactic, lecture-based courses are likely to continue their dominance in higher education. Others have noted how resistance to instructional innovation can be driven by misconceptions about the effectiveness of the approach (Rogers, 2003; Gess-Newsome et al., 2003; Bunce et al., 2008; Mulryan-Kyne, 2010; Seymour et al., 2011). With respect to our own context both the instructor and co-instructor have been recognized by the institution's teaching resource center for their efforts in classroom instruction and pedagogical innovation. With that said, however, the question as to whether the home department and its school see this approach as both parsimonious and adding value remains open.

Under a certain paradigm, it can be viewed as economical and efficient means to maximize the numbers of students, causing us to wonder whether educational institutions, at the level of individual departments on up, see the value in teaching innovations. Challenges arising from such a scenario may be exacerbated if expectations on research or institutional service leave little time or incentive for professors to invest in their teaching. Our experience suggests that this sort of an approach may not optimally leverage all existing assets to improve student learning and engagement.

Conclusions

Although there is some pessimism in higher education and many challenges to engaging students in large-enrollment introductory college courses, we illustrate in this case study a hybrid approach, combining elements of traditional lecture and student-centered social constructivist pedagogies, that we argue has been effective in our context and could inspire adaptation to other institutions and course subjects. Other studies support the effectiveness of hybrid approaches (Carrió et al., 2011; Chase et al., 2013), and even suggest that students may prefer these approaches (Minhas et al., 2012). Our own data, though limited, are consistent with the assertion that the development of this particular approach has led to improvements in student engagement. We also assert that hybrid approaches may be attractive because they could be easier to implement than wholesale adoption of a new pedagogical method and serve as a means for faculty to experiment with new tools while

not straying too far into the unknown. Our approach relied on five key features that were reflected in multiple aspects of our course, and which we believe not only individually promote engagement but are also mutually reinforcing: 1) use of small-group activities to facilitate student-student and student-instructor interactions in the classroom; 2) consideration of multiple perspectives and knowledge sources through the use of a diversity of instructional media; 3) leveling of the classroom hierarchy to invite broader participation; 4) creation of cognitive dissonance as a platform for engagement; and 5) high instructor availability to create opportunities for face-to-face interaction.

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Improving the Quality of Assessment Grading Tools in Master of Education Courses: A Comparative Case Study in the Scholarship of Teaching and Learning

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Abstract: This study compares the use and efficacy of assessment grading tools within postgraduate education courses in a regional Australian university and a regional university in the US. Specifically, we investigate how the quality of postgraduate education courses can be improved through the use of assessment rubrics or criterion referenced assessment sheets (CRA sheets). The researchers used a critical review of rubrics from Master of Education courses, interviews and a modified form of the Delphi method to investigate how one can assure the quality of assessment grading tools and their effects on student motivation and learning. The research resulted in the development of a checklist, in the form of a set of questions, that lecturers should ask themselves before writing rubrics or CRA sheets. The paper demonstrates how assessment grading tools might be researched, developed, applied and constantly improved in order to advance the Scholarship of Teaching and Learning.

Key words: Criterion referenced assessment; grading tools; criteria sheets; Delphi technique/model

Introduction

We need to begin by defining our terms and clarifying the features of criterion referenced assessment (CRA). In Australia and the US the tool used in CRA is commonly called an assessment criteria sheet or rubric. An online search of 20 teaching and learning centre websites in both US and Australian universities (27 April 2015) revealed that both terms were used interchangeably. We will do the same in this article. A rubric is a tool for interpreting and judging students' work against set criteria and standards. The rubric is often presented as a matrix or a grid but there are other, arguably better models, for presenting a rubric. Grainger and Weir (2015) evaluated two styles of criteria sheets: the traditional matrix style criteria sheet and the Continua model of a Guide to Making Judgements (GTMJ). More research in this area is desirable. In principle the purpose of a rubric is to make explicit the range of assessment criteria and expected performance standards for a task or performance. The assessor evaluates and identifies the standard of what a student has submitted against each of the individual assessment criteria and provides an overall judgment for the task or performance as a whole. Another term that we need to define, since it underpins the whole

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case study, is quality. We have decided, for the purposes of this study, to define *quality* by means of a hybrid of two common definitions. For us *quality* is best characterised as fitness for purpose and constant improvement.

In a series of articles and keynote addresses, that span almost two decades, Sadler (1987, 2005, 2007, 2009, 2010, 2013) argued that educational institutions are becoming more committed to using criterion referenced assessment in order to promote effective student learning. He provided convincing evidence in the articles that focused specifically on higher education (Sadler, 2005, 2009) on the connection between good rubrics and good learning. This paper provides a specific, comparative case that helps substantiate the assumption that CRA and well written rubrics will increase the quality of learning. Well composed rubrics not only help the student but also force the teacher to be more exact in the formulation of learning tasks. They also simplify moderation processes because moderators use a common set of criteria to judge a piece of work. Rubrics are efficacious in that they do good during their creation as well as their application. The best way to develop and use them is collaboratively. Involving one's peers as well as one's students in the construction and application of rubrics is a cornerstone of CRA. Jonsson (2014) identified that rubrics made assessment tasks more transparent for students and provided them with the tools to unlock secret by involving them in the assessment process. Rubrics provide students with greater ownership and understanding of the rubric providing the option to undertaken self-assessment. This is something we have endeavoured to do in our case study. The fact that the fourth author was a student in the courses that make up the Australian part of our case study indicates our commitment to involving academic staff and students in the process.

Our study was conducted as part of an international peer review project carried out during 2014-2015 by a team of educational researchers from a regional Australian University and their colleagues from a similar sized, regional tertiary institution in the United States (US). The project used the acronym PEER which stands for Postgraduate Evaluation of Educational Research. Although funding was minimal the aim of the project was ambitious, namely to develop a transferable, online, blended learning model of peer review for research-related Masters of Education degree courses. The model was designed to improve the quality of students' verbal and written reports and save universities time and money. The project involved six lecturers and seventy Master of Education students from both institutions. We divided the project into three sub projects, namely a project focusing on online exchange and review of presentations, improving professional peer review in leadership courses and a project where colleagues from the two universities carried out a case study to improve the efficacy of rubrics, particularly in project-based MEd courses. It is this third sub-project that is reported on here.

Comparative Policies Regarding CRA and Rubrics in Australia and the US

In Australia university lecturers are finding that, whether they like it or not, criterion referenced assessment and the associated use of rubrics, is being directly regulated from above. Government in Australia subsidizes universities and, understandably, creates agencies to ensure that taxpayer money is being spent on a quality product. The Bradley Report (Department of Education Employment and Workplace Relations, 2008) resulted in the Australian Federal Government setting up a new agency for regulating universities called the Tertiary Education Quality and Standards Authority, or TEQSA. A key focus for TEQSA is the development of a set of threshold standards for every level of program offered at any Australian university. These are outlined in the Higher Education Standards Framework (Department of Industry Innovation Science Research and Tertiary Education, 2011).

These reforms include an opportunity for universities to investigate alternative assessment frameworks that can accommodate TEQSA's new standards-based assessment mandates. According to item 5.5 of the TEQSA framework (Department of Industry Innovation Science Research and Tertiary Education, 2011, p. 16) there is a requirement to benchmark standards against similar accredited courses of study offered by other higher education providers. In order to carry out this type of institutional benchmarking universities need a common understanding of assessment principles (Boud & Associates, 2010). This includes the use of rubrics. Top down reforms have a knock-on effect. To comply with TEQSA universities, in their turn, mandate the use of course outlines that include assessment criteria for course tasks and tests. Most lecturers feel obliged to develop rubrics that show how students will be judged according to the criteria. The most common rubric they use is the Matrix style shown in figure 1 below, although it is possible to use variations to this model, for example, the 'guide to making judgments' or continua model (see appendix A).

	Standard A	**Standard B**	**Standard C**	**Standard D**	**Standard E**
Criterion 1	Standard descriptor	Standard descriptor	Standard descriptor	Standard descriptor	Standard descriptor
Criterion 2	Standard descriptor	Standard descriptor	Standard descriptor	Standard descriptor	Standard descriptor

Figure 1: Matrix model. Source: Authors

In Australian universities the standards typically refer to High Distinction, Distinction, Credit, Pass, and Fail. Writing the standard descriptors is a challenging task for lecturers who may not be assessment experts. If a criterion for an essay is, for example, that it displays a 'logical argument' the lecturer might resort to using a set of adjectives, such as an 'excellent, very good, good, passable and incoherent' to explain the standard, which leaves the student wondering how the assessor will distinguish between these terms. The use of rubrics in Australia and the US gained significant support towards the end of last century, particularly in schools, but as Popham (1997) asserted, in a provocative article in *Educational Leadership*, '… the vast majority of rubrics are instructionally fraudulent' (p.73). Popham was talking, in the main, about commercially produced rubrics for schools, but many of the points he made in his article remain valid today, particularly in universities.

The United States, in contrast to Australia, does not have a National Authority for regulating quality in higher education institutions. This work is left to accrediting bodies for institutions such as the Accrediting Council for Independent Colleges and Schools (ACICS) as well as for disciplines, for instance, ABET which stands for the Accreditation Board of Engineering and Technology. The US Department of Education takes a more federalist approach toward governing public institutions of higher education. It offers a modicum of support but leaves administrative matters in the hands of the respective state governments. In the discipline of Education, despite recent efforts at standardization, this approach has led to differences in the way states enforce standards for initial teacher education programs and Master of Education courses.

Our project partners at SUNY Fredonia's College of Education teach in pre and in service teacher education courses. Their courses exemplify how differences, between a national versus state accreditation system, can affect assessment and assessment rubrics in

Australia and the US. All initial teacher education programs in Australia not only need to meet TEQSA standards, but in addition devise tasks that enable their students to prove that they have meet the seven standards mandated by the Australian Institute for Teaching and School Leadership (AITSL). The tasks are rarely multiple choice and short answer tests, but they must be published in course outlines that clearly state the criteria by which they will be assessed. These can be audited and universities can lose the right to graduate teachers if they requirements are not met. Graduates from accredited courses have the right to register as teachers via an administrative process in each state.

In New York State the pre-service teachers are required to take a number of New York State Education Department (NYDED) tests, after graduation, in order to gain teacher registration. The tests are composed of multiple choice and short answer questions and are designed to assure the quality of a prospective teacher by checking their knowledge and skills in pedagogy, academic literacy, subject speciality and diversity awareness, among other things. The tests are professionally produced and rubrics explaining how they are marked are available online. For example, in the Academic Skills Literacy Test, the marking rubric for the criterion connected to argumentative writing skills is as follows:

Score Point	Score Point Description
4	The "4" response demonstrates a strong command of argumentative writing skills.
3	The "3" response demonstrates a satisfactory command of argumentative writing skills.
2	The "2" response demonstrates limited argumentative writing skills.
1	The "1" response demonstrates a lack of argumentative writing skills.
U	The response is unscorable because it is unrelated to the assigned topic or off-task, unreadable, written in a language other than English or contains an insufficient amount of original work to score.
B	No response.

Figure 2: Extract from rubric for ALST. Source: NY State Education Department.

For this particular criterion the descriptors are not so different from our earlier example, and again, one would like to know in what way exactly does a student demonstrate 'a strong command of argumentative writing skills'. Once registered, a new teacher must, within a five-year period, obtain a Master's degree in order to continue their certification beyond the initial level. Given the mix of private and state higher education institutions, capstone assignments for the Masters of Education can vary. Within the State University of New York (SUNY) system, which is made up of 64 institutions, a standard thesis acts as a capstone assignment for advanced teacher preparation. Each institution has the latitude to choose the sequence of courses and assignments that faculty thinks best supports the candidates in the writing of their theses. The most common is a three-course sequence involving an introduction to educational research, a course during which students develop thesis proposals and a final capstone course in which candidates collect and analyse the data from their projects and complete the written requirements for the thesis. The lecturers for each course can decide to produce rubrics or not. In our sub project three of the US team had done so and one had not. The style and quality of the rubrics also varied which we discuss below.

The Problem and How to Deal With It

The current emphasis on standards creates new challenges for tertiary educators. They and their institutions need to rethink and renew the tools they use to assess learning if they are to

be a help to learning rather than a hindrance. The problem that our paper addresses is that Popham (1997) diatribe against potentially educationally fraudulent rubrics can be levelled at those being devised by lecturers in undergraduate and postgraduate courses in Australian and US universities. There is no deliberate intention to 'defraud', but in their haste, lecturers are prone to mistake the performance test of a skill for the skill itself and write rubrics that specifically address the criteria relevant to the task or test, rather than the skill. The criteria and the standard descriptors must be general enough that they could be used with another performance test of that skill. On the other hand they should not be so general, as the descriptors of argumentative writing in the NYSED tests are, that there is no clear indication of what one must do 'to demonstrate a strong command of argumentative writing skills'.

Australian and US academics need support in developing the expertise required to take on new and demanding assessment responsibilities intended to assist benchmarking and quality assurance of standards in tertiary education (Boud & Associates, 2010). Our case study helps develop a common language for describing and interpreting assessment criteria and standards, and presents a checklist that lecturers can ask themselves before designing, developing and improving their rubrics. The literature shows that there is a causal connection between the use of well constructed rubrics and increased understanding and learning on the part of students. Panadero and Jonsson (2013), after analysing 21 studies on rubrics, found that rubrics '…have the potential to influence students learning positively' and that 'there are several different ways for the use of rubrics to mediate improved performance and self-regulation' (p.129). In another meta review of rubric use in higher education, Reddy and Andrade (2010) made the important point that students and their lecturers have different perceptions of the purpose of rubrics. The former saw them as assisting learning and achievement whereas their teachers were much more focussed on the role of rubrics in 'quickly, objectively and accurately assigning grades' (p.5). In the USA, at least, their review of the literature reveals a reluctance on the part of college and university teachers to use rubrics. Reddy and Andrade (2010) suggest that lecturers might be more receptive if 'they understand that rubrics can be used to enhance teaching and learning as well as to evaluate it' (p.439). In other words, rubrics need to be seen as formative as well summative in their purpose (Clarke, 2005; Clarke, Timperley, & Hattie, 2004; Glaser, 2014; Glasson, 2009). In our case study we use qualitative research methods to create a checklist of questions that lecturers can ask themselves before writing rubrics or CRA sheets. The paper demonstrates how assessment grading tools might be researched, developed, applied and constantly improved in order to advance the Scholarship of Teaching and Learning.

Methodology

In our case study we combined a search of the literature with three in-depth interviews and two rounds of a modified Delphi Method. The interviews focused on whether good rubrics can motivate and assist the learning of postgraduate students, many of whom are professionals returning to study a MEd course. The interviewees in this study consisted of an Australian expert in assessment, a US lecturer in a MEd course and an Australian student who had recently completed a MEd by coursework. Because of logistics the interviewees responded to the questions via email. We used an analysis of the interview responses to develop a number of themes and pertinent questions connected with the development and quality assurance of rubrics.

The Delphi method has been used extensively in participatory action research although its origins date back to the cold war when it was used extensively as a forecasting mechanism by the Rand Project (Brown, 1968). We modified the Delphi method in that the first set of guiding questions were produced by the authors, who after an analysis of the

interviews and the survey responses, wrote down a set of questions. This first provided a total of 41 questions. These responses were reduced to 20 guiding questions and these were sent out for a second round and the individual respondents were asked to look at them and come up with their best five questions. Their responses (30) were filtered using the same principles of overlap to produce a final checklist of the best ten questions that a lecturer could ask before writing a rubric. To conclude the process the set of 10 questions were sent out to three experts who were chosen because they had published a number of articles on assessment and in the case of two, edited a book on the subject. Some modifications were made on the basis of their response.

Our modified Delphi was designed as a useful methodological adaptation for university academics interested in developing their own Scholarship of Teaching and Learning (SOTL). Although the sorting method has some resemblance to the constant comparison method in grounded theory it differs in that the goal is to reach a consensus on a predetermined issue rather than to build theory. In our Delphi exercise we looked for conceptual similarities, refined categories and looked for patterns (Tesch, 1990) which are all part of a grounded theory approach but our research was applied rather than theoretical.

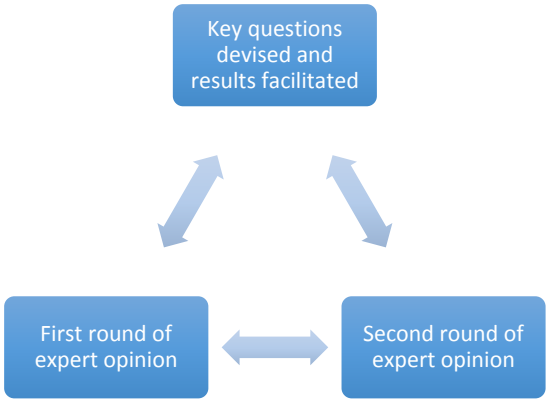


Figure 3. Adapted Model of Delphi Method. Source: Authors

Data Collection and Analysis

Assessment can foster and drive student learning. However, in higher education where there is so much emphasis on grading via written tests and exams the quality of assessment can lead to either surface or deep approaches to learning (Biggs, 2001; Hounsell, 2005). Because higher education is increasingly a form of professional training for teachers, nurses, doctors, scientists, engineers and so many other professions, assuring the quality of that professional preparation is essential. As a result, there has been a renewed focus on improving assessment practice in tertiary education because of its powerful impact on the quality of learning and eventually the quality of the people inducted into different professions (Biggs, 2001; Boud & Associates, 2010). Responses from our interviewees stressed the efficacy of quality rubrics to encourage a deep approach to learning and a sufficient understanding to apply knowledge and skills in a variety of settings.

The three interviewees, represented here by the initials AS (Australian Student), AE (Australian Expert) and AL (American Lecturer), were largely in agreement on a number of points. Their responses, encapsulated in the body of emails and attachments resonated with findings in the literature. AS and AE emphasized the importance of using high quality rubrics in conjunction with assessable tasks. AS said that for students, assessment criteria are integral to their understanding of tasks and success in undertaking them. This is a perspective that

deserves more research in the literature. AS had just completed the required courses for a Masters of Education and reported that fellow students spoke highly of good quality rubrics because of the transparency they provided in terms of the task requirements. The key here is the quality of the rubrics, a point that was underscored in AE's response. Poor quality assessment sheets or rubrics that do not fit their proclaimed purpose can be misleading and confusing rather than motivating.

