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*The Journal of Effective Teaching* is accepting submissions for review for the Spring 2015 issue. Manuscripts will be due October 31, 2014. The expected publication date will be February 28th. Articles will be accepted in any of the Content Areas supported by the journal.
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Manuscripts for publication should:

- Follow APA guidelines (5th Edition).
- Include an abstract and 3-5 keywords.
- Typeset in English using MS Word format and 12 pt Times New Roman
- Articles/essays on effective teaching should be 2000-5000.
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Letter from the Editor-in-Chief:
Don’t Panic, It’s Only an Exam

Russell L. Herman

The University of North Carolina Wilmington, Wilmington, NC

“We must be careful not to discourage our twelve-year-olds by making them waste the best years of their lives preparing for examinations.” - Freeman Dyson (1988)
Infinite in All Directions

Another exam is in the works. We just came out of a two hour review answering questions and working practice problems. Writing an exam can take days of preparation, longer than some of the students will study for it. We worry about the details. Will the exam be too hard, too long, too easy? Unfortunately, it is hard to prepare an easy exam.

Not only do students stress over exams, but instructors spend hours compiling, grading, and fretting over the exams. Exams are (often) part of our assessment of student learning and it certainly would be nice if we could close the assessment loop, especially after a final exam. There should be one more class in which we would review the final and review important missed questions.

Professors and students have been at opposite ends this process for many decades. Levine (1978) discusses some of the history of exams in colonial U.S. universities. It is interesting to read Levine’s account of how the German style of lectures took over the recitation-disputation form of instruction and assessment of student learning. For the most part, students participated in oral examinations on a regular basis as early as the mid-1600s at Harvard, the first colonial college. In 1804-05 quizzes were introduced at Yale and Levine (1978) noted that the word “cram” was first coined. A decade later, Yale began yearly tests on the curriculum. By 1830, written exams were being given at the end of both the sophomore and the senior year. In 1882 the University of Michigan introduced end of course examinations, which replaced the general exam.

The nature and type of exams have always been challenged. Today, Khan (2011) argues that while exams provide a snapshot of where students are, there are plenty of issues with the way we employ exams. Often, teachers move on and students are left to relearn earlier material on their own, if at all. A good student would correct the errors and hopefully learn from their mistakes. For example, when a large number of students do not get key points on my exams, as demonstrated by failing to answer an exam problem, I might assign extra credit for them to go back and work out the problems. The idea is to give them

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a chance to self-correct and learn from their mistakes. However, it is not possible to do this on final exams and a learning opportunity is missed unless this is the first of a sequence course.

There are a variety of test types: multiple choice, true-false, short answer essays. In the mathematics, physics, and some other STEM courses, instructors have students work out problems similar to what they had encountered in the exercises they have done and aimed at displaying their understanding of the methods or concepts in the material covered in the course. When multiple choice questions are given, they are designed to test a concept. Sometimes short answers are solicited also to test terminology, notation, or key formulae. It is surprising how little even good students understand simple concepts while being able to manipulate more complex problems at all levels of the curriculum.

Another source of amazement is the study habits of students. One might think that continual practice and keeping up with the material throughout the course is often not sufficient to prepare for exams. Many students “study” right up to the last few minutes before the exam. These students have all sorts of ways of preparing: creating crib sheets, writing all of the main ideas on a white board a few days before the exam, highlight the book or notes, or preparing notecards filled with equations or terms. A number of students stay up all night, thus not getting the rest that many of us suggest they should have. Cramming at the last minute is common practice.

Gurung, Weidert, and Jeske (2010) developed a 35-item Study Behaviors Checklist, based on other studies, and assessed a class of psychology students on their study techniques. They found that their students performed better when the attended class, answered questions on a study guide, used practice exams, and were able to explain the material. The number of study hours did not correlate to their scores. However, they also found that many of the study strategies that we might recommend had little, or negative, correlation with exam scores. High GPA students who highlighted material for later review did worse on the exam and low GPA students had several negatively correlated behaviors to exam score, such as highlighting important information to look over later, looking over class notes to fill in missing information, reading difficult material slowly, setting up a study schedule, requesting additional materials. Overall, the current studies seeking optimal study skills suggest that there are no strategies that work for every student. (Other studies noted by Gurung, Weidert, and Jeske (2010) are Gerung (2003), Hadine & Winne (1996), and Hattie, Biggs, & Purdie (1996).)

Another issue in testing is the use of finals. It is surprising that in 2010 there was much made in the media about Harvard’s recent decision not to require final exams. The faculty voted to allow instructors to not have final exam slots reserved if they chose to do so. It was noted (Harvard, 2010) that of 1137 undergraduate courses, only 259 final exams were scheduled. Out of over 500 graduate courses, only 14 had scheduled final exams. Typically, universities have a policy that faculty must give final exams, or at least meet their classes during that slot. In many disciplines final exams might be replaced by projects or papers as a more appropriate or useful, assessment tool.
Many of us have experienced final exams as students. Such exams can be stressful to students and often after grading these exams we might even wonder if the students learned anything. Final exams are used to assess what students have learned. There are alternative assessment tools that we can use, such as chapters tests, writing papers, doing presentations or performances, presenting a course portfolio, etc. Not all courses are assessed through a comprehensive, or cumulative, exam. However, students should be exposed to such exams at least for practice, if not for other benefits of taking such exams. Students entering college, or entering postgraduate programs, have to take standardized exams like the SAT, ACT, GRE, Praxis, LSAT, MCAT, or actuary exams in order move on to the next level of their career goal. Once in graduate school, medical school, or law school, students are faced with other comprehensive exams as gateway, or there may be courses in which there are only one or two exams. Without some practice at studying and taking such exams, students may not succeed. So, in part, the final can also be seen as learning how to digest multiple content areas and putting this information into perspective.

I’d like to think that the final exam gives students an opportunity to look back over previous exams and the entire course in order to put the material into perspective and perhaps see the whole picture at the end of four months of study of a subject. Unfortunately, student study habits or time management might not make this a reality. Very often students may put off studying for the final and not devote the time needed to get the complete perspective, but it is a good goal to have in mind.

There are studies indicating that cumulative exams may aid in student learning. Petrowsky (1999) surveyed students and found that the students believed that they spent more time studying and had obtained a fuller understanding of courses which had cumulative exams. Szpunar, McDermott and Roediger (2007) indicate the expectation of a cumulative final has an effect on how students process course material. Repeated testing and expectations of retesting can lead to improved performance on the final.

Khanna, Badura Brack, and Finken (2013) looked into the benefits of cumulative and noncumulative finals on student retention of material in introductory psychology courses. They found that students who had taken cumulative finals outperformed other students as much as eighteen months after the course. However, they did not notice quite the same effects in upper level courses.

There is still much to be learned about writing, grading, studying for, and taking exams. Perhaps some of our future authors are just now exploring research on these topics.

References


Pedagogical Strategies Used by Selected Leading Mixed Methodologists in Mixed Research Courses

Rebecca K. Frels\textsuperscript{a}, Anthony J. Onwuegbuzie \textsuperscript{b}, Nancy L. Leech \textsuperscript{c}, and Kathleen M. T. Collins \textsuperscript{d}

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Abstract

The teaching of research methods is common across multiple fields in the social and educational sciences for establishing evidence-based practices and furthering the knowledge base through scholarship. Yet, specific to mixed methods, scant information exists as to how to approach teaching complex concepts for meaningful learning experiences. Thus, the purpose of this mixed research study was to examine strategies used by selected U.S.-based leading mixed methodologists in mixed research courses as related to significant learning goals for course design. In addition, we examined the extent that their philosophical stances influenced teaching and course objectives for student learning. Participants were 12 leading mixed methodologists who were instructors of mixed research courses from various institutions representing multiple conceptual stances applicable to the teaching of mixed research. Instructional practices are presented for instructors to consider when designing and teaching mixed research and general research methodology courses across disciplines.

Keywords: Mixed methods research, mixed research, pedagogy, learning goals, conceptual stance, philosophical assumptions.

The last decade has witnessed an exponential increase in the number of mixed methods research studies - hereafter referred to as mixed research - in the published literature (i.e., journal articles, book chapters, books). Indeed, Ivankova and Kawamura (2010), who examined five major databases (i.e., PubMed, ERIC, PsychInfo, Academic One File, and Academic Search Premier) representing 10 subject areas (i.e., business, communication studies, education, health and medicine, library studies, political studies, psychology, social work, sociology, and women’s studies) and two mixed research journals (i.e., \textit{Journal of Mixed Methods Research} and \textit{International Journal of Multiple Research Approaches}) from January 2000 to April 2009 documented that the number of methodological mixed research articles increased from 3 in 2000 to 26 in 2006 and 22 in 2008. In ad-

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dition, the number of empirical mixed research articles increased from 10 in 2000 to 243 in 2008.