According to AS the quality and use of rubrics in the courses, including those that are the focus of our case study, varied. In comparing rubrics all three respondents raised a number of key issues that throw light on how CRA and rubrics can help or hinder learning. AS criticised the lack of consistency in formatting, interpretation and approach taken by lecturers but made the observation that these differences meant that engaged students discussed and critically reflected on the strengths and weaknesses of the criteria sheets. The result of such peer review was positive according to AS, but clearly the person who wrote the rubric should have also been involved if we are to accept the findings of Eshun and Osei-Poku (2013), whose study involving 108 university students revealed that students need training in the use of rubrics. In fairness AS did say that certain lecturers discussed the rubric together with the students and made adjustments to it where there were obvious weaknesses.

In AE's response a Continua model of a guide for making judgments or the GTMJ model was presented (see Appendix A). According to AE this type of rubric was becoming more common in the program that is the focus of our case study. The matrix rubrics experienced by AS used *High Distinction* (HD) through to a *Fail* grade in the header for the standards, but some other lecturers used terms such as *Exceptional* through to *Unsatisfactory*. In the response from AL an example of a rubric for an annotated bibliography task was cited. This used ***A*** *Excellent,* ***A-*** *Great bibliography,* ***B+*** *Very good bibliography,* ***B*** *Good bibliography,* ***B-*** *Fair bibliography,* ***C*** *Poor bibliography,* and, ***E*** *Unable to complete assignment*. To compound the problem, according to all three informants, the actual marks that matched the letters were rarely given on the criteria assessment sheet. In most cases, students had to find out what the letters meant in terms of marks from another source.

In the rubrics cited by AS most lecturers provided descriptors for all grade levels from a High Distinction (HD) through to a Fail grade. However, a number of criteria sheets neglected to offer a descriptor below a Pass level, which meant failing students were left outside of the framework. Standard descriptors are a significant reference point for students, according to AS, both during the task development and feedback phases and as such, clarification of the messages within them is essential. According to AE and AL the standard descriptor needs to explain what has to be done using a verb that incorporates the higher level of learning achieved. AS pointed out that it was unhelpful to have a criterion for a task such as 'understands x' and then just add a descriptor under, for example the *HD* column which says 'demonstrates *Excellent* understanding of x'. This is compounded when other adjectives such as *Very Good*, *Good*, *Satisfactory* and *Unsatisfactory* are used in the other grade columns with no indication as to how excellent or satisfactory understanding is actually demonstrated. As AE pointed out, one needs to integrate a taxonomy, such as Bloom, Engelhart, Furst, Hill, and Krathwohl (1956) so that the quality of understanding can be judged by whether or not one has done certain, specified things that demonstrate for example if the student is capable only of declarative knowledge as opposed to being able to contrast, compare and evaluate aspects of that knowledge.

In the studies AS undertook, some criteria sheet formats offered descriptors at only the highest and lowest standards. AS argued that while they contained less detail, the quality of information was sufficient to clearly guide the learning process. According to AS this format placed 'greater emphasis on the criteria themselves rather than the range of standard descriptors, providing scope for differences in approach, creativity and personal style'. AS

added the proviso that 'this format may become problematic when a student attempts to determine why they received a certain grade, and as such its success relies heavily on the assessor providing detailed written feedback'. Both AS and AE mentioned the Masters level skills identified by the Australian Qualifications Framework (AQF) (Australian Qualifications Framework Council, 2011) and raised the question of how the standards descriptors support the broader AQF level descriptors for Master of Education students? AS pointed out the dilemma of finding a balance between highly specific rubrics that provide detailed standard descriptors for all levels (matrix model) or the type mentioned above that only gives the descriptors for the top and bottom standards. According to AS the matrix model 'gives clear indicators for success during the task production phase and a comprehensive checklist within the feedback phase'. AS cautioned that this model 'can divert attention away from learning and towards deconstructing the complexities of the criteria involved'. It can also 'lead the student to believe that the assessor has a specific product in mind'.

Both AE and AL said that they engaged students in a discussion about the rubrics they wrote for their specific course tasks. This was important for students, according to AS who said that interpretation of criteria was a regular feature of discussion within classes throughout the program. All three agreed that when discussion about criteria forms part of the learning, from the start of the course, misunderstandings are reduced. The interviewees all mentioned the problematic nature of inherited rubrics, where the assessor has taken over someone else's course and its assessment rubrics. In that case both assessor and student need to interpret the criteria and standard descriptors. In the cases AS experienced, assessors worked with students to create a shared definition and understanding, aligning the course learning objectives to the assessment criteria. This highlights the need for criteria sheets to be regularly peer reviewed at the faculty level, in order to ensure clarity beyond the author of the criteria sheet.

The interview responses from AE and AS, both of whom were involved with the MEd program that is the focus of our study, stressed the importance of face-to-face feedback to students. They noted that a common practice in the written feedback was to fill out a form composed of the rubric itself with the descriptors within specific standards highlighted and then give a brief, general comment in a lined space beneath the rubric. AS said, that from the student perspective, this offered a precise understanding of where a student sits within the university grading scale but if a descriptor contains several components it can be difficult for a student to determine their level of success. In order to navigate this, and offer students more specific feedback, some assessors highlighted parts of descriptors across different standards. This served to demonstrate that the lines between standard descriptors are not solid, but rather work as a continuum. AS would have preferred a consensus from lecturers in the use of criteria sheets in the feedback phase. A common approach would enable students to engage with the feedback more effectively, rather than seeking clarification from individual lecturers.

In our modified Delphi the forty one responses from the first round covered issues and questions similar to those raised in the interviews. Themes were identified within the 41 original responses which enabled us to reduce them to a set of 20 guiding questions. Each expert was then asked to examine the 20 guiding questions and individually produce a set of the most significant five. The resulting list of 30 questions, which naturally contained considerable overlap was then reduced to the following questions which can be used by academics to develop and evaluate the quality of rubrics or criteria sheets. They are:

1. Does the rubric have criteria that are clear/unambiguous?
2. Do the criteria explain what must be done and demonstrated?
3. Are the criteria knowledge based and skills based at a Masters level standard?

4. Does the criteria sheet have standards identified (i.e., HD, D, C, P, F)?
5. Are the standards' descriptors explicit, devoid of subjective words, and positively worded in terms of what students must do?
6. Are there gradations of quality that differentiate the standards clearly, for example, according to a taxonomy of learning such as Bloom's taxonomy?
7. Is the layout of the criteria sheet clear, not too crowded, uncluttered, nested?
8. Does the task provide opportunities for the students to demonstrate that they have achieved its intended outcomes, graduate attributes and skills according to specific criteria?
9. Does the rubric reflect what students have studied for the task and enable them to demonstrate that they have met its criteria and standards?
10. Does the rubric reflect course outlines as well as graduate attributes and skills?

Results and Discussion

The project revealed significant differences both within and between Australian and US practices when it comes to the use of rubrics in Master of Education courses. The lack of standardization, internally and externally within Master of Education courses at both institutions, is reflected in the variety of grading tools used to mark student work. In our case study, the US lecturers who took Master of Education courses, all used different assessment schedules whereas their Australian counterparts uniformly adhered to CRA and most used a matrix model criteria sheet. One used the continua model of a Guide to Making Judgments mentioned above and exemplified in Appendix A.

We argue that Master of Education courses can be improved, both in Australia and the USA, via a shared understanding of assessment principles and a reform of existing assessment practices, including the instruments used to grade student work. The key is that the tools used to evaluate student learning are truly criterion referenced and standards based, where 'standards are set above the norm with a high achievement focus' (Gittens, 2007, p. 2). Shifts to a standards-based curriculum framework in teaching and learning are in keeping with national and international efforts to standardize and assure research quality. Australia's higher education accrediting agency, TEQSA, will place increasing pressure on lecturers, their departments and their institutions to conform to standardized assessment regimes. Grading tools are a key to quality assurance but our research has highlighted that their design and efficacy for judging student work often varies within and across tertiary education contexts.

In the US, at least from evidence in our case study, there is much more scope for individuality when it comes to writing rubrics. AL conceded that there was 'a good deal of latitude for individual instructors in terms of how they organize their courses' including the writing of rubrics. Fredonia's College of Education (COE), on the advice of faculty working parties, has compiled a handbook on graduate research in education that standardizes the thesis components and submission guidelines. However the development of rubrics, and appraisal of their validity, remains with the individual lecturers. In those instances where rubrics are not used the lecturers explain that they use their professional judgment to allot grades. The use of professional judgement as a quality assurance measurement in the US is partially supported in research by (Banta & Palomba, 2014; Connolly, Klenowski, & Wyatt-Smith, 2012; Klenowski & Adie, 2009; Race, 2006; Readman & Allen, 2013; Sadler, 2013). They indicate that academics who are experienced assessors possess tacit knowledge of what quality in student work looks like. Sadler demonstrated that competent appraisers can consistently identify quality when they see it. This tacit knowledge has been shown to enable assessors to make accurate interpretations of sometimes vague descriptions of student

behaviour in order to discriminate between standards or levels of achievement (Grainger, Purnell, & Zipf, 2008). In some respects professional judgment can act as a fail-safe mechanism to help ensure that experienced lecturers, who inherit defective criteria sheets, can make adjustments so that there is no compromise of assessment integrity and reliability in judging student work. Naturally such lecturers need to rewrite the rubric as soon as possible.

In Australia the matrix style grading tool is commonly used but we have argued throughout this paper that its value depends on the quality of its criteria, standards and standard descriptors. Not all academics understand the rigor needed with criteria and standards based assessment, and it takes some years to get to know how to consistently align evidence of quality with relevant achievement standards. For assessors who are unclear about learning quality, vague assessment rubrics can mitigate against objective judgment of performance and undermine consistency of teacher judgments. Grading tool deficiencies represent a major challenge to what Sadler (2010) refers to as 'grade integrity'. Completely objective judgements of performance become impossible. That is why moderation of grades is necessary. However, it is desirable to aim for the optimum level of clarity in the standards descriptors in grading tools in order to enhance the moderation process.

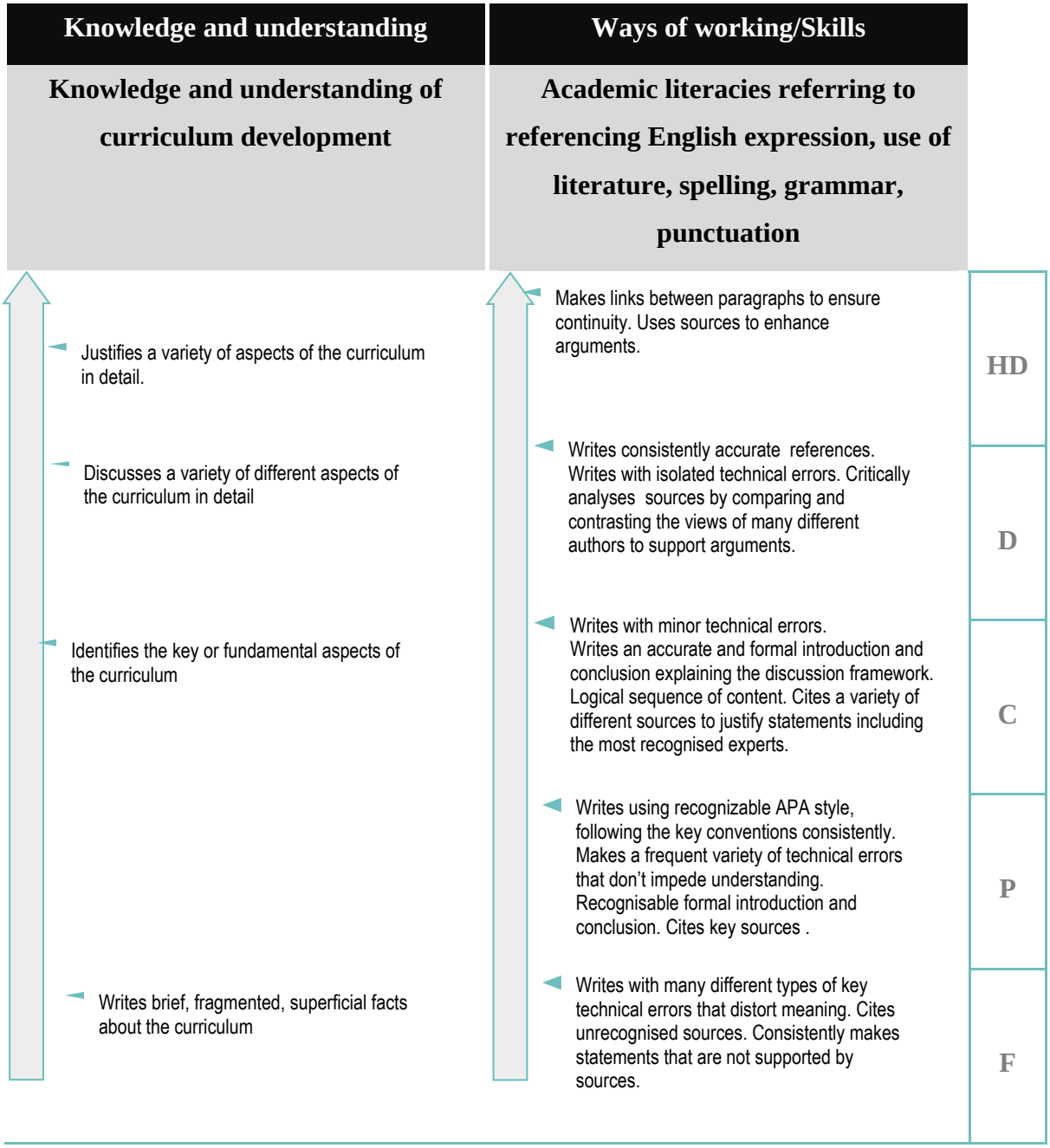
Criteria sheets or rubrics are meant to enable assessors to evaluate the quality of student work as well as guide student learning by making explicit the evidence needed to demonstrate the requirements of the assessment task. These requirements are typically defined in the standards descriptors. Because standards descriptors have more than one purpose and audience, they are not easy to construct to adequately differentiate between levels of achievement. This can result in descriptions of standards that are vague, unclear, indicative only and open to interpretation. Too often it is assumed that the student will be familiar with and understand the language used in the descriptors. Sadler (1987, 2009) argues that standards descriptors must be precise to allow for unambiguous determinations and they must consist of statements that accurately describe the properties which characterise a learning behaviour at its designated level of quality.

We have shown that ambiguous descriptors are problematic for both marker and student, because the required behaviours are vague. The implication for marking is that assessors may be encouraged to ignore the standards descriptors and evaluate student work based on their own criteria, which brings into question the integrity of the final judgement. Evidence of this is reported by Klenowski and Adie (2009). Another major discussion point, raised in both the interviews and Delphi responses, is the issue of alignment. Firstly, alignment of the task and the criteria sheet with the relevant course outline, and then alignment with the graduate attributes and institutional and national requirements.

Assessment is the making of judgments about how students' work aligns with appropriate standards. It serves a number of purposes, including certification, but in terms of learning it should also help students to identify and engage in quality learning (Boud & Associates, 2010). If students are not able to do this as a result of poor assessment practices, the educational purpose of assessment is lost. Rubrics are designed to help assessors make judgments about quality, and justify that quality by using appropriate standards descriptors. They are also an excellent mechanism for giving detailed feedback to students. Boud and Associates (2010) point out that we need specific and detailed information in order to show students what they have done well or not, and how their work could be better. To design, develop and improve on rubrics one needs to ask the right questions. The set of questions that we offer as the result of our study were part of a collegial, international exercise in the scholarship of teaching and learning. Our intention is to make use of the questions to improve on our own rubrics and instigate another cycle of research to see to what extent our students perceive that the revised rubrics help them in their learning. If others follow our example,

then the scholarship of teaching and learning in this area can be shared and deepened in both Australia and the US.

Appendix 1. Example of a Continua Model of a GTMJ. Source: Authors



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Persistent Classroom Management Training Needs of Experienced Teachers

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Abstract: Experienced special education teachers (n=62) were surveyed on their professional preparation to become effective classroom managers. Despite having received extensive preservice training, over 83% of the sample reported being underprepared in classroom management and behavioral interventions. No statistically significant difference was found with respect to the type of classroom management theoretical approach used to train these teachers. Of those (74.2%) who received classroom management training post-graduation, the majority (64%) reported needing still further training in dealing with student behavior. Specific training desired was in whole-class management strategies, as well as in managing behaviors of students with disabilities. Results suggest that teachers' training needs in classroom management may persist throughout their professional careers, even following intensive preservice training.

Key Words: classroom management, teacher preparation, teacher training, special education

A number of researchers assert that pedagogical knowledge is a critical component of teacher effectiveness (e.g. Darling-Hammond, 2000; Berry, Hoke, & Hirsch, 2004; Emmer & Stough, 2001; Kaplan & Owings, 2003; Oliver & Reschly, 2007). This argument is particularly evidenced in studies on classroom management. Positive student achievement gains are regularly found when instruction is accompanied by effective classroom management (e.g. Omoteso & Semudara, 2011; Stronge, Ward, & Grant, 2011). In some studies, effective classroom management has been found to impact student achievement even more than factors such as intelligence scores and socioeconomic status (Anderson, Evertson, & Brophy, 1979; Gettinger & Kohler, 2006; Wang, Haertel, & Walberg, 1993). However, classroom management is rarely taught as a stand-alone course within university teacher education programs; rather, it is content that is usually inserted into other pedagogical coursework (Brophy, 2006; Oliver & Reschly, 2010; Stough, 2006). Such practice within training programs is puzzling in light of persistent reports that preparedness in classroom management is a priority for teachers.

Novice teachers consistently identify classroom management as a primary concern (Brophy, 2006; Nahal, 2010; Watson, 2006). These findings have persisted for over 50 years. Veenman (1984) reported that beginning teachers identified discipline as their most frequently perceived concern in 77% of 91 studies reviewed as part of a meta-analysis. Meister and Melnick (2003) found a nationwide sample of 273 beginning teachers reported managing behaviors as a primary concern, with only 67% believing they could manage the behavioral problems of students

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with disabilities. Most recently, a study of 1,690 first year teachers with limited training in pedagogy reported themselves ill-prepared to handle classroom management or discipline (Kee, 2011).

Novice special education teachers similarly report that university training does not adequately prepare them for their teaching assignments. In a study of 147 new special education teachers from seven different states in the U.S., 60% reported needing assistance with behavior management during their first year of teaching. Further, 83% of beginning special education teachers who needed assistance asked for mentoring related to classroom behavior management (White & Mason, 2006). Likewise, Whitaker (2003) surveyed 156 beginning special education teachers and found classroom management to be one of eight areas in which new teachers wanted additional assistance.