Despite this increase in the number of published mixed research works, there are still some topics related to mixed research that have received relatively little attention. In particular, Teddlie and Tashakkori (2010) identified the following nine important issues or controversies in contemporary mixed research: (a) conceptual stances; (b) the conceptual/methodological/methods interface; (c) the research question or research problem; (d) language; (e) design issues; (f) analysis issues; (g) issues in drawing inferences; (h) practical issues in the application of mixed research (e.g., pedagogy, collaboration, other models, funding); and (i) cross-disciplinary and cross-cultural applications. However, of these nine issues/controversies, we believe that the most important issue pertains to pedagogy because the ways in which students of mixed research are trained will play an important role in shaping the future of researchers across multiple disciplines in the social and educational sciences.

Thus, it is surprising that relatively few works have been published in the area of pedagogy in mixed research even though research, per se, influences best practices and contributes to essentially every field. Interestingly, slightly more than 10 years ago, in their thought-provoking chapter that appeared in the seminal first edition of the Handbook of Mixed Methods Research (Tashakkori & Teddlie, 2003a), Creswell, Tashakkori, Jensen, and Shapley (2003) observed that pedagogy of mixed research and research pertaining to the nature of mixed research courses need greater attention, and initiated a call for further research in this area. However, in the 6 years (i.e., 2004-2009) that followed Creswell et al.’s (2003) call, only five works had been published in the area of mixed research pedagogy. Encouragingly, in 2010, James H. Davidson, Publishing Director of the International Journal of Multiple Research Approaches, provided some leadership in this area by publishing a special issue on teaching mixed research that was guest-edited by Leech, Onwuegbuzie, Hansson, and Robinson (2010). This special issue contained nine articles that more than doubled the number of pedagogical works. However, despite this surge in works in 2010, the number of published works in this area remains relatively scant. As conveyed by Earley (2007), instructors of research methodology courses need a better understanding of how to teach students to address research from more than a mono-method design.

Building on the works of Onwuegbuzie, Frels, Leech, and Collins (2011), we conducted a comprehensive review of literature databases representing numerous social and behavioral science disciplines (e.g., business, education, psychology, social work, sociology, health and medicine, political studies, library studies, communication studies) for the years for which records existed, which revealed only 20 works, to date, devoted predominantly or exclusively to the topic of teaching mixed research-based courses. These 20 works are presented in Table 1. Further, Figure 1 displays the frequency of pedagogical works published per year and the focus of each work. These 20 pedagogical works represent a very small percentage (i.e., approximately 2%) of the 802 mixed research articles (113 methodological and 689 empirical) published between 2000 and 2009 that were identified by Ivankova and Kawamura (2010).
Table 1. Citation Map of Works Published Pertaining to Pedagogy of Mixed Research.

<table>
<thead>
<tr>
<th>Citation</th>
<th>Type of Work</th>
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<tbody>
<tr>
<td>2. Tashakkori &amp; Teddlie (2003b)</td>
<td>Conceptual/Theoretical</td>
</tr>
<tr>
<td>3. Creswell, Tashakkori, Jensen, &amp; Shapley (2003)</td>
<td>Multiple mixed research-based courses or workshops at several institutions</td>
</tr>
<tr>
<td>5. Earley (2007)</td>
<td>Single mixed research-based course or training program</td>
</tr>
<tr>
<td>6. Niglas (2007)</td>
<td>Multiple mixed research-based courses taught at the same institution</td>
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<tr>
<td>7. Christ (2009)</td>
<td>Multiple mixed research-based courses taught at the same institution</td>
</tr>
<tr>
<td>14. Christ (2010)</td>
<td>Single mixed research-based course or training program</td>
</tr>
<tr>
<td>15. Hansson (2010)</td>
<td>Single mixed research-based course or training program</td>
</tr>
<tr>
<td>16. Ivankova (2010)</td>
<td>Single mixed research-based course or training program</td>
</tr>
<tr>
<td>17. Baran (2010)</td>
<td>A series of quantitative and qualitative research courses taught at the same institution</td>
</tr>
<tr>
<td>19. Onwuegbuzie, Frels, Leech, &amp; Collins (2011)</td>
<td>Multiple mixed research-based courses or workshops at several institutions</td>
</tr>
<tr>
<td>20. Frels, Onwuegbuzie, Leech, &amp; Collins (2012)</td>
<td>Multiple mixed research-based courses or workshops at several institutions</td>
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Most importantly, although each of these 20 works provides extremely useful information that adds to the knowledge base in the area of mixed research pedagogy, as noted by Onwuegbuzie et al. (2011) and as seen in Table 1, with two exceptions (i.e., Creswell et al., 2003; Onwuegbuzie et al., 2011), all of these works are either conceptual/theoretical in nature, or they describe a single mixed research-based course or training program, multiple mixed research-based courses taught at the same institution, or a series of quan-
titative and qualitative research courses taught at the same institution. However, none of the empirical works involved the comparison of pedagogy from multiple mixed research courses taught at various institutions. Thus, the transferability of the findings from these works - each of which could be described as essentially representing an intrinsic case study (Stake, 2005) - could not be assessed directly by their authors. Creswell et al.’s (2003) research in the area of mixed methods pedagogy offered insight for future research and discussion pertaining to how best to teach optimally the “new and more complicated designs” (p. 633) to students.

Onwuegbuzie et al. (2011) responded to Creswell et al.’s (2003) call for more information regarding the content and nature of mixed research courses. These researchers utilized mixed research techniques to compare and to contrast pedagogical approaches used by instructors in mixed research courses as well as documenting the learning experiences of students enrolled in a mixed research course. Among the numerous findings emerging from the instructor interview data was the emergence of a three-dimensional model for categorizing and organizing pedagogical approaches used in mixed research courses (cf. Figure 2). These three dimensions represented the following three metathemes - each representing a continuum - that emerged from the constant comparison analysis: Orientation (i.e., the extent to which the instructor instills the importance of understanding qualitative and quantitative research traditions before mixing research approaches), Level of Application (i.e., the degree to which the mixed research course was taught in an applied manner), and Level of Structure (i.e., the degree to which the mixed research course was structured).

**Figure 1. Frequency of works published per year and focus of the work.**

Onwuegbuzie et al. (2011) responded to Creswell et al.’s (2003) call for more information regarding the content and nature of mixed research courses. These researchers utilized mixed research techniques to compare and to contrast pedagogical approaches used by instructors in mixed research courses as well as documenting the learning experiences of students enrolled in a mixed research course. Among the numerous findings emerging from the instructor interview data was the emergence of a three-dimensional model for categorizing and organizing pedagogical approaches used in mixed research courses (cf. Figure 2). These three dimensions represented the following three metathemes - each representing a continuum - that emerged from the constant comparison analysis: Orientation (i.e., the extent to which the instructor instills the importance of understanding qualitative and quantitative research traditions before mixing research approaches), Level of Application (i.e., the degree to which the mixed research course was taught in an applied manner), and Level of Structure (i.e., the degree to which the mixed research course was structured).

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Figure 2. A three-dimensional model for categorizing and organizing pedagogical approaches used in mixed research courses. Directionality of the continua across each dimension is arbitrary. There is no intentionality of suggesting superiority of one continuum point or extreme over another. Rather, the appropriateness of the continuum point depends on the mixed research instructor. Encircled numbers represent eight possible combinations of the extreme points on the three dimensions of orientation, level of structure, and level of application.

According to Onwuegbuzie et al. (2011), the number of prior research methodology courses taken by students directly impacts the quality of mixed methodological dissertation research proposals. Further, the vast majority of students in this study (91.7%) reported positive course experiences and expressed positive perceptions about mixed research. Onwuegbuzie et al.’s (2011) mixed research study demonstrated the utility of conducting instrumental case studies - specifically, multiple/selective case studies - to study pedagogical approaches in mixed research courses. Building on Onwuegbuzie et al.’s (2011) inquiry, the purpose of the present study was to reveal and to examine the concepts and associated pedagogical strategies that are deemed important to teach from the perspectives of leaders in the field of mixed research. Through this inquiry, it was our

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2 This figure was adapted from Onwuegbuzie, Frels, Leech, and Collins (2011).
hope that instructors of mixed research courses - as well as instructors of comprehensive research courses - develop a greater understanding of philosophical/conceptual perspectives and pedagogical strategies that address significant learning experiences.