Even experienced teachers report low self-efficacy (Baker, 2005) or a lack of preparedness (Watson, 2006) in the area of classroom management. A sample of 752 experienced educators ranked classroom management, instructional planning, and behavior management as the three most important instructional competencies needed in inclusive settings (MacPherson-Court, McDonald, & Sobsey, 2003). In addition, the majority of these experienced teachers believed that general and special education teachers needed preservice training in behavior management techniques as well as in classroom management (MacPherson-Court et al., 2003). Finally, 64% of a combined sample of 228 novice and experienced special education teachers reported having received insufficient university preparation in behavior management (Mitchell & Arnold, 2004).

Classroom Management and Teacher Preparation

Given the importance of classroom management to teachers, it seems that classroom management training would be a key component of all teacher preparation programs. However, teacher preparation programs differ in the extent to which classroom management is provided. Oliver and Reschly (2010) found only 27% of 26 reviewed special education teacher training programs included a stand-alone course in classroom management. In addition, programs differ in how classroom management is taught (Gilberts & Lignugaris-Kraft, 1997; Stough & Montague, 2015). For example, preservice teachers typically take the same coursework early in their university careers. However, as they progress through their programs, the training paths of general educators and special educators begin to diverge (Stough & Montague, 2015; Stough, Williams-Diehm, & Montague, 2004). General education preservice training typically focuses on content and group instruction, while training for special education preservice teachers tends to focus on modifications of the general education curriculum and individual instruction (Brownell, Ross, Colon, & McCallem, 2005). As a result, classroom management taught as part of a special education program tends to emphasize individual approaches to behavioral problems, rather than whole class management (Oliver & Reschly, 2010). Conversely, when classroom management is taught as part of a general education program, the pedagogical emphasis is on management and procedures for the whole class (Stough et al., 2004). Examinations of teacher preparation programs also suggest that teachers who complete traditional four-year university preparation programs tend to be more skilled in classroom management than are their peers who complete briefer programs such as Teach for America or other alternative certification programs (Brophy, 2006; Darling-Hammond, 2000; Schoenfeld & Feinman, 2012).

However, research on classroom management content delivered in university training programs is limited. In one of the only studies on models of behavior and classroom management

used in teacher education programs, O'Neill and Stephenson (2012) studied graduates from 21 different Australian teacher preparation programs. While teachers reported being familiar with an average of 12 classroom management models introduced during their preservice programs, the number of models they felt confident in using was much lower- an average of 3. However, O'Neill and Stephenson (2012) found that an increase in classroom management content also increased the number of strategies teachers were confident in using in the classroom. Increase in classroom management content also made teachers feel more prepared to deal with student misbehaviors. However, while the components of quality classroom management training have been described in the literature (e.g. Jones, 2006; Stough & Montague, 2015), no research has been done on how differences in content affect teachers' skills in classroom management.

Classroom Management Models

Glickman and Tamashiro (1980) have described three overarching schools of thought regarding approaches to whole classroom management; interventionist, interactionalist, or non-interventionist. For example, Jones' (1987) *Classroom Discipline* can be classified as an interventionist model in that it is neo-Skinnerian and assumes that children need to be externally controlled in order to learn to behave appropriately, while Gordon's *Teacher Effectiveness Training* (1974), can be classified as a non-interventionist approach to classroom management as it assumes that students are self-regulating and thus can learn to manage their own behavior. Gathercoal's (1990*) Judicious Discipline* is an example of an interactionalist approach in that it focuses both on how teachers create behavior systems in the classroom and how to involve students in creating classroom rules and regulating their personal behavior. Martin, Shoho, & Yin (2003) have found that inexperienced teachers are more likely to take an interventionist approach to classroom management than are their more experienced counterparts. In contrast, experienced special education teachers are more likely to reflect on students' typical patterns of behavior than are novice special education teachers (Stough & Palmer, 2001), which suggests that more experienced teachers tend towards an interactionalist approach.

Few studies have examined the quality of teacher preparation programs in special education (Brownell, et. al, 2005) and little research has been done on the classroom management practices of special educators (Brophy, 2006). The purpose of our study was to investigate the extent to which classroom management training prepares special education teachers to address classroom management. We were also interested in how different preservice classroom management approaches might affect teacher satisfaction with their training. We wished to answer the following research questions:

1. To what extent was university teacher preparation in classroom management helpful?
2. What type of classroom management coursework was the most helpful?
3. In which settings did the teachers learn the most about classroom management?
4. What type of training in classroom management was received post-certification?
5. Do experienced special education teachers want more training in classroom management?

Method

In this study, experienced teachers who had graduated from a university training program in special education were asked about the extent to which their training had adequately prepared them for classroom management. Training included 19 courses specific to pedagogy, as well as 6 fieldwork-

intensive courses, representing five semesters of college study. One pedagogy course specifically focused on classroom and behavior management. Training included most of the recommended components recommended by Jones (2006), including classroom management knowledge, low faculty-student ratio, the opportunity to reflect and discuss management issues, a careful process for selecting mentors, and instruction from experienced teachers.

Over the 12 years of the program, six different instructors had taught the required course in classroom management and behavior. In order to categorize the approach presented in the course over this time period, the syllabi of each of these instructors was obtained and analyzed. We examined the different theoretical and training components that were used to deliver classroom management content in these courses. In some cases, the instructors were contacted to clarify the type of content and fieldwork that had been included as part of their course so that we could gain a better understanding of the components of the course. We found that instructors used one of two distinctly different approaches to management. In the first, an interventionist approach was used wherein Neo-Skinnerian theory was the predominate theoretical approach used and the focus was on individual student behavior. In these courses, interventions were individualized and consequences for responding to student behavior was emphasized. In the second approach, instructors used an interactionalist whole-class approach, wherein classroom management theories that addressed group student and instructional management were emphasized. In this whole-class approach, eight different models of classroom management were introduced, however the focus was always on using each of these approaches as part of the management of the whole classroom. In addition, we analyzed if each course contained field based experiences and the extent to which these experiences were integrated with classroom instruction. As a result, we were able to categorize each course as having either a distinct focus on individual interventionist or on whole-class interactionalist management strategies, as well as whether or not each class included a field-based component.

Although there were differences in the approaches used by the instructors, there were considerable similarities in how these courses were structured. All courses had the same course description and were taught by members of the same faculty. Courses were taught during a full 15-week semester as part of a required curriculum in special education. Classroom and behavior management competencies required as part of special education National Council for Accreditation of Teacher Education (NCATE) standards were included in each class. Class sizes were no larger than 35 students, consisted of more than 90% female students, and were taken in cohort during the junior or senior year of the program. Instructors all had at least three years of experience as special education teachers themselves and were either doctoral candidates or held PhDs from nationally recognized colleges of education.

Participants

Participants were graduates of a university training program which produced one of the largest number of special educators in the southwestern U.S. All of the participants had graduated before 2004; therefore, the recruitment pool consisted entirely of experienced teachers. A database of 364 graduates was used to locate participants. Searches were complicated as the sample was relatively young and mobile, as well as overwhelmingly female, many with changes in surnames. Researchers used multiple sources, including university records, state teacher certification records, internet searches, and telephone directories to locate accurate telephone numbers for those in the database. When the current school district in which a graduate was employed could be identified,

the internet, telephone, or email was used to attempt to contact the participant at that district location. Verifiable telephone numbers for 208 graduates were obtained. Researchers attempted to contact each of the 208 graduates a minimum of three times over a period of two months. A total of 62 completed surveys were obtained for a response rate of 29.8%.

Of the participants, 60 (96.8%) were female with a mean age of 28 years old. Thirty-four (54.8%) participants were currently employed as teachers and the majority (59%) had taught for 3 years or more, with an average teaching experience at the time of the survey of 3.6 years. Of those currently teaching, 27 (65.9%) were teaching in a mid-size district, 9 (22.0%) were teaching in a rural district, and 5 (12.2%) were teaching in an urban district. Although there was a slight tendency for more recent graduates to respond to the survey, there were not any significant differences in sex, age, or ethnicity of the participants versus the non-participants.

Employment positions for respondents at the time of the survey included 29 (46.7%) special education teachers, 3 (4.8%) general education teachers, 8 (12.9%) non-teaching school employees (e.g., diagnosticians, administrators), 5 (8.1%) other education-related employees (e.g., private behavior therapists), 7 (11.3%) non education-related employees, and 10 (16.1%) homemakers. Of those respondents who were no longer teaching in the field of special education, factors which influenced their decision to leave included personal reasons (17), career changes within the field of education (8), career changes out of education (4), and negative experiences in previous educational positions (4).

Survey Development

A structured telephone survey was used to collect data for this study. Three of the authors discussed and drafted survey questions for special education teachers. The survey was then piloted on nine teachers who had completed university certified special education programs. The final survey consisted of a total of 18 items including 1 multiple choice, 6 short-answer, 2 Likert scale items, as well as 9 questions pertaining to teacher demographics, preservice training, and inservice training in classroom management. All survey respondents were asked the same set of questions by one of two researchers. A written telephone script containing all the elements of consent, as well as a brief description of the study, was read to all participants. Responses were marked simultaneously on a coding form as the participants answered the survey questions.

Data Analysis

Quantitative data from each survey were coded and entered into the database by one member of the research team while a second researcher checked entries for accuracy. In a few cases, respondents were contacted an additional time to clarify their responses. To code the responses to the open-ended questionnaire items, two of the researchers independently reviewed all responses and then generated an initial list of categories for each variable. A third researcher then created a final list of categories for each variable. The four open-ended survey questions were then coded by the first two researchers. Interrater reliability was calculated to verify category coding; the interrater reliability of coding each category ranged between 80 to 96%. After interrater reliability was determined, two of the researchers examined the incidences of difference jointly and determined which code should be used for further analysis. Descriptive statistics were calculated on the demographic characteristics and t-tests were conducted between several of the quantitative survey items.

Results

To what extent was university teacher preparation helpful?

Participants were asked to reflect on the classroom management course they had taken as part of their undergraduate program and to respond to a series of questions specifically related to that course. Using a 5-point Likert-scale that ranged from "not at all" to "extremely well," participants were asked, "To what extent did this management course adequately prepare you for the classroom?" Fifty-two percent (31) of the participants reported that their classroom management course, regardless of theoretical approach, had prepared them well or extremely well for classroom teaching. Thirty-five percent (22) of the participants reported that they had been prepared "somewhat." Six participants reported that the course had not prepared them very little or not at all. Three respondents could not recall any details about the course that they had taken.

However, the majority (83.9%) of the sample responded that they would have liked even more training in classroom management during their university teacher training program. In response to an open-ended question about what type of additional training was desired, four different categories were generated: general classroom management techniques (24), management-related fieldwork (17), disability-specific strategies (13), and case studies/role playing scenarios (5).

What type of theoretical approach to classroom management was the most helpful?

We examined if coursework received by these teachers had employed either (a) an individual interventionist approach to classroom management, wherein the instructional focus was on changing individual student behaviors, or (b) an interactionalist classroom management approach to instruction, wherein the instructional focus was on how to most effectively manage the class as a whole. Graduates who had received coursework based on an individual interventionist approach were compared with graduates who had received an interactionalist whole-class approach. No statistically significant difference was found regarding preparedness for teaching between the teachers who were taught with an individual-interventionist approach and teachers who were taught with an interactionalist classroom management approach ($t(57) = .042$, $p > .05$, $d = .012$).

In addition, we analyzed the relative effectiveness of those courses that included field-based experiences. Respondents who had taken field-based courses, did not rate these courses more highly with respect to their effectiveness than did participants enrolled in non-field-based programs ($t(57) = .677$ $p > .05$, $d = .179$). In addition, no statistically significant differences were found between these two types of courses with respect to perceptions of how well they prepared the respondents for teaching ($t(57) = -.118$, $p > .05$, $d = .036$).

In which settings did the teachers learn the most about classroom management?

Respondents responded to an open-ended question, "Where did you learn the most about classroom management or behavioral intervention?" Four different categories of responses were coded. Thirty-eight (61.3%) of the respondents reported that they had learned the most about classroom management and behavioral intervention through teaching students in their own classrooms. Sixteen (25.8%) of the respondents indicated that they learned the most from

fieldwork completed before they had graduated, while 15 (24.2%) of the respondents indicated that they learned the most as part of their university coursework. Two respondents (3.2%) reported that they had learned the most through substitute teaching experiences.

What type of training in classroom management was received post-certification?

Respondents were asked if they had received additional training in classroom management after graduation. A majority of the respondents (74.2%) had received additional professional development. Those who answered affirmatively were asked to identify the type of training they had received. Training was received primarily in one of three forms; as part of in-service or workshop education (87.0%), a university course (21.7%), or through a behavioral consultant (6.5%). Specific types of professional development training identified included *Boys Town*, *Nonviolent Crisis Intervention*, *Applied Behavior Analysis (ABA)*, *Capturing Kids' Hearts*, *Consistency Management & Cooperative Discipline*, *Building Better Boys,* and *Love and Logic*.

Do experienced special education teachers want more training in classroom management?

Sixty-four percent of the respondents (40) expressed the desire for continued professional development in the area of classroom management or behavioral intervention. When asked specifically what type of additional training they needed, three different categories of training were mentioned: 40% (16) of these teachers referenced interactionalist whole-classroom management strategies as important, while 25% (10) desired training in managing behaviors associated with particular disabilities (e.g. autism, Down Syndrome, emotional disturbance). Twenty-five percent (10) described other management or behavior-related training.

All 62 (100%) of the respondents believed that a course focusing on management pedagogy should be required for both general and special education teachers. Using a 5-point Likert-scale that ranged from "not at all" to "extremely well," participants were asked, "Is it important to offer a separate course in classroom management or behavioral intervention?" A majority (91.9%) of the respondents felt that a designated course in management pedagogy was either very or extremely important.

Discussion

The teachers in this study overwhelmingly reported they had found their university course in classroom management helpful. Approximately half of our sample had training that emphasized individualized behavioral interventions; while the other half had training that emphasized a class-wide interactionalist approach to student behavior. However, participants in this study felt they had learned the most about management not from their coursework, but from their experiences in the field. Most of these teachers reported learning most through teaching in their own classrooms, while the remainder ranked their preservice fieldwork experiences as being most helpful. Whitney and colleagues (2002) reported similar results about the positive effects that student teaching and fieldwork experiences had on teachers' instructional and classroom management strategies. It has been long reported that field experiences allow preservice teachers opportunities to rehearse instructional decisions and reflective acts (Fuller, 1969; McBee, 1998; Stough, 2006). Many special education teacher training programs currently include field experiences that are tied to pedagogical coursework (Brownell et al., 2005), however little research exists on how these

experiences affect the practice of experienced teachers (Stough & Montague, 2015). Nevertheless, researchers have suggested that students who complete traditional teacher preparation programs are typically more skilled in classroom management than are their nontraditional peers (Brophy, 2006; Darling-Hammond, 2000).

Despite the relatively extensive training they had received, teachers in this study overwhelmingly expressed their desire for more training in classroom management, not only as part of their university preparation, but as part of their ongoing professional development. These findings are consistent with a number of other studies that have found that training in classroom management and the diverse needs of students are ongoing concerns for teachers, even for those who have graduated from highly-ranked university teacher preparation programs (e.g., Baker, 2005; Cardona Moltó, Florian, Rouse, & Stough, 2010; Coalition for Psychology in Schools and Education, 2006; Nahal, 2010; Whitney, Golez, Nagel, & Nieto, 2002). Similarly, training in classroom management has been repeatedly identified by professional teaching associations as both a continual and critical professional development need (see Oliver & Reschly, 2007).

The experienced teachers in this study were asked about specific types of classroom management professional development that they needed. Most (40%) identified general classroom management techniques. Similarly, educators in the MacPherson-Court et al (2003) study reported classroom management topics as a high priority, including proactive classroom management (97%), theories of classroom management (90%), and managing transitions (75%). However, in our study, an additional one-third of the respondents identified disability-specific techniques as their most desired type of training. This finding is probably particular to samples of special education teachers such as ours, but noteworthy in that teachers may believe specialized forms of classroom management exist for teaching students with particular types of disability.

However, the need for classroom management, according to these educators, crossed special education and general education boundaries. One-hundred percent of the sample believed that both special educators and general educators would benefit from training in classroom management or behavioral interventions. Our findings are similar to those in the MacPherson-Court et al (2003) survey in which over 95% of preservice and experienced teachers responded that all preservice teachers – including special education majors and general education majors – should receive training in classroom management and behavior management. Given the increasing inclusion of students with special needs in general education classrooms and the wide implementation of behavioral supports via a tiered system of supports and interventions, it does seem essential that *both* types of training, classroom management *and* behavioral interventions, be taught to *all* teachers, regardless of specialization. Brownell, Sindelar, Kiely, and Danielson (2010) point out that response to intervention (RTI) systems require that special education teachers need to have extensive knowledge related to interventionalist approaches (Tier 3) in order to be effective educators of students with disabilities. Our findings further their call for more extensive preservice preparation of special educators by suggesting that special educators need additional training in interactionalist whole-classroom management strategies as well.

Limitations

While participants in this study rated their coursework as having prepared them well in the area of classroom management, no statistical significance was found between the classroom management approach taught (either individual interventionist or whole-class interactionalist) in the course teachers had taken and the assessment of the effectiveness of the course. Our analysis was limited,

however, by the overall high ratings that these teachers gave to their coursework, regardless of theoretical approach or composition. Further studies with a larger sample would allow for a more powerful analysis on the effectiveness of different classroom management training approaches. Another limitation was that the instructional style of the instructors of these courses may have influenced participant responses, rather than the approach itself. Also, while this sample consisted of experienced special educators, some had left the field or changed teaching assignments after several years in the special education field. A more heterogeneous sample consisting of current special educational teachers would have been preferred but, as has been reported in the literature (Boe, Cook, & Sunderland, 2008), special education teachers change positions frequently in the first decade of their careers. Despite these limitations, our results do suggest that preparation in classroom management is seen as essential by teachers and continues to be valued by them long after their university training has been completed.

Implications

The findings of this study point to the continued and persistent need for classroom management training. This training need extends beyond preservice and novice teachers—even experienced teachers reported a need for continued classroom management training. Further, the findings of this study highlight the importance of classroom management training, regardless of particular teaching specialty. Because of this reported need, school administrators are encouraged to seek out professional development opportunities to support the advancement of classroom management proficiency. Similarly, preservice programs should include opportunities for practice with classroom management skills throughout their training. While our findings support and extend existing literature on the need for classroom management training, further research is warranted on whether similar training needs exist within differently trained teachers (e.g., general education teachers, physical education teachers) or among teachers from other types of preservice training programs.