**Research Questions**

**Qualitative research questions.** The following qualitative research questions were addressed in this study:

1. What are the dominant learning goals in mixed research courses used by selected U.S.-based leading mixed methodologists?
2. What are similarities and differences in pedagogical strategies used by selected U.S.-based leading mixed methodologists?

**Mixed research question.** The following mixed research question was addressed in this study:

What are the dominant learning goals in mixed research courses used by selected U.S.-based leading mixed methodologists as a function of conceptual stance?

**Conceptual Framework**

Our study was framed using Fink’s (2003) six categories of learning goals as outlined by Earley (2007) in his seminal article for developing a syllabus. Fink (2003) developed a model of integrated course design that involves a 12-step process for creating significant learning experiences that are characterized by the following three key sets of recursive decisions: learning goals, teaching and learning activities, and feedback and assessment. The second of the 12 steps - which is part of the initial phase (i.e., building strong primary components) in integrated course design - represents a particularly important step. This step involves formulating significant learning goals. According to Fink (2003), instead of identifying a list of topics that students should learn about or master, course instructors should use a “learning-centered approach and identify what students should get out of the course” (p. 73). As such, Fink (2003) advanced a taxonomy of significant learning that promotes the following six types of significant learning: (a) *foundational knowledge* (i.e., “knowledge about the phenomena associated with the subject and the conceptual ideas associated with those phenomena” [p. 74]); (b) *application* (i.e., “an ability to use and think about the new knowledge in multiple ways, as well as the opportunity to develop important skills” [p. 74]); (c) *integration* (i.e., “the ability to connect one body of knowledge with other ideas and bodies of knowledge” [p. 74]); (d) *human dimension* (i.e., “discovering how to interact more effectively with oneself and with others” [p. 74]); (e) *caring* (i.e., “the development of new interests, feelings, and values” [p. 74]); and (f) *learning how to learn* (i.e., developing the knowledge, skills, and strategies for continuing one’s learning after the course is over” [p. 74]). Fink’s taxonomy was used in the current study to identify the kinds of teaching and learning strategies and the feedback and assessment activities that each instructor who participated in the study utilized to support significant learning in her or his mixed research course.
The research philosophical stance for our study was what Johnson (2011) labeled as *dialectical pluralism*, referring to an epistemology that requires the researcher to incorporate multiple epistemological perspectives within the same inquiry. We believed that our dialectical research philosophical stance is compatible with Fink’s (2003) model of integrated course design because this model “builds on and incorporates many ideas that already exist in the published literature on instructional design and good teaching” (p. xiii).

**Theoretical Framework**

Teddlie and Tashakkori (2010) identified the following six contemporary conceptual stances associated with mixed research: a-paradigmatic stance, substantive theory stance, complementary strengths stance, multiple paradigms stance, dialectic stance, and alternative paradigm stance (formerly called single paradigm stance). Each of these stances is summarized in Table 2. As stated by Teddlie and Tashakkori (2010), each of these six conceptual stances “has been used (explicitly or implicitly) by groups of scholars who are practicing MMR [mixed methods research]” (p. 14).

**Table 2. Teddlie and Tashakkori’s (2010) Six Conceptual Stances Associated with Mixed Research.**

<table>
<thead>
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<th>Conceptual Stance</th>
<th>Description</th>
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<tr>
<td>A-paradigmatic</td>
<td>Paradigms or conceptual stances are not important to read-world practice</td>
</tr>
<tr>
<td>Substantive theory</td>
<td>Theoretical orientations (e.g., critical race theory) are more pertinent to the underlying research study than are philosophical paradigms</td>
</tr>
<tr>
<td>Complementary strengths</td>
<td>Mixed research is possible but different approaches must be kept as separate as possible in order for the strength of each paradigm to come to the fore</td>
</tr>
<tr>
<td>Multiple paradigms</td>
<td>A single paradigm is not appropriate for all mixed research designs; rather, different paradigms are relevant for different mixed research designs</td>
</tr>
<tr>
<td>Dialectic</td>
<td>Use of multiple paradigms in a single mixed research study yields greater understanding of the underlying phenomenon</td>
</tr>
<tr>
<td>Alternative paradigm</td>
<td>Single paradigm (e.g., pragmatism-of-the-middle; transformative emancipator) is used to support the use of mixed research</td>
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Teaching per se represents an epistemology whereby the essence of knowing occurs during the act of teaching. Because there is a strong connection between philosophy and teaching, with epistemologies providing underlying theoretical frameworks for teaching (Kincheloe, Slattery, & Steinberg, 2000), it is likely that an instructor’s research philosophy plays an important role in the pedagogical approaches used in mixed research courses. Thus, it was of interest to explore this potential link for understanding better potential learning outcomes relevant to research methodology coursework.

Method

Participants and Setting

The participants were 12 leading mixed methodologists from various institutions in the United States who were instructors of mixed research courses. They were selected via a criterion sampling scheme (Miles, Huberman, & Saldaña, 2014) due to their knowledge and skills in mixed research, which includes integration of both qualitative and quantitative research methodologies. As demonstrated by Guest, Bunce, and Johnson (2006), 12 interviews are sufficient to “understand common perceptions and experiences among a group of relatively homogeneous individuals” (p. 79). Also, as concluded by Johnson and Christensen (2010), “when greater resources are available, collective case studies of around 10 cases are common” (p. 397). Thus, our sample size of 12 instructors was deemed adequate for obtaining data saturation.

The 12 instructors comprised six women and six men, who ranged in rank from assistant professor to full professor, teaching mixed research either: site-based (i.e., face-to-face), online, or hybrid (combination of face-to-face and online) context. Using the Carnegie Classification (The Carnegie Foundation for the Advancement of Teaching, n.d.), we noted the instructors’ affiliations as: institutions with very high research, institutions with high research, institutions with doctoral-level research, or institutions wherein research is not classified. With respect to the mixed research course syllabi, sample learning outcomes based on course objectives included that students would successfully:

- Understand the historical underpinnings of mixed research.
- Compare and contrast mixed research to mono-method research.
- Describe the major steps in the mixed research process.
- Evaluate several ways of collecting data in mixed research studies.
- Demonstrate ways to address legitimation in mixed research.
- Identify ethical and legal considerations involved in conducting and reporting research.

Using Teddlie and Tashakkori’s (2010) typology, with respect to mixed research conceptual stances, the composition of participants was as follows: five participants could be classified as endorsing a dialectic stance, four participants could be classified as supporting the alternative paradigm stance, two participants could be classified as promoting the multiple paradigms stance, and one participant could be classified as advancing the complementary strengths stance. Thus, four of Teddlie and Tashakkori’s (2010) six
conceptual stances were represented by the 12 participants. Table 3 presents the participants and each participant’s associated conceptual stance.

Instruments and Procedures

The 12 leading mixed methodologists were interviewed via one of three modes: face-to-face, telephone, or Internet virtual meeting. Regardless of mode, these interviews were audio-taped using two separate hand-held digital recorders to ensure clarity of recordings. The interviews were semi-structured in nature and consisted of open-ended questions. In addition to asking these questions, the interviewer(s) probed each participant’s responses in order to obtain richer data and to facilitate both theory-generation and theory-confirmation. Participants provided information about learning outcomes via syllabi and interview responses. Approval to conduct the interviews was obtained from the Institutional Review Board at the institutions of two of the researchers who conducted this study. Samples of interview questions are as follows:

1. What types of pedagogical techniques do you believe facilitate students’ learning about mixed methods? How effective do you believe they are?
2. What are the issues for instructors in designing and delivering courses that aim to develop researchers’ abilities to carry out mixed methods?
The transcribed interviews underwent member checking (Lincoln & Guba, 1985) in order to maximize descriptive validity (Maxwell, 1992). Further, recognizing that the researchers were the primary research instruments (Poggenpoel & Myburgh, 2003), the two researchers who were involved in interviewing the participants underwent debriefing interviews themselves, as conceptualized by Onwuegbuzie, Leech, and Collins (2008). According to Onwuegbuzie et al. (2008), debriefing interviews are designed to promote reflexivity; to identify biases in interpretation of data; and to obtain rich insights as to ways that the study impacted participants, stakeholders (i.e., instructors and students of mixed research courses), and the researchers themselves.

**Mixed Research Design**

The present study utilized a qualitative-dominant mixed research design (Johnson, Onwuegbuzie, & Turner, 2007). As conceptualized by Johnson et al. (2007), in this study, the researchers adopted a qualitative, constructivist-poststructuralist-critical stance with respect to the research process, while, at the same time, considering the addition of quantitative research approaches in general and quantitative analyses in particular to yield value-added inferences.

**Mixed Data Analysis**

Being *dialectic pluralists*, the researchers utilized mixed analysis techniques - specifically, a sequential mixed analysis (Onwuegbuzie & Combs, 2010) - to address the research questions. Specifically, the qualitative analyses preceded the quantitative analyses.

**Qualitative phase.** A series of classical content analyses (Berelson, 1952) was used to extract the themes pertaining to each qualitative research question. The sources for naming codes and locus of typology (i.e., theme) development were literature (i.e., based on Fink [2003]) and investigative (i.e., stemming from the intellectual constructions of the researchers [Constas, 1992]) via an iterative process involving both a priori and a posteriori coding. Also, the verification component was referential (i.e., based on Fink [2003]) and technical (e.g., use of intercoder agreement). Specifically, two of the researchers independently coded 20% of the interview data and after establishing 100% interrater reliability, using Cohen’s Kappa measure (Siegel & Castellan, 1988), one researcher coded the remaining interview data. Further, all the participants’ data were subjected to cross-case analyses (Miles et al., 2014) to determine whether the emergent themes could be disaggregated. The QDA Miner 3.2 software program (Provalis Research, 2009) was used to analyze the qualitative data.

**Mixed analysis phase.** In the mixed analysis phase, the codes extracted from the qualitative analyses were analyzed quantitatively. In particular, the codes extracted from the interviews were subjected to a correspondence analysis, which is a technique for conducting a mixed analysis of emergent themes (cf. Michailidis, 2007). We utilized the QDA Miner 3.2 software program (Provalis Research, 2009) to conduct the correspondence analysis. Thus, our analysis represented a form of *crossover mixed analysis* (Onwuegbuzie & Combs, 2010) because data associated with one tradition (i.e., qualitative, content...
analysis) were analyzed via another tradition (i.e., quantitative analysis, correspondence analysis).

Results

In creating his taxonomy of significant learning, Fink (2003) emphasized that learning is defined in terms of change for students. As such, each of his six major areas of change contains between two and five descriptive subgoals/subcategories that yield a total of 18 subgoals. It is important to note that in his taxonomy, the significant learning goals are not hierarchical but are relational and interactive. Therefore, often times, teaching strategies might be considered in one or more categories. The following sections are organized by research question and learning goals/subgoals as they relate to teaching strategies distinguished through our findings.

Qualitative Research Question 1: What are the dominant learning goals in mixed research courses used by selected U.S.-based leading mixed methodologists?

Application. Fink (2003) defined Application, which comprises five specific subgoals (i.e., Critical Thinking, Important Skills, Practical Thinking, Creative Thinking, and Complex Projects). He established that Application is the second most common educational goal for many college instructors - second to foundational knowledge. In addition, he emphasized that Application extends beyond the idea that students are learning to use knowledge, but also incorporates the idea that application, or using foundational knowledge, includes developing: Skills, Critical Thinking, Creative Thinking, Practical Thinking, and Complex Projects. For the participants in our study, Application emerged as the dominant learning goal. Within the area of application, the subtheme of Critical Thinking was mentioned by all of the 12 participants as being integral to teaching mixed research. The subtheme of Practical Thinking was noted by 11 of the 12 participants, closely followed by Creative Thinking (10 of 12 participants) and Complex Projects (8 of 11 participants). Regarding the most frequently occurring subgoal, Critical Thinking, one participant revealed,

And my goal is to get students to conceptually understand what a factor analysis is on one hand and a content analysis on the other hand, and how really you're doing the same thing. I think that the conceptual understanding of these similarities and their differences in methodological orientations is probably the most important thing. (Participant AP1)

The learning subgoal of Creative Thinking often included a strategy to address a student’s leaning toward a specific research philosophy:

So, they start off with very often broad and expansive or an impossible design which introduces the concept of the parameters of research designs and bounding the case. Their conceptual stance is what they bring into the class before they've
done the readings, often preferring a specific strand which sometimes limits their way of thinking about how to conduct research. (Participant AP2)

In the subtheme of practical thinking, one participant specified,

In a mixed research study that is evolving, and qualitative research also has that dilemma, there are going to be questions that evolve as the study evolves; and as a researcher, you have to make those quick decisions as to ‘what should I ask; what is appropriate to ask; what is inappropriate to ask; what to include; what not to include,’ and so forth. (D1)

**Integration.** Fink (2003) discriminated three realms of integration: (a) Within-Course Integration, or interdisciplinary learning (i.e., students look at problems from the perspectives of two or more disciplines or perspectives within a course); (b) Between-Courses Integration (i.e., students integrate different perspectives and focus on connecting diverse people as well as diverse fields); and (c) Other Areas of Life Integration (i.e., social or work connections stemming from academic understanding). The learning goal Integration emerged as the second most dominant goal emphasized by all 12 participants. In addition, all three subthemes (Within-Course, Between-Courses, Other Areas of Life) were emphasized by participants within the theme of Integration. With respect to Within-Course Integration, one participant discerned,

[Students] just have to learn not only the content but also they have to learn the language, the terminology, and actually, the concepts you know. Content is more methodological - how you do things differently in mixed methods research, quantitatively or qualitatively - concepts are new things that are unique to mixed methods research, for example, like how you integrate. (Participant MP1)

To address the importance of Between-Course Integration, another participant explained,

Also, I think that if you’re going to have them do a proposal or do a project, [students] have to come to the class with some sort of a content area of interest. And so, you are simultaneously trying to teach the students how to do mixed methods research and also to help them develop an area that they’re interested in. So, if they don’t come to the course with some area that they’re interested in, then it becomes sort of a hypothetical exercise. (Participant AP1)

Regarding the theme of Other Areas of Life Integration, philosophy of research appeared to help bridge concepts of mixed research embedded within either the community at-large or within the personal perspective of the individual. For example, one participant suggested,

I think that the core - if there is a core idea of mixed research - is listening to multiple perspectives and believing that something greater will be gained from that. Something better will be gained by listening and respecting multiple perspectives. (Participant D2)
A Mixed Research Study of Pedagogical Approaches

Further, another participant explained,

I would talk about the integration of thinking that emerges from a quantitative perspective, and a qualitative perspective. But I would also put that within a framework, a larger framework. What are the underlying philosophical beliefs that guide you in your understandings about the meaning of mixed methods? (Participant AP4)

Table 4 presents the emergent six learning goals and 18 subcategories/subthemes in rank order from highest in frequency to lowest in frequency relating to the participants. As seen in Table 4, even though the learning goal of Application was a dominant theme, the subtheme of Within-Course-Integration was uncovered as the most frequently occurring overall subtheme. When comparing the percentage of overall frequency of the 18 significant learning subgoals, it should be noted that: (a) Within-Course Integration, (b) Perspectives for Understanding, and (c) Key Information were only slightly higher than were the subthemes of (a) Critical Thinking, (b) Other Areas of Life, and (c) Interacting with Others.

Table 4. Significant Learning Goals and Subtotals in Rank Order of Emphasis by Leaders in Mixed Research Courses.

<table>
<thead>
<tr>
<th>Significant Learning Goal and Related Subgoals</th>
<th>Rank of Goal</th>
<th>Coding Frequency for Goal</th>
<th>Coding Frequency for Subgoal</th>
<th>% of Overall Subgoal Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>1</td>
<td>106</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative Thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complex Projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>2</td>
<td>90</td>
<td>45</td>
<td>12</td>
</tr>
<tr>
<td>Within-Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Areas of Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between-Courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation</td>
<td>3</td>
<td>76</td>
<td>39</td>
<td>10</td>
</tr>
<tr>
<td>Perspectives for Understanding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning How to Learn</td>
<td>4</td>
<td>44</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Inquiry Within-Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Directed Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to Be a Good Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Dimension</td>
<td>5</td>
<td>46</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>Interacting with Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning about Self</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Caring</td>
<td>6</td>
<td>27</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Feelings about the Subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interests about the Subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Values about the Subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mixed Research Question: What are the dominant learning goals in mixed research courses used by selected U.S.-based leading mixed methodologists as a function of conceptual stance?

The correspondence analysis yielded interesting results as a function of conceptual stance. Figure 3 displays the correspondence analysis and the 18 subthemes relating to each participant as a function of conceptual stance. In the correspondence analysis, the 18 subthemes and 12 participants were clustered on a horizontal axis with the following three of the six major learning goals, specifically identified through their related subgoals, which were positioned mostly on the far left: (a) Learning How to Learn (i.e., Inquiry Within-Course, Self-Directed Learning, How to be a Good Student), (b) Human Dimensions (i.e., Interacting with Others, Learning about Self), and (c) Changes in Caring (i.e., Feelings about the Subject, Interests about the Subject, Values about the Subject). On the far right of the continuum of the horizontal axis, two of three other learning goals (and related subgoals) are positioned: Application (i.e., Critical Thinking, Practical Thinking, Creative Thinking) and Foundation (i.e., Perspectives, Key Information). However, the learning goal Integration spans across the continuum from Inquiry Within-Course to Other Areas of Life. On the vertical axis, there were no apparent significant goals that clustered; yet, a few isolated subgoals appeared in the upper quadrants (i.e., Quadrant 1 and Quadrant 2): (a) Learning About Self (i.e., Human Dimension), (b) Critical Thinking (i.e., Application), and (c) Values about the Subject (i.e., Caring). Further, the following subgoals are positioned in the lower quadrants (i.e., Quadrant 3 and Quadrant 4): (a) Creative Thinking (i.e., Application) and (b) Feelings about the Subject (i.e., Caring).