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Millennial Perspectives and Priorities

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Abstract: Through prioritizing student voice, this study investigated the perspectives of millennial students in relation to their preferences and priorities for how they desired to experience teaching and learning. While not experts, our assumption was that undergraduate students, because of their relatively long experience as students, would be closely in touch with how they preferred to learn. Employing a mixed method study, randomly selected students (n = 291 of a total N = 2,993) completed a brief online survey, and we followed with qualitative focus groups and individual interviews in order to confirm the quantitative data and deepen our understanding of the student perspective. Findings pointed toward particular student preferences and priorities for: teacher behaviors such as caring, passion, and enthusiasm, the communication of clear expectations, course alignment between course content taught and tests, a desire for more real-world examples and applications, and active learning opportunities, all of which, in turn, were generally linked by students to their improved attention, intensity of focus, and ability to engage both in the classroom and during homework.

Keywords: teaching, learning, millennial students, classroom environment, enthusiasm, caring, motivation, student voice

Introduction

When it comes to how college curriculum and instruction may be delivered effectively, researchers have typically ignored or marginalized the voice of undergraduate students. Even large meta-analytic efforts (e.g., Kyriakides, Christoforou, Charalambous, 2013) have reached conclusions that exclude student voice. Hence, by utilizing student voice, this study sought to identify not just key preferences, but more importantly the current *priorities* of millennial students in relation to their experiences with teaching and learning.

Globally, universities are investigating the use of teaching performance indicators for performance-based funding and for benchmarking purposes (Marsh et al., 2002; Prosser & Barrie, 2003; Barrie et al., 2005). Because student voice provides an essential perspective, this study presents data from current millennial students aimed at enhancing the current research on course design and instructional approaches that may effectively impact student learning.

During the fall of 2013 and spring of 2014, data from students were collected. Our ultimate intention was to seek data that might lead to, improve, or at least call into question, how faculty go about their teaching so that students might become more motivated and/or improve their learning. Hence, we asked relatively basic questions about what really mattered to students when it came to how they preferred to be taught and how they thought content and different teaching approaches could impact their learning.

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Problem & Context

Clearly, many college students are "Academically Adrift" and have been for some time (Arum & Roksa, 2011). Today, student opinions on teaching and learning, while gathered, are not typically valued or considered to the point of making significant changes in curriculum or instruction. One typical exception may be an instructor's mid-term request for students to offer formative, anonymous feedback to questions such as: "Thus far, what specifically is helping you learn in this course? What specifically might be hindering your learning in this course? What specific suggestion do you have for providing a better learning experience in this course?" Even in this context, schools often suggest, but do not require teachers to work toward improving their teaching practices, and so teachers may lack a motivating reason to pursue improvement or to risk trying new approaches. Furthermore, while administrators may evaluate the "overall" score of teachers, they may only require that a minimum average number is met.

Typically, administrators do not know whether a teacher reads or employs their student evaluation scores for making improvements. Teachers themselves may not care to read, reflect upon student evaluations, or adapt their teaching accordingly. Teaching and learning, however, are typically challenging and intimate practices that deserve more attention, thought, and responsiveness from the perspective of students in our study. Hence, how may teachers improve the overall classroom experience and learning outcomes that may be derived from today's student preferences and priorities? As such, our research attempted to better know how students perceive the functioning and quality of their teaching-learning experiences.

This study focused on a large state institution located in a small mid-western town with a Fall 2013 on-campus enrollment of approximately 20,000 undergraduate students (88% White), with a six-year graduation rate hovering around 56%. Of the almost 1,100 faculty members, approximately 60% were full-time tenure/tenure-track and 40% were adjuncts, all incentivized in large measure by the overall average score on a student opinion survey (SOS) taken at the end of each semester. It should be noted that the SOS questions are not constructed within a learning paradigm (i.e., the basic questions ask students about how a given instructor is teaching, not about how that teaching relates to actual student learning), and that this type of instrument for teacher evaluation has been largely held in disregard by the preponderance of evaluation research over the last 30 years.

Because an SOS score may be heavily weighted in tenure, promotion, and reappointment decisions, faculty may fear a low SOS score from students in a particular class or set of classes. Consequently, faculty are often reticent to take any perceived risk with their instruction in fear of how their students will rate them or potentially comment negatively on the SOS form. Such fear or reticence often constrains faculty from implementing or even considering new teaching/learning methods. The other limiting factor with SOS scores is that they arrive in the hands of an instructor at least two to three weeks after the conclusion of a course, thus precluding any data-driven instructional adaptation by an instructor during the semester.

Another challenge is that faculty members are generally unaware of what a particular group of students prefer regarding delivery of instruction (at least until after the semester ends). Faculty may have goals and know that *they* want to do, for example, to engage students better in their readings/lectures but they do not actually grasp what students want during a particular semester. However, because faculty are mostly untrained in the art and science of teaching, they typically are not familiar with how to proceed or fulfill their instructional goals, often using, if any method, trial and error or the methods they experienced under their past instructors. In one study, only 8% of the professors reported taking "any account of research on teaching and

learning in preparing their classes" (Bok, 2006, p, 50). Most faculty do not know much about or the importance of evidence-based teaching, nor are they typically rewarded for same, thus leaving them unaware or unmotivated to try new instructional methods.

Assumptions and Research Question

In light of the foregoing problems and teaching-learning concerns, we assumed that if faculty knew more about what is most important to their students *before* planning curriculum and instruction, they could then focus their efforts in ways that deliver content in a more informed, timely, creative, and confident way, which would then enhance faculty efforts to encourage a more robust learning transfer in collaboration with their students. Thus, the goal for this study became the gathering and analysis of current student perceptions regarding their content, course design, and instructional preferences, from which our research question followed: What do students prioritize and thus prefer to experience during a course that helps them to learn?

By exploring what students prefer, faculty may better understand how to direct their teaching efforts, thus reducing inefficient or ineffective directions, methods, or investments of time and energy. Student voice and their preferences matter. Students are the ones who ultimately invest in the education system in which our society also invests and so heavily values. To understand a student, in effect, is to understand a client, and thus it becomes critical that institutions of higher learning carefully consider the preferences and priorities of students. To this end, our research seeks to provide indications as to what students want to experience when they enroll for an undergraduate degree.

Teaching is ultimately difficult because it is meant to evoke substantive strides in student learning outcomes. Sir Ken Robinson (2014) concludes that "Teaching, properly conceived, is not a delivery system," and cautions teachers that:

> You're not there just to pass on received information. Great teachers do that, but what great teachers also do is mentor, stimulate, provoke, engage. You see, in the end, education is about learning. If there's no learning going on, there's no education going on. And people can spend an awful lot of time discussing education without ever discussing learning. The whole point of education is to get people to learn. (2013, video)

Accordingly, this research affords faculty a window in which to view those student perspectives about that which is most important to students in relation to their learning.

Literature Review

In addition to the studies above, the main research that informs our study came from several different though related areas of investigation. While education researchers have not delved into nor prioritized student perspectives as to what impacts teaching and their learning, some studies have been done that are subject or discipline specific. Typically, however, these studies do not lead to strategies or factors that impact undergraduate teaching and learning.

Specific evidence related to how teaching impacts student learning appears to be vital. For example, Sanders and Rivers (1996) found that: "The single most dominating factor affecting student academic gain is teacher effect (p. 6)." This is supported by Wenglinsky's (2000) analysis as to how "changing the nature of teaching and learning in the classroom may be

the most direct way to improve student outcomes" (p. 11). Research has typically focused on student ratings of individual classes, notably the ratings of individual teachers and their practices, while other studies have focused on students' perceptions of the learning environment across their collegiate experience, and how their perceptions are related to study methods and subsequent learning outcomes (e.g. Ramdsen & Entwistle, 1981; Crawford et al., 1998; Lizzio et al., 2002).

Students may not be motivated to learn when faculty deliver course content in a low-key, matter-of-fact way, essentially devoid of overt acts of caring. The old axiom in relation to students still rings true: "They don't care how much you know until they know how much you care," and is supported by Dweck (2007), who performed decades of research on achievement and academic success. She poses a related question: "Do teachers have to love all their students?" and concludes that: "No, but they have to care about every single student" (p. 197). She concludes that a little bit of care can go a long way: "When teachers are judging them, students will sabotage the teacher by not trying. But when students understand that school is for them - a way for them to grow their minds - they do not insist on sabotaging themselves," and goes on to state: "It is common for students to turn off to school and adopt an air of indifference, but we make a mistake if we think any student stops caring" (p. 201). This refers to the idea that learners need to be made aware of their potential to learn a subject, and need to believe that their teachers want to guide them along that process. In this way, students appear to value their teachers' intentional, overt, caring guidance.

If caring is a key to students' motivation to learn, Nel Noddings offers the seminal research in this area. Drawing on the work of Martin Buber, she railed against the mere presentation of disciplinary content, and, unlike cognitive developmentalists, emphasized instead the moral necessity to exhibit caring in one's teaching, leading her to ask "what are we like" when engaged in an act of caring (Noddings, 2002).

Noddings (2002) observed that an essential characteristic of caring is receptive attention, whereby two basic steps happen in sequence:

a. a teacher's 'motive energy' flows toward the student via an act of caring,
b. a recognition that an act of caring has transpired and a reciprocal response on the part of the student that is hopefully helpful in some way.

Thus, a connection is made between teacher and student(s) where both give and gain from the experience. In order for this connection to work over a longer term, like a semester, the teacher would be "one who fairly regularly establishes caring relations and, when appropriate maintains them over time" (Noddings, 2002, p. 19).

Through specific processes, an ethic of caring may have the potential to positively impact the classroom. Noddings (1998) conceptualized four processual components: modelling, dialogue, confirmation and practice. Modeling, she posited, is where "We do not merely tell them [students] to care and give them texts to read on the subject, we demonstrate our caring in our relations with them" (p. 190). Dialogue and confirmation, because caring can be manifested in many different ways, affords a way to explain, critique, and gain feedback about acts of caring in order to confirm, disconfirm, or modify caring practices and their implications. Finally, if students are to produce a habit or 'mentality' toward acts of caring, they should have ample opportunities to practice and reflect upon their experiences of care and caring. As such, with the

work of Dweck and Noddings in mind, readily apparent caring on the part of faculty may have important links to student motivation and improved learning outcomes.

In addition, motivating or affording opportunities for students to care more about and intensify their efforts in a course may be linked to key teaching strategies. In accord with our observations during presentations of our research to faculty across the United States, the Heath's (2007) similarly cite evidence that while "Managers have to make people care enough to work long and hard on complex tasks" and "activists have to make people care about city council initiatives, . . . teachers have to make students care about literature" (p.168).

Motivating students to learn may transpire in a variety of ways. The Heath's (2006) illustrate that teachers can motivate their learners to care by transforming and conveying content in the form of a story. Via stories, students associate prior knowledge and emotions from their own personal experiences with the emotions that people in the stories may be feeling, enabling them to create "memory hooks" with the content in a lecture, discussion, or lesson. "It's not about pushing people's emotional buttons, like some kind of movie tearjerker," they write, but rather, "the goal of making messages 'emotional' is to make people care" (p.169).

Emotion-based inspiration to take action may also be fostered and sustained with a teacher's passion and enthusiasm. From their synopsis of the research, the Heath brothers (2006) suggest that: "Feelings inspire people to act" (p. 169). Research also distinguishes and indicates that enthusiasm for teaching, rather than enthusiasm for the subject matter, may be more important to student motivation (Kunter, et al, 2008). Brophy (1986), in his review, identified teacher enthusiasm as one of the main keys for promoting student motivation.

Positive energy enthusiastically presented may also be inspiring and motivational for students. Linda Nilson (2010), founding director of Clemson University's Office of Teaching Effectiveness and Innovation concludes in her book, *Teaching at Its Best: A Research-Based Resource for College Instructors*, that: "Enthusiasm is contagious. You're showing some of yours for the subject matter and the opportunity to teach it will motivate your students' interest in learning it and inspire their respect for you as a scholar" (p. 45).

How then might a teacher reveal his or her enthusiasm? Nilson (2010) encourages teachers to:

> Deliver [your] presentations with enthusiasm and energy. Strive for vocal variety and constant eye contact. Vary [your] speaking pace, and add dramatic pauses after major points. Gesture and move around the class. Be expressive! To [your] students, be they right or wrong, [your] dynamism signifies [your] passion for the material and for teaching it. As a display of [your] motivation, it motivates them. (p. 55)

Thus, students may become more willing and better able to learn from a teacher who shows enthusiasm. Nilson (2010) also found that teachers should use a variety of motivational strategies to reach different segments of the student population. As students expressed themselves during our focus groups and individual interviews, their excited, intense emotional tones were evident. Students said they were craving a more personal, caring, and enthusiastic demonstration from faculty during a learning experience. Stemming from our assumptions and the literature above, we turn now to the main details for how we conducted this study.

Method

Deciding that a mixed method approach was an effective way to capture data that answered our research question, we implemented both quantitative and qualitative methods to collect and analyze data. In addition to the context above, and in order for the reader to make decisions about generalizing any findings to another context, below are the salient details of our method so that the reader is afforded a more informed opportunity to determine the utility of this study for their own purposes.

The main purpose behind our online survey was to collect data broadly, then to use the focus groups in order to dig deeper into the results of the survey. Thus, the survey questions were designed to offer an array of possible choices for the students to pick from, using terms that they broadly understood. In order to identify terms that were commonly understood by students, we piloted the questions and answer choices with students, eventually ending up with terms that were easier to understand. Still, we assume that some students did not answer a question or make choices that were absolutely clear to them.

In order to create a more student-centered survey, the process for designing this study and collecting data, that addressed teaching behaviors and learning strategies, began in close collaboration with administration and highly-skilled, experienced instructional designers at the university. These designers have, combined, decades of experience in both teaching and working closely with faculty via observations, individual consults, workshops, as well as in-class focus groups with students. Their background and experience doing research helped to inform production of the survey, the piloting process of the survey questions, as well as the focus group question sets. Their assistance afforded degrees of confidence regarding our direction and method as we moved forward with the investigation.

Prior to collecting and analyzing data, and similar to establishing inter-rater reliability, we asked students to explain their understanding of the terms and questions in the survey. We made changes based on feedback from students (during the piloting phase) so that the terms and questions were clearer, with randomly selected students providing agreed upon definitions and examples of the terms in the survey, with only a handful of students who wanted further clarification.

The survey, constructed in SurveyMonkey, included both rank-order and open-ended questions. For example, students were asked to rank their preferences among teaching strategies. The ranking questions included answer options that were strategies carefully put together in collaboration with experienced instructional designers at Central Michigan's Faculty Center for Innovative Teaching. Open-ended questions were asked of students aimed at mining their personal experience in the classroom or online. In the survey, students were mostly asked to rank (top two) what they perceived as most effective among the teaching strategies presented to them. The five specific areas they were asked to rank included methods or strategies for: course design, student engagement strategies, active learning strategies, assessment, and attention/level of focus.

In order to gather qualitative data, we posed two open-ended questions in the survey with the purpose of revealing any patterns as to what it was that students viewed as most important in a formal educational setting, as well as what they believed would specifically help or hinder their learning. After the survey results were collected and analyzed, patterns were identified which were further probed during semi-structured focus groups and interviews with groups of randomly selected students (sophomore level and above). We wanted to know if these students agreed with

the data, including the calculated averages) from our survey. Hence, we were able to delve deeper into more precise reasons as to *why* we got the results we did, gathering detailed stories and concrete examples (in the results section) in the process to further mine the data from the surveys and develop likely implications.

Sample

In order to collect quantitative data, we constructed a sample of experienced on-campus students that were randomly chosen and stratified by grade level (sophomore, junior, and senior) for each of the six colleges within the university (Health Professions, Business, Science and Technology, Humanities and Social Sciences, Communication and Fine Arts, and Education). Specifically, we randomly selected, per college, 10% of the sophomores, 10% of the juniors, and 10% of the seniors; resulting in 2,993 students at the university. The response rate to the online survey was 9.7% (n = 291 students). Some of the key demographics of the respondents include:

- 88% Caucasian/White, 12% minority;
- 6% sophomores, 31% juniors, 50% seniors;
- less than 2% graduate students, and
- 11% transfer students.

There was also a relatively even distribution of students from each of the six colleges, with a range from 13.2% to 20.7%.

Results & Discussion

The results were intended to help answer our query about what students prefer and prioritize in relation to their teaching-learning experiences. Both the online survey results (see Table 1 below) and focus groups yielded salient results. For example, when students were asked in survey question one about which "Course Design Strategies" they preferred (keeping in mind that they were afforded multiple choices), almost two-thirds (65.5%) wanted "instructor provided notes, projects, quizzes, and exams," followed by almost half (49.2%) who indicated that they wanted a syllabus that included a detailed class schedule. What students didn't appear to prioritize (12.4%) were communications with their instructors outside of class, and they didn't appear to value a discussion of class policies (4.4%).

Other highlights in the results included:

- When asked about preferred "Active Learning Strategies" in Question 2, almost three of five students (59.2%) responded with the preferences "hands on," "interactive labs," or "experiential activities."
- When asked about their engagement strategies in Question 3, 76.4% of the students preferred that their learning be related to the real world, whereas they indicated little preference for creative (17.6%) or reflective thinking (12%) types of engagement.
- When it came to assessment strategies (Question 4), students rated highly their preference for instructor timeliness (66.4%).

- Question 5 asked about how attention was best obtained and maintained, and constitutes perhaps our most striking result: four out of five students (80.4%) indicated that an instructor's enthusiasm was a major factor for gaining their attention for learning.

Table 1. Results (ranked in descending order by percentage).

Question 1: Top Two Preferred Course Design Strategies?

Instructor provided notes, projects, quizzes, & exams are all related	**65.6%**
Syllabus includes a detailed course schedule	**49.2%**
Instructor creates clear expectations of student performance	**35.6%**
Homework assignments relate to course objectives	**32.8%**
I have the opportunity to communicate with my instructor outside of class	**12.4%**
Policies are discussed clearly	**4.4%**

Question 2: Top Two Preferred Active Learning Strategies?

Hands on, interactive labs, or other experiential activities	**59.2%**
Class discussion involves Q&A	**44.8%**
Case studies involving problem-solving exercises	**32.4%**
Brainstorming, categorizing, & prioritizing activities	**28.4%**
Partner or group activities	**19.2%**
Self-assessment activities such as pre and post surveys	**10.8%**
Learning through completing community service projects	**5.2%**

Question 3: Top Two Preferred Student Engagement Strategies?

Real-world connections are made	**76.4%**
Class environment is stimulating	**50.0%**
Course content is linked to possible career goals	**44.0%**
Discussions and examinations require creative thinking	**17.6%**
Opportunities to reflect on my learning	**12.0%**

Question 4: Top Two Preferred Assessment Strategies?