In addition, in Figure 3, participants are identified as they are positioned in four quadrants and with respect to the 18 subgoals. Specifically, two participants are positioned in Quadrant 1, two participants are located in Quadrant 2, four participants are positioned in Quadrant 3, and four participants are located in Quadrant 4. Similar to the results of the content analysis, the subgoals that were clustered closest to the origin (i.e., intersecting axes) as central themes among participants in this area were as follows: (a) Key Information, (b) Perspectives, (c) Important Skills, and (d) Complex Projects.

Upon closer examination of Figure 3, it can be seen that two of the three learning goals (i.e., Application [Critical Thinking, Practical Thinking], and Foundation [Key Information, Perspectives]) that were positioned to the right of the vertical axis are learning goals that pertain to what might be considered the depth of teaching. Conversely, the subgoals relating to the other three learning goals (i.e., Learning How to Learn [Inquiry Within-Course, Self-Directed Learning, How to Be a Good Student], Human Dimension [Interacting with Others, Learning about Self], and Changes in Caring [Feelings about the Subject, Interests about the Subject, Values about the Subject]), which might be considered a type of breadth in teaching, appeared only on the left of the spectrum. The learning goal Integration represented both depth and breadth. Depicted in Figure 3, the two participants who held the Multiple Paradigms conceptual stance (i.e., MP1 and MP2) are situated, respectively, in Quadrant 2 and Quadrant 4 (i.e., depth in a course). Further,
Figure 3. The 18 subgoals related to six learning goals (Fink, 2003) and participants by conceptual stance. The six significant learning goals are presented as they relate to the 18 subgoals on the horizontal continuum. Also, the quadrants are numbered 1-4.
participants who were classified as representing an Alternative Paradigm stance (i.e., AP1, AP2, AP3, AP4) are scattered farthest away from each other on the correspondence plot, appearing in three of the four quadrants. Also, the one participant with the Complementary Strengths stance (CS1) is situated farthest right in Quadrant 4 and closest to one of the AP participants, specifically Participant AP3. Interestingly, both of these participants viewed the integration of course content quite uniquely. Participant AP3 emphasized in both his/her interview and member checking (by inserting an underline under the word research) the importance of presenting a mixed methods course as a research course, by stating the following:

I don't call it a mixed methods course, or mixed methods research. It is research. It is the way it's supposed to be, rather than be fragmented. Everything is together. Quant is integrated in many respects. When it comes to design for example, for experimental design, we have both qualitative kind of data, quantitative kinds of examples, questions, etc. All the way to ethnography, it's the same as we go through designs. It's the same as much as possible—they're integrated.

Also different from other participants, Participant AP2 explained how philosophy frames perspectives that are important to bridge personal beliefs and integration. This participant declared,

Combining methodological traditions in mixed methods research now includes mixing methodologies within a particular conceptual stance. What I mean by that is, I'm seeing and encouraging students to consider conceiving of mixed methods as more than qualitative and quantitative research, it can be a mixture of paradigms, conceptual stances, or mixing methodologies within a particular traditional research stance such as in the qualitative domain where combining things like transformative or critical research stances with case study design is a mixture.

Finally, Participant CS1, who held a different conceptual stance from all other participants, revealed a unique perspective of teaching mixed research that was different from all other participants:

I use the term mixed methods differently from some others. Mixed methods contain one complete method plus at least one other strategy. And if you're using two complete methods, I refer to that as ‘multiple methods.’

As can be seen in the correspondence plot, other differences with respect to the central significant learning goals can be distinguished within Quadrant 1: D1 and AP1. Both of these participants addressed bridging content with culture. As articulated by Participant D1,

I want to create a culture of research and a phrase I like to use as well is a ‘culture of open-mindedness,’ which I unfortunately don’t see enough. With open-mindedness, meaning, I am willing to learn anything? I may not use it down the road, but I am willing to learn about software, and if I don’t use it, great. But at
least if I don't use it, it is not out of ignorance; it is out of philosophy, or because it doesn't help me address my research question and so forth.

It was discovered that the majority of the participants (i.e., 9 of 12) mentioned that students should have a thorough grounding in both quantitative and qualitative research skills before undertaking a course in mixed research. One participant reasoned,

It's extremely important to me for them to fully understand the strong version of qualitative research and the strong version of quantitative research. What I mean by that is that it includes epistemological and ontological viewpoints, positions… in addition to the methods. So, I don't want anyone to argue that I didn't really teach them qualitative or say I didn't really teach quantitative or whatever it might be. So, after I've done that, now I'm really ready to teach them about mixed research. (Participant D2)

Conversely, Participant D1 surmised,

I think students need to have a thorough grounding in research, not quan not qual, but in research, because there are core things that cut across quantitative and qualitative research, we tend to focus on differences, and that is always a frustration of mine, rather than focusing on commonalities.

Thus, to distinguish further the similarities and differences, a partially ordered matrix (Miles et al., 2014) was created whereby we displayed conceptual stance, whether or not the participant mentioned the need to have a thorough understanding of quantitative and qualitative research before taking the course, and the dominant within-case participant learning goal(s). In addition, we summarized the overall impression of each within-case with a unique overall identified characteristic, or focus. Table 5 illustrates the findings pertaining to (a) the dominant learning goal(s), (b) view regarding whether a thorough grounding is needed in quantitative/qualitative research methods, and (c) overall characteristic.

**Qualitative Research Question 2: What are similarities and differences in pedagogical strategies used by selected U.S.-based leading mixed methodologists?**

Teaching strategies implemented by the participants included a variety of teaching tools for addressing the complexity of a mixed research course. The use of current published literature in the area of mixed research was a primary means to broaden students’ understanding of mixed research as a process. In addition, the use of literature was used to address Critical Thinking. In fact, some participants utilized the reading of what they deemed as poorly designed studies versus what they considered as well-designed studies to address areas such as sampling procedures, data collection, types of data, and integration. One participant (D2) described his/her use of readings:

I would ask the student to find mixed research articles - empirical studies discussing [one area of interest such as] bullying. Then, I ask him/her to critique these
To address one strategy in teaching mixed research design, another participant summarized,

Well, here's the key, I explain to students that once you have your question, you then figure out what design you're going to use. There are some good typology and designs .... And then that's going to inform a lot of phases of your project. You can now draw a visual picture of your procedures: how you're going to treat your data; where you're going to mix your data; how you think about validity; and how you think about ethical issues. So, the design sets the center of my thinking about a good mixed methods course. Now that's my particular orientation. (Participant MP2)
Similar to the results of the correspondence analysis whereby participants clustered together in depth and breadth, participants who noted the importance of quantitative and qualitative understanding before taking a mixed research course also surmised how terminology was core to understanding mixed research, as exemplified by the following statement:

And I think some of the issues that students have is learning the terminology, applying it appropriately, recognizing which concepts to use ... and how to construct dialog whether it be written or orally for communicating with others about their ideas. (Participant D3)

A frequent concept to address in teaching mixed research was to move students into the creative realm of thinking about research. For example, Participant AP1 concluded,

I think the power of mixed methods research is that it can change the way that people conceptualize ‘what normal science is.’ They can bring to that the richness of qualitative data and how the quantitative and qualitative data are not antithetical to one another; in fact, they are just opposite sides of the same page ... The data are interchangeable. And so I think what the teacher or the professor has to do with teaching a mixed methods course is get people beyond the dichotomization to a point where they're simply interested in what the research problem is and how they can approach that research problem, from a variety of different ways.

In addition, one central teaching strategy addressed by Participant D1 was to integrate learning via team-teaching with a doctoral student. He/she explained,

I try where possible to get a student, a former student, if I can, to come into the class and either give some pointers at the beginning of the course, if that is all they have the time for, but ideally they team-teach the course with me so that students can see an example of how I try to encourage life-long researchers. They can interact with the students, and so the students can have an automatic role model via this student, who is still a student.

Table 6 lists the various strategies in the voices of participants for the teaching and learning of mixed research and the domain that each strategy addressed. Similar to Fink’s (2003) description that all learning goals are integrative and iterative, as depicted through the examples in Table 6, strategies in teaching mixed research address multiple learning goals. For example, foundational elements in mixed research such as design, analysis, and development of a study might be addressed through Critical Thinking, Practical Thinking, and Between-Courses Integration. In addition, participants addressed techniques for developing student skills such as writing research and integrating ethics throughout a mixed research course that might be considered as being part of the significant learning goals of Learning How to Learn, Human Dimension, and Foundation.

To summarize further the findings pertaining to Qualitative Research Question 2, we created a matrix of instructional practices espoused by leading mixed methodologists.
Table 6. Techniques Used to Facilitate Important Skills and Domains Pertaining to the Applications of Learning Goals.

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Domain Addressed</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important</td>
<td>Design</td>
<td>When they are through with their [project], they have learned to logically think, plan and conduct research. They also are much more competent consumers of information.</td>
</tr>
<tr>
<td>Skills</td>
<td>Analysis</td>
<td>In reference to the quantitative [approach], in my class, I only focus on descriptive analyses I tend to keep it at descriptive level only, to allow as many students [in the course] to be able to interact with the dataset.</td>
</tr>
<tr>
<td>Important</td>
<td>Analysis</td>
<td>The analyses are descriptive analyses. They don't do any conversion at this point, [they do] descriptive analyses, and then they augment it [this analysis] by a content analysis.</td>
</tr>
<tr>
<td>Skills</td>
<td>Ethics</td>
<td>I should do more…as Joe Maxwell has said many times: the practice is so much more complicated than the theory. And, you know, the steps should be iterative. Not linear and it shouldn't be. They should be, back and forth and around and around.</td>
</tr>
<tr>
<td>Important</td>
<td>Analysis</td>
<td>I never expect them to collect a lot of data, but they have to collect some data ; their data sets don't have to be huge and, most of the time they don't have enough power to find significance, and things like that, but I'm not that worried about that. I'm more worried about their going through the motions of what they will be doing in a study.</td>
</tr>
<tr>
<td>Skills</td>
<td>Design</td>
<td>It's, for you as a teacher to use as examples. Present your own work is a tremendous boost, as you can describe the decisions, the compromises and the problems and how they were overcome. It is one thing to have a perfect design, another to be able to execute it in the research setting.</td>
</tr>
<tr>
<td>Important</td>
<td>Writing</td>
<td>They will get feedback on their ability to write in a technical way, which would include the words that they use, include grammar, include APA, and so forth, with a goal that once they have done that a couple of times, they have really started to get a feel for how to write up the results of a research study.</td>
</tr>
<tr>
<td>Skills</td>
<td>Analysis</td>
<td>They'll be given a data set and I give them some research questions that are mixed and ask them to analyze the data and write it up in a way that would appear like it would in a journal.</td>
</tr>
<tr>
<td>Important</td>
<td>Analysis</td>
<td>I think one of the things that really helps, and there is a barrier associated with that, in my present institution, is the use of software…like QDA Miner.</td>
</tr>
</tbody>
</table>

Figures 4, 5, 6, and 7 each present a conceptually ordered matrix, specifically a content-analytic summary table (Miles et al., 2014) to illustrate: (a) activities for teaching mixed research (Figure 4); (b) content important to include in mixed research courses (Figure 5); (c) design components to include in teaching mixed research (Figure 6); and (d) ethics
specific to mixed research (Figure 7). It should be noted that just because an instructional practice is not identified by a participant from one conceptual stance does not necessarily mean that it is not used. However, this strategy was foremost on the mind(s) of those who stated it.

Discussion

Due to the fact that research methodology courses often involve some level of application and involve interacting with other disciplines, it is not surprising that our findings unveiled the learning goals of application and integration as being highly emphasized by these instructors of mixed research. Importantly, due to the complex nature of mixed research (i.e., involving “mix[ing] or combin[ing] quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”; Johnson & Onwuegbuzie, 2004, p. 17), leaders in the field also emphasized the importance of critical thinking and understanding various perspectives almost as equally as they emphasized the importance of the subgoals pertaining to key information, application, and integration.

The finding that the AP participants were located far away from each other in general highlights the way that overall philosophy of the instructor might impact pedagogy. The unifying element of this stance is the belief that mixed research should be driven by a different paradigm from those paradigms associated with quantitative (e.g., postpositivism) and qualitative (e.g., social constructionism, critical theory) research traditions. Therefore, it is not surprising that these participants did not appear close to each other on our correspondence analysis plot. For example, the transformative emancipatory stance (cf. Mertens, 2010) is very different to various forms of pragmatism (cf. Biesta, 2010; Johnson et al., 2007). Thus, it might not be surprising that they would fall into different quadrants pertaining to learning goals. In fact, in Quadrant 3 of the correspondence analysis plot, it can be seen that the humanistic pieces of teaching, as we identified as breadth, is associated with the transformative emancipatory conceptual stance. Conversely, a pragmatist who is considered as representing the Alternative Paradigm stance might realistically align with the depth quadrants that emphasize in-depth tools that tend to work when conducting research. This finding provides compelling evidence of the role that a teacher’s research philosophy plays in the formation and utilization of pedagogical approaches in mixed research courses.

Regarding the two Multiple Paradigm stance participants, our findings offer some insight into the relationship between this conceptual stance and significant learning goals. According to the Multiple Paradigm stance, a single paradigm is not appropriate for all mixed research designs and that paradigms can be tailored to fit the research question and research design. In order to do this, a student would need a very in-depth understanding of multiple research paradigms before determining a best fit. Thus, it is not surprising that these participants fell within the right quadrants, or what we described as representing depth in the course content.

Similarly, the participants who held beliefs associated with the Dialectic stance, with the exception of one participant, tended to fall near the origin of the plot and around the
Activities for Learning Mixed Research | Conceptual Stance of Participant(s) | Relevant Significant Learning Goals
--- | --- | ---
Discussion of research traditions and methodologies | All | Within-Course
Structure thinking before implementing the study | All | Critical Thinking
Use a model such as the 13-step (Collins, Onwuegbuzie, & Sutton, 2006) | DP | Practical Thinking
Each week, use published readings to interpret each step of research | All | Critical Thinking
First session, introduce or compose a definition of mixed method research | Most | Key Information
Provide an overview of quantitative and qualitative research | Most | Key Information
Be sure to balance: philosophical, conceptual, and applied components | All | Perspectives
Integrate the course as much as possible from the beginning: historical, philosophical, worldview issues, sampling, and data collection | Most | Within-Course Integration
Provide a variety of readings to address philosophical issues | All | Perspectives
Include a reflective piece such as a reflective journal | DP | Learning about Self

**Figure 4.** A content-analytic summary table of instructional practices of U.S.-based leading methodologists for addressing class structure specific to mixed research. In the column that notes the conceptual stance of participant(s), if more than one conceptual stance-participant noted the instructional practice, it is labeled as *most.* If all three of the conceptual stance-participants noted the instructional practice, it is labeled as *all.*
<table>
<thead>
<tr>
<th>Practices for Addressing Content Specific to Mixed Research</th>
<th>Conceptual Stance of Participant(s)</th>
<th>Relevant Significant Learning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasize design and validity issues, or as Jennifer Greene might say is a <em>good mental model</em></td>
<td>AP</td>
<td>Perspectives</td>
</tr>
<tr>
<td>Teach more than one conceptual stance</td>
<td>All</td>
<td>Perspectives</td>
</tr>
<tr>
<td>Bring students to a deeper understanding of how you bring methods together</td>
<td>All</td>
<td>Practical Thinking</td>
</tr>
<tr>
<td>Incorporate a type of <em>street smart ability</em> for students that they make clear all components of the study</td>
<td>AP</td>
<td>Other Areas of Life</td>
</tr>
<tr>
<td>Get students to a point to recognize the overall value of mixing</td>
<td>All</td>
<td>Values about the Subject</td>
</tr>
<tr>
<td>Incorporate conceptual understandings for analyses, such as what a factor analysis is versus a constant comparison analysis—as being parallel</td>
<td>DP</td>
<td>Between-Courses Integration</td>
</tr>
<tr>
<td>Help students become <em>methodologically eclectic</em></td>
<td>AP</td>
<td>Changes in Interests</td>
</tr>
<tr>
<td>Use the <em>Journal of Mixed Methods Research</em> for examples of research by experienced researchers</td>
<td>Most</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>Incorporate the <em>Sage Handbook of Mixed Methods Research</em> into readings</td>
<td>All</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>Use a rubric to help guide students to evaluate readings</td>
<td>DP</td>
<td>Practical Thinking</td>
</tr>
<tr>
<td>Have students draw the design of published articles</td>
<td>CSS</td>
<td>Creative Thinking</td>
</tr>
<tr>
<td>If textbooks present mixed research in dichotomies, assign chapters such as 1 and 13 at the same time</td>
<td>AP</td>
<td>Within-Course Integration</td>
</tr>
<tr>
<td>Remember that mixed research terms are new to students such as ontology, epistemology. Simplify these</td>
<td>Most</td>
<td>Key Information</td>
</tr>
</tbody>
</table>

**Figure 5.** A content-analytic summary table of instructional practices of U.S.-based leading methodologists for content important to include in mixed research courses. In the column that notes the conceptual stance of participant(s), if more than one conceptual stance-participant noted the instructional practice, it is labeled as *most*. If all three of the conceptual stance-participants noted the instructional practice, it is labeled as *all*. 