Timely feedback on quizzes, exams, projects, & homework	**66.4%**
Projects	**31.0%**
Labs	**23.2%**
Presentations (oral and/or with media)	**18.8%**
Writing down/turning in a note about the most confusing part of class that day	**16.8%**
Journals (reflection)	**16.4%**
Writing assignments	**16.0%**
Service-Learning projects	**6.8%**
Capstone projects	**4.0%**

Question 5: Top three things that caused you to pay attention and learn in class?

Enthusiasm from your instructor	**80.4%**
Short lecture	**39.2%**
Problem-solving activities	**36.4%**
Instructor works problems on the whiteboard	**32.4%**
Challenges to your creativity	**29.6%**
Small group discussions	**26.8%**
Large group discussions	**25.6%**
Powerpoint presentation	**25.2%**
Long lecture	**4.4%**

In the last part of the survey, students were provided an open-ended question to answer: "What specific things make it easy for you to learn?" Without further prompting, 42% of the student responded with one or more of the following words:

- "care" or "caring"
- "passion" or "passionate"
- "enthusiasm" or "excitement"
- "energetic" or "fun"

Students explained that such behaviors would help them to better engage in their learning experiences.

Like with all questions, we followed-up during focus groups (three total, with six to ten students each) and individual interviews (eight) to explore these and other factors more in-depth, and these students also confirmed that caring, enthusiasm and similar behaviors were vital in order to motivate them to invest more time and focus to learn course content.

The responses to the survey, combined with remarks captured during focus groups and individual interviews, appear to reveal a particular longing that students have for faculty who genuinely care, who have passion, and who are enthusiastic. In particular, students want to feel cared about, and they want to feel that what they learn is worth caring about. For example, one student (63) stated, "I can handle hard exams and difficult writing assignments. In fact, I enjoy being challenged. But the amount of work I'm willing to do is directly related to how much the professor cares."

Discussion

A summary of salient patterns indicates that what hinders students from learning, in their opinion, is a lack of four things: appropriate level of challenge, stimulation, passion/enthusiasm, and caring. This finding adds to and supports the research of Dweck (2007) that emphasizes how caring improves student motivation to learn.

We also wanted to understand some of the specific teacher practices and behaviors that students believed to be disruptive to their learning, and thus the question: "What are specific things that make it difficult for you to learn?" One pattern that emerged in the focus groups and individual interviews was reflected in one student's (8) view of most of his classroom learning environments: "Boring and not usually challenging enough." Another student (38) said: "I have trouble paying attention to a teacher who talks the entire class period. I will start daydreaming 15-20 minutes in." Such a dearth of attention is often supported in the literature on the brain and attention span which, for example, found that a typical student's attention span ranges between 5 and 12 minutes (Richtel, 2010; Vidyarthi, 2011).

When it comes to how teachers may hinder learning, one student (69) wrote about, "lack of engagement in class, unmotivated professors, constant note-taking instead of conversation, and lack of creativity." Another student (103) was frustrated due to a lack of feedback from students to instructor: "Professors who do not take the time to question their teaching strategy and if it is actually working," are typically "not getting feedback from students [which] prevents them [professors] from presenting the material in the most effective way."

While students are not experts in curriculum or instruction, we asked them to consider their experience and then preferences in relation to a few course design practices. In survey question one, their preferred course design strategies related to:

1. Instructor provided notes, projects, quizzes, & exams are all related (65.6%);
2. Syllabus includes a detailed course schedule (49.2%);
3. Instructor creates clear expectations of student performance (35.6%);
4. Homework assignments relate to course objectives (32.8%)

While the implication may be that students are not experiencing these strategies or techniques, they also indicated via their number one preference above and in their comments that the

instructor should design a given course that creates a clear and precise pathway to a good grade, an expectation that is both warranted (yes, course alignment is essential to better learning outcomes) and yet troublesome (shouldn't instructors expect students to take their own notes?).

Assessment is also a part of course design. Two-thirds of the students emphasized that alignment of what is taught with their exams helped their learning to be more effective, and an equal percentage said they would prefer more timely feedback on exams and project work. Almost half said that a clear, detailed schedule in the syllabus contributed to their success in a class. When asked, the reason students appreciated timely feedback on exams and projects was because it allowed them to have closure with the information upon which they were so focused, before being exposed to new content requiring a more focused type of attention.

While not surprising in the light of current research, 60% of students said that hands-on experiential activities get them more engaged and act as a pivotal aid to their learning. In the same vein, 45% say class discussion involving question and answer (Q&A) is what they would prefer for a class activity. Students were emphatic in their preference for quality Q&A, that is, being challenged by their instructors with tough questions followed by hearing other student views on the material being covered. The key ingredients to a quality Q&A appear to be rigor, a real-world connection, and a teacher who strategically mediates and facilitates the flow of conversation.

When asked to rank their top two preferred engagement strategies, 76% of students said they benefitted when real-world connections were made in class. With their second and third preferred option, 50% of students chose how the class environment should be stimulating (that is, they felt more like engaging with given content), and 44% said that they were more likely to feel engaged when the class content related to the real world or their career goals. Of special note, students felt more stimulated and likely to participate in class when it was clear that opportunities to use critical thinking would not be subject to any kind of grading.

Students generally worried about their grades in a given class, so we asked them to rank their top two preferred grading strategies: 53% of students said that three to five small exams helped them to take more away from each lesson; 39% said that several small quizzes contribute more to their learning, priorities that also held true in the focus groups. Students said that the longer the amount of time between the exams, the larger the amount of information they would be required to memorize, which may illustrate that students want to become more intimate with the content they are learning, and would appreciate more learning and less memorization.

The question with the highest consensus was in relation to student focus: "What three things cause you to really pay attention and learn in class?" Four of five students (81%) said that enthusiastic teachers cause them to really pay attention and learn in class. During the interviews, students revealed relatively intense emotions on this topic. When asked what an enthusiastic professor looks like, several students ruled out a need for "edutainment." Instead, they simply wanted the instructor to show some sincere emotion, reasoning that why should they care about what an instructor is teaching if his or her emotion is flat or there's no overt indication of caring. Students said hand gestures, body language, tone of voice, pace, facial expressions and upbeat attitude were ways that instructors could display enthusiasm. Students were also attracted to enthusiasm because they respected people who put greater effort into their work.

In the last open-ended survey question, we wanted to know more precisely what teachers could do to help students learn and get more out of their education, asking: "What are specific things that make it easy for you to learn?" One student (63) explained: "When a professor is enthusiastic and genuine, my ability to do well in the classroom skyrockets. Nothing means more

as a student to have a professor who truly cares." This may indicate that students are receptive to an instructor's energy and are able to notice when a professor is sincerely trying or not. With a slight but significant twist, one student (46) added: "Enthusiastic instructors who really enjoy teaching and really love the subject help me to learn." This reminds us again that students can tell if a professor loves what they teach or not. Students need to feel that the material is important to the instructor, generally ascertained through his or her degree of passion or enthusiasm.

Asking questions and collaboratively working through appropriate challenges were important to students, one (198) saying that what helps is: "Engaging teachers that ask questions through the class so you have to pay attention." In order to gain further elaboration, students in a focus group queried: "Why wouldn't you have to pay attention otherwise?" Their input indicated that often times an instructor will try to fit too much information into one lesson plan, who then ends up talking the entire class period, which then leads to weakened attention and students who let their minds wander. Students wanted to participate in a lesson plan that was more "engaging and challenging, but not too challenging."

When it came to likeability, one student (48) said, "I like when a professor is personable and tries to tailor the class to the specific group of individuals in that class instead of having one way to do things for everyone." In a focus group, when asked what difference it made if a teacher is personable or not, and more precisely what personability has to do with learning, students claimed that all it took was an effort to get to know them personally "before cramming information down their throats." Students viewed instructor personability as a sign of respect, like getting to know their names or favorite songs, and were more likely to reciprocate with greater effort during the semester. Students said they were more willing to work *with* a professor rather than to work *for* a professor.

Conclusions and Implications

Our study brings to surface a relative consensus among a subset of millennial undergraduate students regarding their perceived preferences when it comes to teaching and learning. By the end of our investigation, we came to know more about what appeared to be significant and legitimate student perceptions in relation to classroom teaching and learning. While students are not experts in curriculum, course design, or instruction, the major implication of our study appears to be that students do indeed have marked preferences when it comes to how they are taught, and that modifying curriculum, course design, and instruction in accord with such preferences may lead to either increased student motivation, focus, and/or improved student learning outcomes. Of course, any such linkages would be apropos for further investigation.

Future research into student perspectives is ripe with possibilities. For example, whereas we focused data collection in the classroom, online students may have a very different set of preferences and priorities. Also, faculty historically don't pursue behavioral changes to their teaching, so asking teachers why they don't do this could be of great interest, or conversely, what motivates faculty to undertake changes that respond to student opinions? Another area involves student attention and focus. While we touched on this, what are more effective ways to capture student attention and develop greater focus among millennials and students of the digital age? Additional studies could gather data as to what students specifically identify as caring or as enthusiastic behavior. Finally, while this study generated some focus group data as to *why* students prefer, for example, passion or high energy, more study is needed as to the reasoning behind the effectiveness of certain preferred behaviors or teaching practices.

As far as lessons learned, starting with a larger initial sample would have most likely increased the number of survey respondents. We could have been more intentional about gathering data and reached out to more diverse and/or international student groups in order to augment or enrich the data set. Segmenting the data by ethnicity or by international students may have yielded a broader perspective and different preferences. In reference to methodology, employing a mixed method approach yielded both a breadth and depth to our data. The number of survey questions, seven, seemed to be about the right amount (no students complained about the length of the survey and all respondents completed the survey). We also came to appreciate the eagerness and desire with which students shared their ideas and opinions.

In summary, students appear to want teachers who teach with heart, that is, with passion, enthusiasm, and caring, which may in turn be vital practices for increasing student motivation to learn. Overall, without prompting the students, 42% of the responses from the open-ended survey question included the following words: care, passion or passionate, enthusiasm or excitement, energetic or fun, and interaction or involvement. Students appear to need and want these things in order to better engage in their classes and coursework.

By extending the work of Noddings (1998, 2002) and her ethic of caring, we may also conclude that teaching is never a choice to focus on either curriculum or instruction. Students want a curriculum that is challenging and that makes real-world connections in order for their learning to become more meaningful. Students also want a teacher who does not merely deliver the curriculum with a pro-forma approach. They want a teacher who cares, learns their names, who is personable, passionate, makes course expectations clear, and who challenges their thinking through active learning.

Students today are widely subject to boredom and a litany of distractions meant to keep boredom at bay: online video, video games, TV, texting, tweeting, skyping, and music that's available 24/7. Focusing young adults on challenging course work presents teachers with a major challenge: to keep students mentally engaged and emotionally involved once they are in the classroom or online. When students elaborate, they indicate that teachers who exhibit positive energy is motivational, that body language or facial expressions indicating passion starts to capture their attention and tends to increase their responsiveness. Teachers might do well to reflect from this student perspective and ask: "Would I want to take my class? Am I creating a culture in the classroom that increases motivation and at least potentiates improvements in student learning over the course of an entire semester? Could I make my expectations clearer, provide more real-world connections with more active learning methods, and approach teaching with greater passion, enthusiasm, and caring?"

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The Road to Redemption: Reclaiming the Value in Assessment Retention Exams

Trey Stohlman[1]

Abstract: A good assessment plan combines many direct and indirect measures to validate the collected data. One often controversial assessment measure comes in the form of retention exams. Although assessment retention exams may come with faults, others advocate for their inclusion in program assessment. Objective-based tests may offer insight to instructors about course objectives that students comprehend well and other concepts that need more attention. This research shows that using retention exams as an assessment measure can generate useful and meaningful data for both the students and the program. Students can learn strengths and weaknesses based on scores. Faculty and programs can learn where gaps may exist within the program. But, whenever a program decides to use retention exams as an assessment tool, faculty members need to be included in the process. Discussions about content need to occur constantly. Exams need to consistently reflect current standards and student learning objectives. And faculty need to stay involved in the process to know exactly where any inconsistencies may lie within their courses, and how they contribute to the students' overall experience within the program.

Keywords: retention exams, program assessment, faculty buy-in, objective-based testing

Many instruments exist for program assessment. Some use direct measures such as final course grades which show comprehension at the completion of the course. Others use indirect measures like feedback from alumni. These data from alumni give organizations feedback about what is currently happening in the industry to ensure students stay competitive with their peers at other institutions. A good assessment plan combines many direct and indirect measures to validate the collected data. "Because any one assessment is imperfect and imprecise, collect more than one kind of evidence of what students have learned" (Suskie, 2009, p. 38). One often controversial assessment measure comes in the form of retention, or exit exams. Banta and Palomba (2015) defined these objective-based exams as instruments that allow students to "demonstrate the knowledge they have acquired and their ability to process and use that knowledge" (p. 105). In comparing these tests to those used in elementary and secondary school, Tucker (2006) defined exit exams as "tests that cover specific material deemed by state or federal officials as important for students at that particular level" (p. 374). The exams in this case combine these two definitions, resulting in tests that measure student retention of knowledge of core course concepts in a given subject.

Tucker (2006) identified one criticism of retention exams as the material covered on the exam often dates back to the beginning of a student's collegiate experience. The department will find itself testing students on material taken several years earlier. If this material has been reinforced as the student has gone through the program, this will not be a problem. If, however, it

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has been 5 or 6 years since the student has been exposed to the material, then review sessions might be required (Tucker, 2006, p. 379-80).

Although assessment retention exams may come with faults, others advocate for their inclusion in program assessment. Banta and Palomba (2015) argued that "tests that contain well-written items covering the appropriate subject matter and level of thinking can reveal much about student learning" (p. 110). Objective-based tests may offer insight to instructors about course objectives that students comprehend well and other concepts that need more attention. Tucker (2006) agreed and said to make the exams become part of a regularly graded class such as a capstone experience. Students expect these types of exams to be part of a course because they expect to be tested on course material. Since the capstone class encompasses the entire program, students expect some sort of testing of their knowledge and skills of the program prior to their graduation. In the case of the broadcasting program at the university used as the subject for this paper, the exams became part of the capstone class, and featured appropriate subject matter to reveal true evidence of student learning. However, the road to recovery for this assessment measure hit a few bumps along the way. This paper shares the importance and the value of a systematic approach to assessment regarding the data gathered, and also provides a way to create commitment within the entire department or program to strengthen their inclusion as an effective assessment tool.

Initial Analysis of Retention Exams

When first presented with the capstone course and its contents, the instructor, as any new instructor to a course might do, utilized the resources from the previous instructor. Although the materials were comprehensive, the assessment exam portion of the class lacked efficiency in the execution of the exams and consistency of the construction of the exams as well. The first issue the instructor addressed was the efficiency in the distribution and completion of the exams. The instructor utilized the learning management system in use by the university to construct electronic examinations so tests could be immediately scored, and so data from the tests could be collected and aggregated more efficiently. This only scratched the surface of the issue. The collected data still reported inaccurate information as the tests were not normed or consistent. Tucker (2006) found that "given the lack of nationally normed exams in the area of mass communication, any department that decides to use an exit exam as a measure of direct assessment will have to create one" (p. 378). The broadcast department in this study constructed the exams, but lacked the appropriate guidance to make them able to collect rich, useful assessment data. The second step to redemption for the retention exams as an assessment instrument needed to tackle this issue.

A New Paradigm

The key to creating useful retention exams for assessment starts with involving the faculty in their creation. Banta and Palomba (2015) agreed that "tests that are developed locally for program assessment typically reflect a group effort" (p. 108). Suskie (2009) also pointed out that "our assignments are more effective if we first clarify what we want students to learn from the assignment and then design an assignment that will help them achieve those ends" (p. 148) and objective tests "are especially good for assessing fundamental knowledge and understanding" (p. 166). As a result, the instructor charged the faculty with creating retention exams that reflected

fundamental knowledge and understanding, and emphasized retention of course and program objectives.

The retention exam creation started with a test blueprint. A good objective test that uses a test blueprint ensures that tests reflect course objectives and learning goals deemed important by the department (Banta & Palomba, 2015; Suskie, 2009). The department simplified this process by using the Master Course Syllabus (MCS) required for every course as the template. The MCS, required by the university, outlines each course by providing a description, Student Learning Outcomes/Objectives (SLO), and suggested course evaluation measures. The student learning outcomes and course objectives listed on the MCS clearly indicate the desired outcomes of the course. Each question on the exam needed to reflect these measures and not any text- or instructor-specific content. Although the MCS simplified the process, the test creators still needed some additional guidance. Tucker (2006) suggested four helpful techniques:

1. The content of the tests should match the classroom objectives and what the teacher emphasized.
2. The test items should represent the full range of knowledge and skills that are the primary targets of instruction.
3. Expectations for student performance should be clear.
4. The assessment should be free of extraneous factors, which unnecessarily confuse or inadvertently cue student responses. (p. 375)

The broadcast department faculty created the new retention examinations under the guidance of the assessment coordinator and course instructor. Each instructor reviewed the existing version of the exam to compare questions on the exam against student learning outcomes on the MCS. Any question that did not reflect one of the course objectives was eliminated and replaced with one that did. For example, one SLO required students to "identify a variety of methods of mass media criticism and analysis including aesthetic, sociological, economic, structural, psychoanalytical and ethical perspectives." The original multiple choice question asked students to define "the Way of the Rhetorician." This was a question specific to the textbook, and not covered by all instructors of the course. A new question addressing this SLO asked students, in multiple choice format, to define Auteur Theory. This new question addressed a basic tenet of the course, covered by all instructors of the course. Each instructor created their objective-based exams in this manner with multiple choice, true/false, and matching-style questions using the MCS objectives as a blueprint.

The following semester the capstone course instructor deployed the new exams through the learning management system as before. Although the new tests generated improvements in scores, new concerns arose from the faculty, and new problems occurred in the classroom.

The faculty questioned, now that the exams were taken electronically though the learning management system, if the capstone course was the appropriate place to administer the exams. Students previously enrolled in the course were not held accountable for their performance on the exams, so the faculty questioned the authenticity of the data and the purpose of their inclusion in the course. The instructor and assessment coordinator argued for the continued inclusion of the exams as part of the capstone class for the program. Suskie (2009) supported this argument, stating "capstones help students synthesize their learning by tying together the various elements of their program and seeing the big picture" (p. 7). The assessment retention exams administered in the course reflected this synthesis. Additionally, Banta and Palomba (2015) agreed that "objective

tests are a normal and expected part of the classroom experience and are a type of direct measure included in many assessment programs" and "objective tests allow students to demonstrate the knowledge they have acquired and their ability to process and use that knowledge" (p. 105). So the exams stayed. But the question then became not about whether the exams should stay part of the capstone experience, but how to hold the students accountable for their performance.

Addressing Accountability

The assessment coordinator for the program suggested including the exam scores as part of the course grade. Banta and Palomba (2015) supported this argument noting "with locally developed assessment instruments, faculty are often more comfortable with test content and its relationship to the curriculum, and are more likely to include results in the course grade" (p. 109). Faculty questioned the fairness of including scores on test material covered in courses anywhere from two to five years prior to when the students take the exams. Informing the students prior to taking the exams of their value, and the inclusion in their course grade effectively tackles this issue. Banta and Palomba (2015) addressed this concern as well, noting that "because of the many possible approaches, students must be informed of the effect, if any, that their performance or participation will have on their grades" (p. 109). The course instructor suggested holding the students accountable for only a portion of the scores on the exams. This way the exams would encourage the students to perform at their highest level without penalizing them too severely for poor retention. The faculty seemed amenable to the compromise. But, this required more changes to the exams.

Each exam needed to contain the same number of questions to simplify the point process. Students enrolled in the capstone class completed a total of eight different assessment exams, one for each core class in the curriculum and one elective exam reflecting their chosen concentration within the program. The proposed method for inclusion scored all eight exams, but only held the students accountable for their performance on seven. The instructor aggregated the scores on the exams and divided by one less. Students who performed well could potentially score higher than 100%, but students who failed to perform well would not suffer harshly for their performance. With all parties in agreement and new tests to deploy, the new semester looked promising for the assessment coordinator and capstone course instructor.

Data Collection and Analysis

Data from the assessment exams in the semester following deployment of the new procedure provided encouraging results.

Table 1. Comparison results from old instrument to new instrument

	Course	Year	Results	Goal Changes from 2013 to 2014
1.	Survey	12-13	19.8% earned 70% or greater	80% of achieving 75% or better
		13-14	53.1% earned 70% or greater	new goal 70% achieving 70% or better
2.	Audio	12-13	26.4% earned 75% or greater	80% of achieving 75% or better
		13-14	36.3% earned 70% or greater	new goal 70% achieving 70% or better
3.	Video	12-13	54.4% earned 75% or greater	80% of achieving 75% or better
		13-14	38.1% earned 75% or greater	new goal 75% achieving 75% or better
4.	New Tech	12-13	79.7% earned 75% or greater	80% of achieving 75% or better
		13-14	67.5% earned 75% or greater	new goal 75% achieving 75% or better
5.	Copywriting	12-13	68.4% earned 75% or greater	80% of achieving 75% or better
		13-14	74.5% earned 75% or greater	new goal 75% achieving 75% or better
6.	News writing	12-13	25.0% earned 75% or greater	80% of achieving 75% or better
		13-14	66.7% earned 75% or greater	new goal 75% achieving 75% or better
7.	Web Content	12-13	38.1% earned 75% or greater	80% of achieving 75% or better
		13-14	51.5% earned 70% or greater	new goal 70% achieving 70% or better
8.	Criticism	12-13	31.4% earned 75% or greater	80% of achieving 75% or better
		13-14	40.0% earned 70% or greater	new goal 70% achieving 70% or better
9.	Law & Policy	12-13	4.5% earned 75% or greater	80% of achieving 75% or better
		13-14	38.0% earned 70% or greater	new goal 70% achieving 70% or better
	Overall	12-13	18.7% earned 75% or greater	80% of achieving 75% or better
		13-14	48.0% earned 70% or greater	new goal 70% achieving 70% or better

Students scored higher than in previous semesters thanks to uniform exams that reflected course objectives. Banta and Palomba (2015) mentioned that incentives for students to participate in assessment activities may be necessary, but noted that intrinsic motivation always elicits their best work. Tying the score on the exams to their course grade worked as the motivating factor in this case. Additionally, the instructor communicated the importance of the exams to the students, noting that the data collected help to make the courses in the program stronger for future students. "The messages faculty give about assessment are powerful motivators. If faculty care about

assessment, students are much more likely to care too" (Banta & Palomba, 2015, p. 62). The inclusion of the scores in the final course grade, and the discussion of the implications of the results, encouraged students to perform at their best level.

The electronic distribution of the exams allowed the department to collect data for instructors to evaluate which concepts needed more attention, and those concepts students retained more successfully.

Table 2. Sample Question

Answers	Question 17: Auteur Theory	% answered
A	is limited to European program content	0%
B	was developed by Herbert Gans	5.882%
C	is applicable when the creator puts a recognizable stamp on the work	0%
D	is a key form of originator criticism	5.882%
E	both c and d (Correct Answer)	88.235%

The instructors used this data to ensure instruction of course concepts remained even across all instructors, and that those concepts where students were lacking in retention were reinforced. Additionally, instructors could alter exams if questions were continually missed. Although the process still needed some adjusting, the introductory phase of deployment encouraged the course instructor and assessment coordinator to continue their efforts.

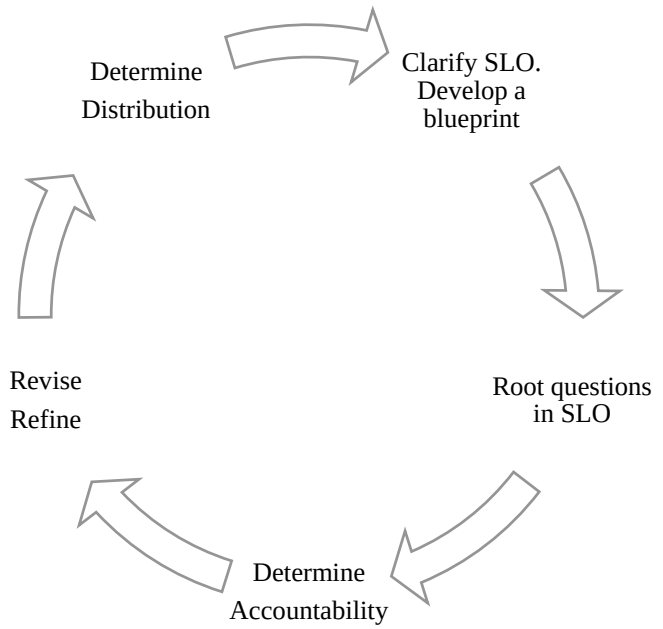

Figure 1: Development Cycle

Conclusions

The use of assessment retention exams is back on the rise. Banta and Palomba (2015) noted that "the percentage of program heads reporting that they use this assessment method is above 50 percent for trade programs, health sciences, computer science, business, and engineering" (p. 106). In the broadcasting program at the university in this paper, assessment efforts continue to look for ways to use multiple assessment instruments to gather useful, meaningful, and rich data. Suskie (2009) reminded programs and assessment coordinators to "make participation in the assessment a requirement of a program or course (typically a capstone course)" (p. 29). Banta and Palomba (2015) prompted test designers to ensure that tests are not focused at "such a general level of information that they do not yield detailed results useful for improvement of teaching and learning" (p. 107).

This research shows that using retention exams as an assessment measure can generate useful and meaningful data for both the students and the program. Students can learn strengths and weaknesses based on scores. Faculty and programs can learn where gaps may exist within the program. But, whenever a program decides to use retention exams as an assessment tool, faculty members need to be included in the process. Discussions about content need to occur constantly. Exams need to consistently reflect current standards and student learning objectives. And faculty need to stay involved in the process to know exactly where any inconsistencies may lie within their courses, and how they contribute to the students' overall experience within the program.

The data continue to flow, and the results continue to generate useful information for program evaluation. But the process needs to continue to constantly be reevaluated. Without continuous monitoring and attention to exams to ensure their reflection of changing course objectives, the critics of retention exams will continue to devalue retention exams as useful assessment measures. For this program, the road to redemption lead to richer more useful data than any collected before.

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Effectiveness of a Hybrid Classroom in the Delivery of Medical Terminology Course Content

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Hybrid courses are emerging as a viable option for content delivery across college campuses. In an attempt to maximize learning outcomes while leveraging resources, one institution used several sections of a Medical Terminology course as a pilot. Traditional and hybrid course delivery were compared utilizing a quantitative research method to evaluate the effectiveness of a hybrid course design in meeting and/or exceeding course objectives, as determined by student satisfaction and perceptions. Both hybrid and traditional class groups agreed that Medical Terminology has potential to be delivered in a hybrid format, but the hybrid group's agreement was significant stronger (+0.38 points on 5-point scale, P=0.008).

Key words: hybrid course, flipped classroom, SOTL, STEM

Introduction

Beginning in early 2000, significant literature on hybrid courses began to emerge in the research on higher education. Initial studies examined retention rates of hybrid courses and found them to be higher than traditional classroom formats (Dziuban & Moskal, 2001; Gascoigne & Parnell, 2014; Vaughan, 2007). Further studies reported higher grades for students in hybrid courses in comparison to their traditional counterparts (Adams, 2013; Dziuban & Moskal, 2001; Twigg, 2003). Despite this, Tallent-Runnels et al. (2006) found that institutional support and guidelines for faculty and students varied widely, as do definitions of hybrid courses. Generally, hybrid courses are defined as "classes in which instruction takes place in a traditional classroom setting augmented by computer-based or online activities which can replace classroom seat time" (Scida & Saury, 2006). However consensus on a single best practice for hybrid course design and implementation remains elusive, due to a variety of factors (So & Brush, 2008; Westover & Westover, 2004).

Much of the literature regarding hybrid courses can be categorized as follows: defining hybrid courses; elements of successful integration of the traditional (face-to-face) material with online material; creating a classroom experience; and, theories of teaching and learning in an alternative format. The hybrid course can be as fluid or as rigid as the instructors design it and

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Aycock et al. (2002) point out that "time flexibility in hybrid courses is universally popular". Creating an opportunity to educate students in an alternative format may provide an increased appeal to students who might otherwise be reluctant to enroll in a class that has a formal or unyielding schedule. In a hybrid class, students benefit from both the traditional face-to-face instruction, and a self-directed, self-paced learning experience that blends elements from both pedagogies. Finding that right balance facilitates the teaching and learning experience (Aycock et al., 2002).

However, Jackson & Helms (2008) caution, "the hybrid format is stuck in the middle of two disparate pedagogies or extremes and appears to suffer from both the strengths and the weaknesses at either extreme". Their study identifies three central vantage points from which to consider the hybrid model: the student's, the faculty member's, and the administrations'. They cite several strengths to hybrid programs: the variety in content delivery provides "an excellent opportunity for students to be exposed to a new way of learning. (They) are exposed to learning interactively and in the classroom setting all at once" and the advancement of critical thinking skills, as students are challenged to complete significant portions of the work on their own. In contrast, they warn "it may not be an effective method of learning for some students" (Jackson & Helms, 2008).

Providing a variety of learning experiences and opportunities can enhance the hybrid course experience (Ausburn, 2004). The integration of the online material in an appropriate ratio to the in-class experience, as reported by Ausburn (2004), underscores the need for appropriate course design as aligned with the students' preferred learning strategies to include frequent interaction with classmates and instructors. Furthermore, Aycock (2002) found that successfully transitioning a course from a traditional format to a hybrid model requires a course redesign, not, simply adding "online work in addition to traditional coursework or simply to load lecture content, such as PowerPoint slides, online. The emphasis is on pedagogy, not technology".

Faculty and students alike are negotiating this new terrain and results are mixed, but offer a promising glimpse into this new educational venture. Aycock et al. (2002) note several key findings of effective hybrid courses stating that while "both the instructors and the students like the hybrid model; students don't grasp the hybrid concept readily" even if they are able to envision their plans to succeed. Ausburn (2004) noted that students in a hybrid course ranked "self-directed learning" as a one of their most important goals for learning (p. 330). Additionally, she noted that students listed "course announcements and reminders from the instructor" as well as "course information documents" (syllabus, schedules, outlines, grading procedures and policies) as the most valuable component of the online portion of the course (p. 330). The issue of creating a positive classroom experience to promote student learning is crucial to the success of a hybrid course. Delfino at al. (2005) states that a successful hybrid course "…seems to contribute to a higher level of socialization and sense of togetherness among participants and, consequently, to increase the quality of learning and the achievement of instructional objectives''. (p. 3).

With the myriad of definitions to describe hybrid courses, it is important to choose one that is generally accepted at the institution where the course redesign takes place. The description of a hybrid course provided by Delfino et al. (2005) most closely aligns with the way this study employed it, whereby instructional material is offered through the online sessions, allowing students to work through examples, and in class time is spent providing an overview of the content. Students in this study were informed on the first day of class that their sections would require significant self-direction and that there would be an opportunity after the course concluded, to voluntarily participate in a survey designed to assess their perceptions.

When implementing or revising curriculum or instruction, Tyler's (1949) four-step curriculum review model focuses on the learners' experience, similar to that of this study. The model focuses on the educational purposes, providing effective learning experiences to meet learning objectives, useful instruction, and the best manner in which to evaluate instruction and learning experiences. Like Tyler's model, this study aimed to find the most effective learning experiences, or delivery methods, to obtain optimal learning objectives. The manner in which course content is delivered and received is significant when teaching course material (Steele, 2006). "The fundamental administrative point, thus, is not the removal of content from the curriculum but, rather, to ensure that whatever the content, it can be successfully delivered and received" (p. 162). The purpose of this study was to compare the effectiveness of traditional and hybrid course designs in meeting and/or exceeding course objectives in the delivery of a one-semester Introduction to Medical Terminology course (Biomedical Sciences [BMS] 203) at Quinnipiac University. BMS 203 had been delivered in a traditional format at the institution for over 20 years and will likely continue a transition to a more hybrid-like classroom and/or a fully online experience. We hypothesized that delivery of hybrid course design for an Introduction to Medical Terminology course would be at least as effective as delivery in the traditional classroom format respective to the course objectives.

Methodology

The study was designed to compare the perceptions of traditional classroom students with hybrid classroom students to assess their experiences with the learning process; identify factors that influence their ability to meet the course objectives; and to compare the amount of time dedicated each week to the course in order to assure success. Course content between the traditional classroom format and the hybrid format was identical, as evidenced by syllabi and disciplinary norms for the teaching of medical terminology. McGuire (2009) states "students acquire knowledge of medical terminology by repeatedly encountering terms" (p. 46).

A survey response tool (Survey Monkey) was chosen as the most appropriate method to provide economy of design and efficient data collection (Nesbary, 2000; Sue & Ritter, 2007). Demographic questions were designed to gather information about past experience with online courses and future considerations about enrolling in an online course. Likert scales were provided to assess perceptions about the instructional methods and learning processes; as well as perceptions about the effectiveness of the course format. Values for the Likert scale questions were assigned as follows: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree. A forced ranking scale was used to assess perceived value in educational and study factors in meeting course objectives (i.e., ranked from values of 1 to 6 with 1 being the first [highest agreement] to 6 being the last [least agreeable] choices). Additionally, an optional open-ended question was designed to allow participants to share additional thoughts regarding the course format. The open ended question asked respondents to "Please feel free to share any further thoughts/comments you may have about learning Medical Terminology through a Hybrid course format."

Gathering data from students who have completed the course in each format (hybrid and traditional) provides valuable insight into the effectiveness of teaching practices as well future pedagogical considerations in the course, department, and beyond. Two instructors across four sections of a hybrid course gathered data following completion of the course in order to compare students' perceptions of their experiences in the hybrid course delivery compared to four sections of students who were enrolled in the traditional course delivery during the previous academic year. Students were asked to voluntarily participate in a survey to assess four broad categories: previous

experience with online course delivery; time commitment needed, as perceived by the student, to succeed in the course; experience with meeting the course objectives as outlined in the syllabus; and overall satisfaction with the course delivery.

In accordance with Institutional Review Board (IRB) approval, a single-stage sampling of students (N = 206) who completed a semester of a 200-level Medical Terminology course, BMS 203: Introduction to Medical Terminology at a four-year, private, mid-sized co-educational institution (Quinnipiac University) contacted via email to request their voluntary participation in a brief on-line survey to evaluate the effectiveness of a hybrid course design in meeting and/or exceeding course objectives in the delivery. Students (n = 101) from all four enrolled sections of a traditional classroom format from the previous academic year; and students (n = 105) from all four enrolled sections of the hybrid format were invited to participate in the study. All students were contacted via email. The email outlined the procedures for the study, which included a brief description of the study, purpose and value as well as commentary regarding any perceived risks and benefits to be neither. A follow-up email was sent two weeks later as a reminder. Both emails clearly stated that participation in the study was voluntary and confidential, and that data would be pooled on a survey response website (Survey Monkey) in a password protected file. No identifiers would be used and students were free to answer candidly. The study was purposefully narrow in scope in order to determine if a curricular change at a single institution could be supported by shifting a traditional medical terminology course to a hybrid model.

Data Analysis

Following data collection to detect outliers, z-scores were generated resulting in the identification and deletion of 6 outliers ($z \geq \pm 3.0$) from the data set (<0.005% of all data points). Ordinal data (i.e. rank and scale items) were analyzed by Mann Whitney U tests. An alpha level of $P < 0.05$ was required for statistical significance. All statistical analyses were performed using SPSS version 22.0 for Windows (SPSS, Chicago, IL, USA). Data are presented as mean ± SD.

Findings

Demographics

Seventy-nine students completed the survey (38.3%) with forty-one (40.6%) and thirty-eight (36.2%) respondents from the traditional and hybrid classrooms, respectively. Fourteen (36.8%) and twenty (48.8%) respondents from the traditional and hybrid classrooms, respectively, reported previous experience with online courses (P = 0.287; Table 1). In addition, only two (5.3%) and one (2.4%) respondent(s) from the traditional and hybrid classrooms, respectively, reported that they would not consider enrolling in an online course. Five (13.2%) hybrid and eight (19.5%) traditional classroom respondents responded "I don't know" with regards to considering online class enrollment. There were no significant differences between groups in previous experience with online courses or consideration for enrollment in online courses.

Table 1. Respondent demographics

		Hybrid (n=38)	**Traditional (n=41)**	
Item	*Question*	*Mean ± SD*	*Mean ± SD*	*P-value*
1	I took Medical Terminology in a traditional classroom format (i.e. BEFORE Spring 2014).	0.00 ± 0.00	1.00 ± 0.00	< 0.001
2	I have previous experience with online courses.	0.37 ± 0.49	0.49 ± 0.51	0.287
3	I would consider enrolling in an online course.	0.94 ± 0.24	0.97 ± 0.17	0.558

Data are presented as mean ± SD. Items 1 and 2 were presented as questions with responses limited to No and Yes. Item 3 was presented as a question with responses limited to *No*, *Yes*, and *I don't know*. Values assigned were as follows: *No*, 0; *Yes*, 1; and *I don't know*, n/a. Comparisons between a hybrid, flipped classroom and a traditional course format were made using a Mann Whitney U test. *P*-value < 0.05 denotes statistical significance.