©2014 All rights reserved.
<table>
<thead>
<tr>
<th>Practices for Addressing Design Components in Mixed Research</th>
<th>Conceptual Stance of Participant(s)</th>
<th>Relevant Significant Learning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize sequence: a credible database, an audit trail that is evidence-based, integrate the findings</td>
<td>Most</td>
<td>Practical Thinking</td>
</tr>
<tr>
<td>Clear confusion regarding sampling: what is a population versus a probabilistic sample?</td>
<td>All</td>
<td>Key Information</td>
</tr>
<tr>
<td>Experience collecting data, especially qualitative to compare with other data collection experiences in quantitative</td>
<td>All</td>
<td>Within-Course Integration</td>
</tr>
<tr>
<td>Incorporate legitimation criteria, such as Onwuegbuzie and Johnson (2006)</td>
<td>DP</td>
<td>Foundation</td>
</tr>
<tr>
<td>Use diagrams throughout every stage of the research design</td>
<td>DP</td>
<td>Creative Thinking</td>
</tr>
<tr>
<td>Begin with an overarching problem and design a complementary set of quantitative or qualitative questions, then integrate the findings at the end</td>
<td>DP</td>
<td>Other Areas of Life Integration</td>
</tr>
<tr>
<td>Demonstrate how to follow through on research</td>
<td>All</td>
<td>Values about the Subject</td>
</tr>
<tr>
<td>Help students decide mixing points, where they will mix the two approaches</td>
<td>Most</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>Bring to students’ awareness that mixed research is a hot topic, but also requires a greater knowledge and greater time commitment</td>
<td>AP</td>
<td>Learning about Self</td>
</tr>
</tbody>
</table>

**Figure 6.** A content-analytic summary table of instructional practices of U.S.-based leading methodologists for design components to include in mixed research courses. In the column that notes the conceptual stance of participant(s), if more than one conceptual stance-participant noted the instructional practice, it is labeled as *most*. If all three of the conceptual stance-participants noted the instructional practice, it is labeled as *all*. 

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### Practices for Addressing Ethics Specific to Mixed Research

<table>
<thead>
<tr>
<th>Practices for Addressing Ethics Specific to Mixed Research</th>
<th>Conceptual Stance of Participant(s)</th>
<th>Relevant Significant Learning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporating how to address Institutional Review Board (IRB) with both quantitative and especially qualitative data collection: What is important to note?</td>
<td>All</td>
<td>Values about the Subject</td>
</tr>
<tr>
<td>How ethics flow through data collection, data analysis, the write-up stage pertaining to the mixed design</td>
<td>All</td>
<td>Complex Projects/Critical Thinking</td>
</tr>
<tr>
<td>Using the mixed research perspective for inspecting a position on ethics: examine what you value, examine the different ways to get there. It is an examination of the means and the end.</td>
<td>Most</td>
<td>Learning about Self/Values about the Subject</td>
</tr>
<tr>
<td>Examine the mixed research perspective that says to listen to different and multiple perspectives and construct the most ethically justified position of these viewpoints</td>
<td>Most</td>
<td>Self-Directed Learning</td>
</tr>
<tr>
<td>Use role plays to communicate mixed methods to an IRB representative</td>
<td>AP</td>
<td>Creative Thinking</td>
</tr>
<tr>
<td>Decide if consent is quantitatively driven or qualitatively driven</td>
<td>DP</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>Incorporate the voices of participants and know that the researcher voice is always present</td>
<td>AP</td>
<td>Interests about the Subject</td>
</tr>
<tr>
<td>Utilize Guba and Lincoln’s (1989) authenticity criteria to strive not only to do no harm, but moreover to do good</td>
<td>Most</td>
<td>Interacting with Others</td>
</tr>
<tr>
<td>Inspect Mertens’s (2010) transformative-emancipatory stance to learn how to make a difference for your participants</td>
<td>Most</td>
<td>Values about the Subject</td>
</tr>
<tr>
<td>Discuss responsibilities to gatekeepers, stakeholders, and also the people of whom you promise things: these are the same issues that are noted in ethnography and anthropology</td>
<td>Most</td>
<td>Interacting with Others</td>
</tr>
</tbody>
</table>

**Figure 7.** A content-analytic summary table of instructional practices of U.S.-based leading methodologists for ethics to include in mixed research courses. In the column that notes the conceptual stance of participant(s), if more than one conceptual stance-participant noted the instructional practice, it is labeled as *most*. If all three of the conceptual stance-participants noted the instructional practice, it is labeled as *all*.
central unifying learning goals highlighted by Fink (2003) as being the most common focus of most college instructors: foundational knowledge and application of that knowledge. Finally, the participant who adhered to a Complementary Strengths stance fell furthest within the depth quadrant, which also provides some evidence that this stance might be quite unique. Regardless, a strong research philosophy, which, Collins, Onwuegbuzie, and Johnson (2012) referred to as “philosophical clarity” (p. 854), seems to be interrelated to pedagogical strategies for these mixed research instructors.

Potential limitations of our study included descriptive credibility, such as the academic time of year (October through November) because instructors might have been overly cognizant of one group of students versus prior groups of students. In addition, as leaders in the field of mixed methodology, participants might have experienced reactivity to the study and a heightened enthusiasm for characteristics of mixed research. Trustworthiness was addressed through member-checking and the use of original language of participants. In addition, the primary researchers addressed reflexivity through debriefing interviews as suggested by Frels and Onwuegbuzie (2012) in the data collection, data analysis, and data reporting stages of the study.

Implications

As distinguished by Fink (2003), good courses include “teachers who care - about the subject, their students, and about teaching and learning” (p. 28). Without doubt, as U.S.-based leaders in the field of mixed research, it is clear that the participants who engaged in our study care about the future of mixed research and successful learning by their students. As passionate leaders in the field, the 12 participants in our study, on average, had secured (a) 160.33 works published in the literature; (b) at least 5,625.17 citations for their works; and (c) a h-index of 23.08, indicating that, on average, at least 23 of their works had been cited on at least 23 occasions (Hirsch, 2005). Although our study recognized pedagogy and concepts specific to mixed research (e.g., data collection methods, legitimation, ethics), it is important to note some of the additional overall developmental characteristics that emerged as being important to participants in our study. These areas revealed the importance of expanding perspectives, critical thinking skills, and other learning goals outlined by Fink (2003) for integrated course design.

For addressing the research questions and to recognize the teaching strategies used by selected U.S.-based leading mixed methodologists, it was not our intention to generalize beyond our study. However, due to the fact that the concepts in general research methodology courses are the building blocks for mixed research coursework, a naturalistic generalization (Stake & Trumbull, 1982) might be considered by instructors of social and educational research methodology courses in multiple fields of study. Because mixed research methodology - by its very nature - is intended to expand possibilities for addressing particular goals and objectives not possible through the use of mono-methods alone, the associated pedagogical strategies might reveal ways to approach multiple and complex research concepts.
The nature of mixed research is naturally integrative; thus, it is not surprising that teaching strategies used by mixed research instructors align strongly with integrated course design. It is our hope that by recognizing that these goals and their similarities and differences are influenced by philosophical/conceptual stance, mixed research instructors and general research methodology instructors might reflect and re-evaluate ways in which philosophy, pedagogical strategies, and learning goals are reflected in course design. Therefore, one implication for mixed research course instructors might be to refer to Earley’s (2007) recommendation of aligning learning goals with course objectives using a reflective practice that examines the learning process for ongoing course development. For example, instructors might reflect on Fink’s (2003) goals and assess their efforts in addressing student researcher identity - intentionally addressing the human dimension goal.