Medical Terminology Instructional Methods and Learning Processes

Table 2 shows mean group responses to six 5-point Likert-scale questions designed to evaluate students' perceived effectiveness of medical terminology instructional methods and the associated learning processes. No significant difference was found between groups with regards to perceived value of in-class instruction (Items 4c, 4f). In fact, on average, both groups disagreed (mean value < 3.0) with the notion that they learned most content in class or that the material needed to be 'taught' in the classroom. Both hybrid and traditional class groups agreed that medical terminology has potential to be delivered in a hybrid format, but the hybrid group's agreement was significant stronger (+0.38 points on 5-point scale, P=0.008).

Similarly, both groups did not agree that medical terminology is best offered in a traditional format with hybrid respondents demonstrating a significantly lower response value, on average (-0.44 points on 5-point scale, P=0.025). Items 4d and 4e were designed to evaluate students' perceived requirements for self-directed learning of Medical Terminology. For both items, hybrid classroom respondents demonstrated significantly greater agreement with statements indicating self-directed learning (+0.55 and +0.34 points on a 5-point scale for items 4d and 4e, respectively, P<0.05).

Table 2. Student responses to 5-point Likert scale statements evaluating Medical Terminology instructional methods and learning processes

		Hybrid (n=38)	**Traditional (n=41)**	
Item	Statement	Mean ± SD	Mean ± SD	*P*-value
4a	Medical Terminology is a course that has the potential to be successfully offered as a hybrid format.	4.58 ± 0.55	4.20 ± 0.65	0.008
4b	Medical Terminology is best offered as a traditional in-class format.	2.71 ± 1.01	3.15 ± 0.88	0.025
4c	I learned most of the Medical Terminology content by attending class.	2.55 ± 1.01	2.73 ± 1.25	0.694
4d	A course such as Medical Terminology requires the student to commit significant out-of class time to learn the material in order to facilitate student success.	4.47 ± 0.56	3.93 ± 1.01	0.014
4e	I learned much of the course material 'on my own' and used the classroom time to review key concepts	4.54 ± 0.56	4.20 ± 0.72	0.032
4f	In order to succeed in a course such as Medical Terminology the student needs to have the material 'taught' to them by an instructor in a classroom	2.21 ± 0.66	2.22 ± 0.96	0.702

Data are presented as mean ± SD. Items 4a through 4f were presented as statements with respondents asked to rate their agreement using a 5-point Likert-scale. Values assigned were as follows: *strongly disagree*, 1; *disagree*, 2; *neutral*, 3; *agree*, 4; and *strongly agree*, 5. Comparisons between a hybrid, flipped classroom and a traditional classroom format were made using a Mann Whitney U test. *P*-value < 0.05 denotes statistical significance.

Effectiveness of course formats

Table 3 shows mean group responses to four 5-point Likert-scale questions designed to evaluate the capability of the course formats in meeting the course objectives. Respondents from both groups agreed that the course effectively developed the students' ability to translate unfamiliar medical terms, construct acceptable new medical terms from their description(s), pronounce medical terms, and read case studies while defining words in context. There were no significant differences between groups with regards to the course format's effectiveness, except in item 5d, where hybrid classroom respondents' indicated lesser agreement with 'the ability to read case studies and define words in context' in (-0.32 points on a 5-point scale, *P*=0.020).

Table 3. Student responses to 5-point Likert-scale questions evaluating the effectiveness of the course to meet course objectives

		Hybrid (n=38)	**Traditional (n=41)**	
Item	Question	Mean ± SD	Mean ± SD	*P*-value
5a	At the completion of the course, I was able to literally translate unfamiliar medical terms by analysis of word parts.	4.66 ± 0.48	4.68 ± 0.47	0.814
5b	At the completion of the course, I was able to construct acceptable new words from their description(s).	4.57 ± 0.55	4.61 ± 0.59	0.632
5c	At the completion of the course I was able to pronounce medical terms correctly.	4.32 ± 0.57	4.44 ± 0.59	0.318
5d	At the completion of the course, I was able to read case studies and define words in context.	4.24 ± 0.63	4.56 ± 0.55	0.020

Data are presented as mean ± SD. Items 5a through 5d were presented as statements with respondents asked to rate their agreement using a 5-point Likert-scale. Values assigned were as follows: *strongly disagree*, 1; *disagree*, 2; *neutral*, 3; *agree*, 4; and *strongly agree*, 5. Comparisons between a hybrid, flipped classroom and a traditional classroom format were made using a Mann Whitney U test. *P*-value < 0.05 denotes statistical significance.

Students' perceived value in educational and study factors in meeting course objectives

Table 4 shows mean group responses to a 7-point ranking question (1= best choice, 7=worst choice) designed to evaluate factors in the students' ability to meet course objectives. Respondents from both groups agreed that their own commitment to learning/studying the material (item 6c) and the textbook (item 6d) were the most important factors. However, hybrid classroom respondents indicated that the in-class activities (item 6b) were significantly more important in their ability to meet the course objectives (ranks: 3 vs. 6 for hybrid vs. traditional respondents, respectively; *P*=0.019). There were no significant differences in ranks of any other factor (items 6a, 6e-g). In addition, a between groups difference in self-reported study time dedicated to medical terminology approached significance, but did not meet the requisite alpha level of 0.05 (2.16 vs. 1.90 on 4-point scale for hybrid and traditional classroom respondents, respectively, where a value of 1 indicates <2 hours/week, 2 = 2-4 hours/week, and 3= 4-6 hours/week; *P*=0.073).

Table 4. Student responses to 7-point ranking question evaluating the students' perceived ability to meet the course objectives

		Hybrid (n=38)	Traditional (n=41)	
Item	Statement	Mean ± SD	Mean ± SD	*P*-value
6a	My ability to meet the course objectives was due to: the in-class instruction.	4.11 ± 1.54	4.05 ± 1.50	0.943
6b	My ability to meet the course objectives was due to: the in-class activities.	3.95 ± 1.39	4.70 ± 1.47	0.019
6c	My ability to meet the course objectives was due to: my own commitment to learning/studying the material.	1.74 ± 0.92	1.61 ± 0.89	0.449
6d	My ability to meet the course objectives was due to: the textbook.	2.32 ± 1.43	2.39 ± 1.22	0.465
6e	My ability to meet the course objectives was due to: the ease/difficulty of the material.	4.19 ± 1.13	3.76 ± 1.24	0.119
6f	My ability to meet the course objectives was due to: previous experience with the material.	4.67 ± 1.85	4.66 ± 1.57	0.794
6g	My ability to meet the course objectives was due to: some other factor(s).	6.87 ± 0.34	6.83 ± 0.45	0.837

Data are presented as mean ± SD. Items 6a through 6g were presented as statements with respondents asked to consider all statements and rank each from 1 through 7. A value of 1 was associated with the respondent's first (e.g. best) choice, whereas a value of 7 was associated with the respondent's last (or worst) choice. Comparisons between a hybrid, flipped classroom and a traditional classroom format were made using a Mann Whitney U test. *P*-value < 0.05 denotes statistical significance.

Conclusions

Several conclusions may be drawn from the data, most notably that students in the hybrid courses perceive that a medical terminology course offered in a hybrid format can be a potentially successful model of instruction ($p = 0.005$), even if it requires more out of class time to learn ($p = 0.044$). While only one of 14 students (7%) who chose to answer the open -ended question stated: "I probably would not have taken this course if it was in hybrid format. I like the traditional classroom style", the majority of open-ended comments were positive (64%) or neutral (21%). Several comments indicated that a hybrid model was conducive to learning and integrating course material, including the higher level thinking required for application and synthesis of word construction and meaning. One student stated, "I like the hybrid course format because it helped me integrate what I learned to studying outside of class independently without feeling lost on the material."

A sample of comments from two other students in the hybrid sections:

> I think that Med Term [*sic*] has great potential to be offered as a hybrid course. I enjoyed this format during my time taking the course in Spring 2014 semester. Learning the material on your own keeps things more interesting than spending 50 minutes just going over words. Also, the in class activities help reinforce the material that was studied outside of class. Such reinforcement helps facilitate the learning of these terms.
>
> My learning took place solely outside of the classroom. I felt as is the class time was not needed, because all we did was review the vocabulary terms. This seemed tedious, since I already studied the words outside of the class. This class is extremely useful, but it can be structured differently because the classroom time is not needed.

As this study suggests, students are open to varying delivery methods of course content. With an ongoing emphasis regarding content delivery in higher education, hybrid courses can be a viable manner in which to deliver course content. Courses heavily rooted in foundational knowledge concepts such as memorization, pronunciation, repetition, and scaffolding, such as medical terminology courses, could especially benefit from such a course format. Courses such as medical terminology, which require an ability to decode constructed terms and rely less heavily on higher-level cognitive skill such as analysis and evaluation, offered in a hybrid format may prove to be a successful alternative to traditional classroom format; particularly when combined with in-class activities designed to reinforce concepts.

To provide effective hybrid courses, criteria must align with institutional pedagogy. Furthermore, course content should be integrated online with a focus on learning experience and instruction should be evaluated for effectiveness in meeting the learning objectives. Hybrid courses can benefit institutional retention, provide more flexibility in schedule, improve how students learn course content and meet learning objectives, as well as keep students engaged when designed purposefully. While efforts at refining pedagogies that most appropriately meet students' needs and expectations continue to evolve, it is worth considering an evolution of course content delivery, as well.

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Curricular Integration and Measurement of Cultural Competence Development in a Group of Physical Therapy Students

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Abstract

Introduction and Background

The link between cultural competence and effective physical therapy encounters is established. Physical therapist educational programs face the challenge of fostering the cultural competence of students in effective and meaningful ways within the curriculum. They also face the challenge of measuring the development of cultural competence to establish efficacy in the curriculum. One program measured the development of cultural competence in its students using the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Student Version (IAPCC-SV) before and after the program's various educational opportunities immersed throughout the curriculum that could serve to increase cultural competency. In the three-year curriculum, the students participated in both mandatory and voluntary experiential learning opportunities. Required didactic presentations and activities were integrated throughout the curriculum and designed to enhance cultural competence. Voluntary experiences included providing service and/or leadership to a student-run pro bono clinic. The program was interested in whether cultural competency increased after these experiences and whether leadership opportunities or additional hours of voluntary service beyond the class median caused increases that exceeded the minimal detectable change (MDC) reported in the literature.

Methods

All students completed the IAPCC-SV at the beginning of their Doctor of Physical Therapy education and again at the end of their final year of didactic curriculum.

Results

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For the class of 2011, a Wilcoxon signed ranks test noted a significant increase in IAPCC-SV scores from pre-test (56.51 +/- 4.82) to post-test (64.16 +/- 6.19), $p \leq .001$. For the class of 2012, a Wilcoxon signed ranks test noted a significant increase in IAPCC-SV scores from pre-test (58.87 +/- 5.67) to post-test (64.13 +/- 5.47), $p \leq .001$. Sixteen students from the class of 2011 and 13 from the class of 2012 exceeded the 8.57-point MDC of the IAPCC-SV.

Discussion and Conclusion

Exposure to a variety of cross-cultural encounters throughout a physical therapy curriculum significantly increases self-rating of cultural competence in these graduate students. Students who take advantage of volunteer leadership roles in extensive cross-cultural encounters may be more likely to achieve an increase that exceeds the MDC on the IAPCC-SV. These results are particularly interesting given that the students themselves were ethnically homogeneous and did not experience cultural diversity within the constituents that made up their class or faculty.

Key Words: Cultural Competence Curriculum, Measurement

The increasingly diverse nature of client populations is well established (Humes, Jones, & Ramirez, 2012), as is the impact one's culture has on physical therapy examination, evaluation, communication, interventions and outcomes (Lattanzi & Purnell, 2006). Cultural competence is traditionally defined as, "a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals and enables that system, agency or those professionals to work effectively in cross-cultural situations" (Cross, Bazron, Dennis, Isaacs, 1989). Leavitt (2010) asserts that the development of cultural competence within the physical therapy profession is mandated by the professional core values (American Physical Therapy Association (APTA), 2003), generic abilities (May, Morgan, Lemke, Karst, & Stone, 1995), and professional code of ethics (APTA, 2006). Specific to physical therapist student education, the Commission on the Accreditation of Physical Therapy Education (CAPTE), the sole accrediting body for entry-level physical therapist education in the United States (Commission on Accreditation in Physical Therapy Education, 2007), acknowledges the importance of developing cultural competence in students by including the phrase "culturally competent" in 26 of the current evaluative criteria. The American Physical Therapy Association created a "Blueprint for Teaching Cultural Competence" as a culmination task force report to assist faculty in this process (American Physical Therapy Association Committee on Cultural Competence, 2008). Thus, the importance of fostering cultural competence in physical therapist students is clear, as is the need to measure its development. How to best develop cultural competence in physical therapist students is also important to consider.

Cultural Competency in the Professional Curriculum

Panzarella (2009) states that weaving cultural competence throughout the curriculum sends an important message that this is a valued and necessary skill. This facilitates student recognition

that cultural competence is not just of interest to one faculty member but valued by all faculty members as an important aspect of clinical practice (Panzarella & Matteliano, 2008).

There are many ways in which physical therapy programs can infuse the message of cultural competence. Romanello (2007) describes a physical therapy program committed to the integration of cultural competence throughout the curriculum. She found that the program focused on creating a diverse campus environment, diverse clinical experiences, and a faculty committed to exploring diversity issues with students. Other examples include adding reflective practice as a curricular component as well as including public health content to provide students with additional skills to practice in diverse environments (Palombaro, Lattanzi, & Dole, 2011). The Center for International Rehabilitation Research Information and Exchange (CIRRIE) provides a guide to assist programs with including cultural competence curriculum activities, such as case studies, classroom activities, and service-learning / community based projects (Panzarella & Matteliano, 2008).

Service-learning and community based projects allow students to interact with community members in authentic contexts and have been shown to enhance professional competencies beyond clinical skills, including cultural competence (Reynolds, 2005). In one example Jorge (2006) describes a service-learning elective course where students work with local community farmers and ranchers with disabilities, exposing these students to farm and ranch culture. The students reportedly showed enhanced cultural competence in dealing with the farm and ranch culture (2006). Panzarella (2009) describes another example where students experience working through an interpreter and managing various cultural health beliefs and behaviors in the screening of local refugees. Evidence of formal assessment of cultural competence was not provided in this example, but helpful and positive information was gleaned from student exit interviews and course evaluations. Some curricular examples in the literature occur as single events where students engage with diverse populations (Black, 2002), while others describe ongoing or routine activities for student engagement (Palombaro, Lattanzi, & Dole, 2011; Lattanzi & Pechak 2011). An unfortunate but common theme among these examples is the challenge of measuring and documenting outcomes that support changes in cultural competence in the students who participate in these service-learning and community based projects.

Measuring Cultural Competence

From a pedagogical standpoint, measuring cultural competence outcomes is a necessary element to determine if the cultural competence curriculum is meeting its objectives (Panzarella, 2009). A systematic review that examined the literature on educational interventions to improve cultural competence in health care professionals from 1980 through 2003 reveals evidence in support of such training programs to improve knowledge, attitudes and skills of healthcare professionals (Beach et al., 2005). The majority of the 34 studies reviewed investigated training programs for physicians and nurses, most of which were pre-professional in nature. All studies reviewed included some level of pre-test/post-test or control group assessment.

Within physical therapy education, evidence of and changes in cultural competence in students has been assessed primarily through informal means. Wong and Blissett (2007) documented levels of cultural competence by analyzing reflective writings of student physical therapists using the Cultural Competence Curriculum (CCC). Two independent raters reliably

applied the CCC, a 6-level ordinal scale from cultural destructiveness to cultural proficiency, across more than 150 written entries. Dupree and Goodgold (2007) describe an international cultural immersion program where the development of cultural competence was assessed by completion and analysis of a pre- and post-questionnaire lending insight into the cultural understandings that the participants gained. Panzarella (2009) described the use of standardized patients to allow students to practice skills related to cultural competence in a structured manner and to receive feedback about their performance in a patient examination activity.

The literature also includes examples of objective measurement tools used to evaluate cultural competence within physical therapy and health profession education. In their review of the relevant literature, Capell, Veenstra and Dean (2007) described several tools that have been used to measure cultural competence within the health care professions. The tools identified and appraised included the Cross-Cultural Adaptability Inventory (CCAI) (Kraemer & Beckstead, 2003), the Cultural Competence Assessment (CCA), The Cultural Efficacy Scale (CSES) and The Inventory for Assessing the Process of Cultural Competence among Healthcare Professionals-Revised (IAPCC-R). Two of these tools, the CCAI and the IAPCC (specifically a version for students labeled the IAPCC-SV) have established reliability (Gulas, 2005; Kraemer & Beckstead, 2003; Palombaro & Lattanzi, 2012) for use with populations of physical therapist students (Gulas, 2005; Kraemer & Beckstead, 2003; Palombaro & Lattanzi, 2012). Hilliard, Rathsack, Brannigan and Sander (Hilliard, Rathsack, Brannigan, & Sander, 2008) measured change in cultural competence of physical therapist students as a result of their clinical education experiences using the Cross-Cultural Adaptability Inventory (CCAI). Okere, Gleeson, Mitchell, Melzer and Olson (2012) used the Inventory for Assessing the Process of Cultural Competence among Healthcare Professionals-Student Version (IAPCC-SV) in a double-blind, randomized controlled trial to examine the differences in cultural competence between two groups of physical therapist students following specially designed instruction. They found statistically significant differences favoring the experimental group that participated in an educational module designed to enhance cultural competence compared to a control group that attended a professional abilities educational module. These findings support the use of the IAPCC-SV in documenting changes in student physical therapist cultural competence that may result from curriculum experiences designed to enhance cultural competence.

This paper describes the use of the IAPCC-SV as an objective measurement of the development of cultural competence in graduate physical therapy students from one accredited program after the required and voluntary educational opportunities integrated throughout the curriculum that could serve to increase cultural competence. The experiences designed to engage students and foster development of cultural competence included a combination of classroom activities and service-learning opportunities within the local community. Methods included didactic instruction, readings, discussion, case studies, reflective writing and self-assessment, and provision of clinical and health related services (Table 1). While all of the methods included in Table 1 are designed to help develop students' cultural competence, the experiences in the physical therapy student run pro bono clinic contributes much to this development. The clinic offers a consistent experience for cross-cultural encounters in a patient-care setting. Additionally only a small number of students are on the student board, thus engaging in hours of cross-cultural encounters beyond what is integrated into the curriculum.

Table 1. Curricular Activities to Enhance Cultural Competence Infused throughout the Curriculum

Activity	Description	Classroom or Service-Learning	Mandatory or Voluntary
Classroom Activities	Cultural Self-Assessment Community Self-Assessment	Classroom	Mandatory
Case Studies	Case studies with cultural diversity throughout several courses	Classroom	Mandatory
Formal Presentation	Lecture and Discussion	Classroom	Mandatory
DVD Presentations	Beyond the Vital Signs (Armstrong, 2001) Communicating Effectively through an Interpreter (vanderHoof, 1998)	Classroom	Mandatory
Medical Ethnography Reading & Reflection	The Spirit Catches You and You Fall Down (Fadiman, 1997)	Classroom	Mandatory
Annual MLK Day of Service: Community Mobility Clinics	First year students are paired with third year students and conduct a day of blood pressure screening and mobility device cleaning & screening	Service-Learning	Mandatory
Community Health Practicums	Sustained weekly activity program project conducted in collaboration with 4 different community partners	Service-Learning	Mandatory
Pro Bono Clinic Service	Service in the student-run physical therapy pro bono clinic open 4 evenings /week and staffed by 4 student physical therapists each evening; supervised by 1-2 licensed physical therapists	Service-Learning	Voluntary
Pro Bono Clinic Student Leadership	Service on the leadership board which consists of 8-10 student leaders from each class (XXXXX, 2011)	Service-Learning	Voluntary

The study also compares students who demonstrated increased service through provision of clinical services by participating as a student volunteer at the program's pro bono clinic or as a student leader of that clinic. Student leaders were those students that applied and were selected to serve on the pro bono clinic student leadership board. The model for this student-run pro bono clinic has been described in the literature (Palombaro, Lattanzi & Dole, 2011). The purposes of

this study were: 1) To determine if cultural competence increased at the end of the curriculum, 2) To determine if the increase was a meaningful change, 3) To determine if completing above a set threshold of clinic hours increased the likelihood of meaningful change, and 4) To determine if participation in pro bono clinic leadership resulted in an increased likelihood of meaningful change.

Methodology

The participants were members of the graduating classes of 2011 and 2012 for one accredited physical therapy program. The sole inclusion criterion was being a member of one of these two classes. This study was approved by the IRB of Widener University.

All students completed the Inventory for Assessing the Process of Cultural Competence among Healthcare Professionals-Student Version (IAPCC-SV) at the beginning of the physical therapy program. Table 1 depicts the curricular activities, both didactic and experiential, that were designed to enhance cultural competence across the three-year Doctor of Physical Therapy curriculum. All students completed the IAPCC-SV again at the end of their final year, just before going out for their final full-time clinical internship experience.

The measurement tool, the IAPCC-SV, measures cultural competence in the healthcare professional student, including physical therapy students. The 20-item IAPCC-SV measures constructs of cultural competence (Table 2) with scores ranging from 20-80 points with higher scores indicating increased competence. Students are assigned to levels of cultural competence based on their scores. The levels progress from culturally incompetent, culturally aware, culturally competent to culturally proficient (Campinha-Bacote, 2003). The IAPCC-SV is reported as reliable (Fitzgerald, Cronin, & Campinha-Bacote, 2009; Palombaro & Lattanzi, 2012) and valid (Fitzgerald et al., 2009) for use with health profession students and has a reported minimal detectable change (MDC) of 8.57 (Palombaro & Lattanzi, 2012).

Table 2. Definitions of Constructs of Cultural Competence (Campinha-Bacote, 2007)

Cultural Awareness	"The deliberate self-examination and in-depth exploration of our personal biases, stereotypes, prejudices, and assumptions that we hold about individuals who are different from us (Campinha-Bacote, 2007, p. 27)."
Cultural Knowledge	"The process of seeking and obtaining a sound educational base about culturally diverse groups (Campinha-Bacote, 2007, p. 37)."
Cultural Skill	"The ability to collect relevant cultural data regarding the client's presenting problem as well as accurately performing a culturally-based physical assessment in a culturally sensitive manner (Campinha-Bacote, 2007, p. 49)"
Cultural Encounters	"The act of directly interacting with clients from culturally diverse backgrounds. (Campinha-Bacote, 2007, p. 71)"
Cultural Desire	"The motiviation of the healthcare professional to 'want to; engage in the process of becoming culturally competent; not the 'have to' (Campinha-Bacote, 2007, p. 21)."

All students were assigned an identification number known only to one researcher (JB); another researcher (KP) performed the data analysis on the de-identified data. The identification number allowed for the IAPCC-SV pre- and post-tests to be linked. Demographics of sex, age and race were collected via the students' graduate school application file.

The number of volunteer hours in the clinic for each student and whether each student served as a clinic leader was also tracked and provided in de-identified format to the researcher performing the data analysis.

Data were analyzed using SPSS® Version 20. Following the instructions of the IAPCC-SV authors (Fitzgerald et al., 2009), a composite score was calculated for each subject for pre- and post-test data and was entered into SPSS. Additionally, a change score for each subject was calculated in order to compare it to the MDC value. Descriptive statistics were used to characterize the study sample.

Wilcoxon signed ranks tests were performed on pre- and post-test data for each class cohort. Chi square analysis was performed on each class using the median number of clinic hours as a threshold and student board members versus non student board members to determine if clinic hours or student board service influenced attaining a meaningful change on the IAPCC-SV.

Findings

Demographics

Seventy-nine students participated in this study. Thirty-nine were members of the class of 2011; 8 post-tests of the class of 2011 were considered incomplete because those students had neglected to complete the back of the page. Forty were members of the class of 2012; one pre-survey and 2 post-surveys were incomplete for the class of 2012. See Table 3 for demographic information. The cohort was homogenous in ethnicity. This provided a unique opportunity to evaluate the improvement in cultural competence in an ethnically homogenous cohort of students. The ethnic and racial background of the cohort was in contrast to the communities served by the service-learning and pro bono clinical services provided by these students. The communities targeted for the activities and services are ones where the majority of the population is African-American, lower socio-economic conditions prevail, and the number of individuals that are underserved and uninsured is high (US Census 2005). The median and range of hours of clinic service for the entire class, student board, and non-student board members is reported as a point estimate of central tendency and variability respectively because the data was skewed. Many non-student board members in the class of 2011 performed no clinic service and several students were outliers in their number of service hours for both classes. The median is a stable estimate of central tendency as it is not influenced by outliers.

Table 3. Student Sample Demographics

	Class of 2011	Class of 2012

Number of Students	39	40
Average Age at Graduation*	26.48 +/-2.9	24.97 +/-1.9
Females	25	27
Males	14	13
Caucasian	39	40
Number of student board members	10	8
Median hours of clinic service entire class*	0 (0-61)	14.25 (0-110.5)
Median hours of clinic service student board members	19.25 (0-36)	40.75 (12-110.5)
Median hours of clinic service for non-student board members	0 (0-61)	7.5 (0-43.5)

*Significant between-class differences ($p \leq .01$)

Findings

Data from the class of 2011 and 2012 were analyzed separately as their experiences were different in terms of Clinic participation. For the class of 2011, the mean number of hours of participation was 9.47 (+/-16.66) and the median was 0 hours (range 0-61). For the class of 2012, the mean number of hours of participation was 18.71 (+/-23.81) and the median was 14.25 hours (range 0-110.5). The students in the class of 2011 primarily participated in the clinic if they were on the Student Board, whereas clinic participation was open to more students in the class of 2012. The majority of students who completed the pretest (69.2% class of 2011; 53.8% class of 2012) scored in the culturally aware category while the majority of students who completed the post-test (64.5% class of 2011; 73.7% class of 2012) scored in the culturally competent category on post-test. The scores for the IAPCC-SV were normally distributed for both classes. See Table 4 for frequencies in all categories.

Table 4. Frequency Table for IAPCC-SV Cultural Competence Categories

Category	IAPCC-SV Score	Number of Students Pretest		Number of Students Posttest	

		Class of 2011	Class of 2012	Class of 2011	Class of 2012
Culturally Incompetent	20-40	0	0	0	0
Culturally Aware	41-59	27	21	9	9
Culturally Competent	60-74	12	18	20	28
Culturally Proficient	75-80	0	0	2	1

For the class of 2011, a Wilcoxon signed ranks test noted a significant increase in IAPCC-SV scores from pre-test (56.51 +/- 4.82) to post-test (64.16 +/- 6.19) in the Class of 201, $p \leq .001$. For the 31 students in the Class of 2011 for whom linked pre-tests and post-tests were available, 16 exceeded the MDC of 8.57 points. Chi square analysis on completed data revealed differences between student board members and non-members in terms of exceeding the MDC of the IAPCC-SV at post-test $p \leq .031$, with student board members exceeding the MDC at higher than the expected count. Because the median hours of service was 0 for this class, the median of 19.25 hours of service for the student board was used as a threshold for chi-square analysis to determine if being above the threshold of hours related to exceeding the MDC for the IAPCC-SV. Chi square analysis revealed no differences between being above the threshold of median hours of service and exceeding the MDC of the IAPCC-SV at post-test, $p \leq .333$.

For the class of 2012, a Wilcoxon signed ranks test noted a significant increase in IAPCC-SV scores from pre-test (58.87 +/- 5.67) to post-test (64.13 +/- 5.47), $p \leq .001$. For the 38 students in the class of 2012 for whom linked pre-tests and post-tests were available, 13 exceeded the MDC of 8.57 points. Chi square analysis on completed data revealed no differences between student board members and non-members in terms of exceeding the MDC of the IAPCC-SV at post-test $p \leq .695$. The median hours of service for this class of 14.25 was used as a threshold for chi-square analysis to determine if being above the threshold of hours related to exceeding the MDC for the IAPCC-SV. Chi square analysis revealed no differences between being above the threshold of median hours of service and exceeding the MDC of the IAPCC-SV at post-test, $p \leq .819$.

Discussion and Implications

The results of this study demonstrate that an integrated curriculum that includes experiential learning and exposure to a variety of cross-cultural encounters throughout a physical therapy curriculum can significantly increase self-ratings of cultural competence in graduate students. In this study, students in the Class of 2011 who volunteered for leadership roles in a student-run pro bono clinic where they were engaging in cross-cultural encounters were more likely to achieve an increase that exceeded the MDC on the IAPCC-SV. This did not hold true for the Class of 2012. This class' leadership and commitment was not as strong as the class of 2011, requiring need for faculty mentorship, intervention and personnel changes. It may be that the findings for the Class of 2011 represented students with stronger leadership skills upon assuming the leadership positions. Strong leaders are able to work effectively with a variety of people, consider multiple perspectives, have strong self-awareness and have positive social exchanges and thus may be in a position to learn more from cross-cultural encounters (Avolio & Gardner,

2005). Students who are not strong leaders may be more focused on developing their leadership skills versus their cultural competence (Institute for Educational Leadership, 2005).

The IAPCC-SV identifies a continuum of the development of cultural competence and links the assessment scores to different levels of the continuum. These levels are culturally incompetent, culturally aware, culturally competent and culturally proficient (Campinha-Bacote, 2003). As noted above, there was an aggregate change of 6.6 points for the entire group denoting an improvement in cultural competence. The students shifted from the level of culturally aware toward culturally competent and culturally proficient. An improvement in IAPCC-SV scores indicates that the students are progressing toward cultural competence and cultural proficiency during the course of the curriculum.

Campinha-Bacote (2003) describes five constructs essential for the development of cultural competence for healthcare professionals: cultural awareness, cultural knowledge, cultural skill, cultural encounters, and cultural desire. In this study, all of the participants went through activities in the classroom designed to increase cultural awareness and cultural knowledge. Examples include completing a cultural autobiography, conducting and reflecting upon a cross-cultural interview, reading and discussing a medical ethnography, and working through culturally diverse client scenarios. In the experiential service-learning activities, the students regularly had cultural encounters and opportunities to apply their knowledge and grow in their awareness and skill. The students all had that opportunity but were not mandated to participate in the student-run physical therapy pro bono clinic on campus.

Students in one class who had served as student leaders of the student-led pro bono clinic for their three years in the program were more likely to exceed the MDC for the IAPCC-SV. Student leadership service is voluntary and is a commitment made in the first year of the program. It requires hours outside of class to both lead and serve in the pro bono clinic. Perhaps it is these students electing to volunteer in this way that are exhibiting inherent "cultural desire", the fifth construct of Campinha-Bacote's model and thus, experiencing more significant change in their scores. Campinha-Bacote describes cultural desire as the "motivation of the healthcare professional to 'want to' engage in the process" of becoming cultural competent (2003)." The literature provides several examples where students electing to participate in service-learning experiences demonstrate improvements in cultural sensitivity or cultural competence (Dupree & Goodgold, 2007; Hayward & Charrette, 2012; Ng, Goddard, Gribble, & Pickard, 2012).

As noted previously, the cohort in the study was unique in that it lacked ethnic diversity. This provided the opportunity to assess cultural competence development without ethnic diversity in the classroom. Romanello (2007) found that ethnic diversity in the classroom was an integral component to increasing cultural competence. This study shows that it is possible to make improvements in cultural competence even when the diversity is lacking in the classroom. While this is not ideal, it is encouraging to know that it is possible as the physical therapy profession continues to strive for a more diverse representation in the field, it is possible to enhance cultural competence in the ways described in this study.

This study's primary limitation was the use of a self-report measure to gauge cultural competence. In prior research the authors have questioned the reliability of student self-report of cultural competence because students early on in their exposure to cultures may overestimate their cultural competence (Palombaro & Lattanzi, 2012). Students may be less able to accurately assess their cultural competence prior to exposure to cultures different than their own. Thus, student self-report may become increasingly reliable as students move through a physical therapy

curriculum by participating in multiple cultural encounters and opportunities to reflect on those encounters. The study also does not control for the individual clinical internship experiences that the students underwent throughout the curriculum. The first three clinical experiences occurred within the pre- and post-measure time frame. It is possible that the clinical internships in various settings largely contributed to improvements in cultural competence. It is also possible that experiences outside of the physical therapy curriculum contributed to growth.

Future study should include investigation into the student's experiences serving in leadership to this program's pro bono clinic to examine what aspects of that experience might lead to greater cultural competence. This would allow us to investigate whether students who struggle in leadership positions achieve the same level of cultural competence as those who do not and would also assist the program in incorporating similar experiences for all students. Investigating whether there is a threshold related to number of hours of service in the pro bono clinic associated with development of cultural competence would help this program plan for opportunities to promote cultural competence among its students. Additionally, tracking students at entrance to the program, at the program's midpoint and upon completion of the curriculum would allow for a better understanding as to whether students overestimate their cultural competence and then adjust their self-assessment after exposure to cross-cultural encounters. Finally, an investigation into other programs with opportunities for leadership and cross-cultural encounters may also yield additional information as to whether the actual experience, leadership opportunities imbedded into an experience or both have an impact on IAPCC-SV scores.

Conclusion

This study points to improvement in cultural competence scores pre and post a three-year curriculum that includes didactic classroom activities centered around cultural competence and emphasis on service learning and cultural encounters. Campinha-Bacote states, "cultural encounters is the pivotal construct of cultural competence that provides the energy source and foundation for one's journey towards cultural competence (2003)."

Curricular integration of cultural competence development including traditional classroom as well as community-based service-learning opportunities yielded improvements in cultural competence as measure by the IAPCC-SV tool. Increased exposure to service-learning and leadership opportunities provided these physical therapy students with the opportunity to improve their cultural competence in significant and measurable ways.

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JOSOTL
JOURNAL OF THE SCHOLARSHIP OF TEACHING AND LEARNING

Mission

Founded in 2001, the Journal of the Scholarship of Teaching and Learning (JoSoTL) is a forum for the dissemination of the Scholarship of Teaching and Learning in higher education for the community of teacher-scholars. Our peer reviewed Journal promotes SoTL investigations that are theory-based and supported by evidence. JoSoTL's objective is to publish articles that promote effective practices in teaching and learning and add to the knowledge base.

The themes of the Journal reflect the breadth of interest in the pedagogy forum. The themes of articles include:

1. Data-driven studies: formal research projects with appropriate statistical analysis, formal hypotheses and their testing, etc. These studies are either with a quantitative or qualitative emphasis and authors should indicate the appropriate domain. Acceptable articles establish a research rigor that leads to significant new understanding in pedagogy.

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3. Reviews: Literature reviews illuminating new relationships and understanding, meta-analysis, analytical and integrated reviews, etc.

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Style Sheet for the *Journal of the Scholarship of Teaching and Learning*

John Dewey[1] **and Marie Curie**[2]

Abstract: This paper provides the style sheet for the Journal of the Scholarship of Teaching and Learning. Manuscripts submitted for publication should adhere to these guidelines.

Keywords: radiation, metacognition, identity theory, constructivism, educational philosophy.

General Guidelines for the Manuscript

The final manuscript should be prepared in 12-point, Times New Roman, and single-spaced. Submissions should be double-spaced. All margins should be 1 inch. The text should be fully left- and right-justified. The title (in 16 point bold) and author's name (in 12 pt. bold) should be at the top of the first page. The author's name should be followed by a footnote reference that provides the author's institutional affiliation and address. The abstract should be indented 0.5" left and right from the margins, and should be in italics.

Except the first paragraph in a section subsequent paragraphs should have a 0.5" first line indent. Use only one space after the period of a sentence (word processors automatically adjust for the additional character spacing between sentences). The keywords should be formatted identically to the abstract with one line space between the abstract and the keywords. Authors should use keywords that are helpful in the description of their articles. Common words found in the journal name or their title article are not helpful.

Pages should be unnumbered since they will be entered by the Journal editorial staff. We will also insert a header on the first page of the article, as above.

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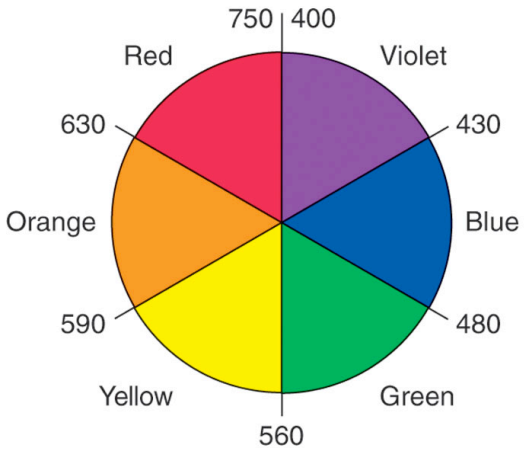

Figure 1. Color wheel with wavelengths indicated in millimicrons. Opposite colors are complementary.

Acknowledgements

Acknowledgements should identify grants or other financial support for this research by agency (source) and number (if appropriate). You may also acknowledge colleagues that have played a significant role in this research.

Appendix

Please insert any appendices after the acknowledgments. They should be labeled as follows:

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