Another implication emerging from our study is the idea that if students are to navigate successfully through a course in mixed research, instructors might initiate dialogue aimed at differentiating concepts from quantitative and qualitative research traditions in an active, integrative process specific to their fields of study. Further, instructors of research methodology courses in general (e.g., educational research) might reflect on ways to adopt mixed research concepts and philosophical diversity that might enhance creative thinking for students. As revealed by the findings for practical techniques in teaching mixed research (see Figures 4-7), many of the learning outcomes appear to overlap with concepts presented in general research methodology courses, such as quantitative sampling techniques, data analysis techniques, and ethical considerations.

Due to the fact that our study aligned philosophical stance with teaching approaches, it was important for us to examine how our stated conceptual stance of dialectical pluralism impacted the interpretation of our findings. Dialectical pluralism is a stance whereby the researcher listens carefully and interprets the values, ideas, and concepts of multiple ontologies, epistemologies, methodologies that include stakeholder and local perspectives (Johnson, McGowan, & Turner, 2011). Simply put, our dialectical pluralist stance guided the way that we situated the multiple perspectives of participants and focused on diversity in approach of teaching strategies in mixed research courses.

In closing, the current study continues the dialogue called for by Creswell et al. (2003), Earley (2007), and Onwuegbuzie et al. (2011) to examine the rapidly developing field of mixed research for the next generation of researchers who are influenced by pedagogy and teaching approach. The U.S.-based leaders of mixed research who participated in our study delineated concepts, strategies, and course design elements specific to mixed research that they deemed important for teaching and learning mixed research. We encourage future researchers to continue our line of inquiry so that instructors of mixed and general research methodology courses alike might better understand the impact of philosophical/conceptual stance, pedagogical strategies, and integration of learning goals for student development.
References


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Teaching Evolution: From SMART Objectives to Threshold Experience

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Abstract

Despite the centrality of evolution to the study of biology, the pedagogical methods employed to teach the subject are often instructor-centered and rarely embedded in every topic throughout the curriculum. In addition, students’ prior beliefs about evolution are often dismissed rather than incorporated into the classroom. In this article we describe the use of SMART (specific, measurable, attainable, relevant and time-sensitive) guidelines to “flip” our classroom in order to create and maintain a supportive learning environment that addresses these concerns. This environment consisted of at-home learning modules deployed at specific times throughout the semester. We found that students responded well in the environment and generally achieved our benchmarks for performance. We observed that many students struggled both with conceptual understanding as well as their conflict between deeply held personal beliefs and evolutionary theory. Our observations also appear to support the view that evolution through natural selection is a threshold concept in biology.

Keywords: Evolution, natural selection, SMART guidelines, threshold concepts, flipped classroom.

Nothing in biology makes sense except in the light of evolution. (Dobzhansky, 1973)

As Dobzhansky’s famous quote communicates, the concept of evolution through natural selection is perhaps the central theme in biology. Yet, multiple obstacles exist in the classroom that can create an environment in which its concepts can be difficult for students to grasp. First, evolution is often addressed as a separate principle and rarely embedded in every topic throughout a biology curriculum. In addition, evolutionary concepts are often taught using instructor-centered models of education, where content delivery is prioritized through methods such as the traditional lecture. This, despite the evidence that there are critical impediments to learning through traditional lecture and that student-centered instruction produces better learning outcomes (Armbruster, Patel, Johnson, & Weiss, 2009). Furthermore, evolutionary biology comprises concepts that students often find difficult, even in other contexts, such as the notions of equilibrium and change.
complexity, scale, variability and hypothesis creation. These (as well as others) have been classified as threshold concepts within evolution (Taylor 2006), meaning these ideas present troublesome knowledge and that once mastered, can result in fundamental changes in understanding (Meyer and Land, 2006). Finally, confronting the commonly held belief that humans represent the pinnacle of a teleological evolutionary process as well as the influence of theological thinking in the classroom presents its own challenges.

In their seminal article detailing the challenges and solutions involved in teaching evolution in a higher education setting, Bruce Alters and Craig Nelson emphasize that the key to teaching evolutionary theory in the classroom is to adopt student-centered learning as opposed to the more traditional instructor-centered teaching methods (Alters & Nelson, 2002). In instructor-centered teaching, the focus is on the delivery of content with the students absorbing material to the best of their ability. Learning in this setting is often either superficial or strategic. Superficial learning is defined here as the student memorizing information without making any connections to prior knowledge, while strategic learning is characterized by an orientation towards getting a good grade with very few students actually applying the knowledge gained in the classroom to real world situations (Entwistle, 1987). In contrast, student-centered learning is designed to promote deeper learning where students are able to understand, internalize, and then apply concepts learned to real world situations (Bender 2003; Blumberg, 2009; Carmean & Haefner, 2002). Properly implemented, this type of student-centered learning can lead to increased motivation to learn, greater retention of knowledge, deeper understanding, and more positive attitudes towards the subject being taught (Collins & O’Brien, 2003).

Yet, student-centered learning methods can also take a considerable amount of time on the instructor’s part. SMART (Specific, Measurable, Attainable, Relevant, Time-oriented) objectives, routinely used in project management and education (Blumberg, 2009) can help ensure that critical content is being delivered in an efficient and effective manner, even in student-centered curricula.

This study employed and modified SMART objectives as a strategy to achieve a student-centered classroom that introduced and reinforced threshold concepts and built on students’ prior beliefs. During the planning stage of the course development we constructed a set of specific learning outcomes using action verbs. The outcomes were designed to be measurable with specific benchmarks assigned and attainable; that is, they could be achieved in the course of a semester (or learning module) and were appropriate in scope.

The standard SMART guidelines call for designing relevant objectives in the sense that they are aligned with an overall goal or plan. We felt that this sense of the word was less applicable in our case as our learning objectives were clearly aligned with the overall goal of having students master the concepts of natural selection and evolution. Instead, we modified the SMART program by incorporating recent pedagogical theory focused on the importance of culturally relevant teaching (CRT). CRT is a term coined to describe “a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes,” (Ladson-Billings, 1994). In other words, curricula should be relevant to the students’ lives (Osborne &
Cooms, 1987; Osborne & Sellars, 1987). Our student population is mostly of African-American, African or Latin American heritage and we chose topics that we anticipated our students would encounter in their daily experiences and would therefore resonate on a level that other topics might not. In short, the SMART guidelines were adapted here to mean relevant to students’ lives, rather than relevant to an overall goal or plan.

Finally, our curriculum presented the material with specific timing, with assignments due at regular intervals. We introduced the topic at the beginning of the semester, reinforced it during the semester using real world examples, and assessed learning outcomes at the end of the semester.

Employing SMART objectives helps the instructor to engage in both student-centered teaching and good assessment practice (Blumberg, 2009; Suskie, 2009). In addition, this study found that SMART objectives can be used to effectively design what is now known as a flipped classroom. In this teaching style students access learning materials such as audio clips, videos, PowerPoint presentations, etc., customized for the topic and then typically take an on-line assessment to measure background knowledge and basic understanding. The advantage of this approach is that it allows instructors to devote more in-class time to the more challenging concepts that students typically struggle with and promotes a deeper understanding of the topic at hand (Bergmann, 2012).

An additional major aspect of teaching evolutionary theory is addressing prior beliefs. Personal belief systems play a significant role in learning (Hokayem & BouJaoude, 2008), best exemplified by a negative correlation found between acceptance of evolutionary theory and a strong belief in God and frequent prayer (Miller, Scott, & Okamoto, 2006). One of the major tenets of cognitive psychology emphasizes addressing and building on students’ prior knowledge (Murphy & Alexander, 2000). Therefore, to teach the science and ignore students’ personal beliefs would result in failure to teach evolution effectively (Nelson 2007). In order to address prior beliefs, we provided our students with opportunities to freely express their views on issues relating to evolution.

This paper describes our approach to a flipped classroom, using modified SMART guidelines, which allowed us to generate a student-centered, supportive learning environment that introduced and reinforced threshold concepts, built on students’ prior beliefs, and was successful as measured by student attainment of performance benchmarks.

Method

We conducted our study at Bronx Community College, a campus of the City University of New York, over the course of 4 semesters of an Introduction to General Biology course (n = 83 students, approximately 20 students per class). Students enrolled were a combination of biology and non-biology majors, 57 freshmen (68.7%) and 26 sophomores (31.3%). Two instructors conducted the study, each operating from the same set of specific and measureable learning outcomes. (Table 1)
Table 1. Student learning outcomes aligned with taxonomic level

<table>
<thead>
<tr>
<th>Taxonomic Level</th>
<th>Student will be able to…</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall</td>
<td>…define terms</td>
<td>Population</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Genetic variation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mutation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selection Pressure</td>
</tr>
<tr>
<td>Comprehension</td>
<td>… distinguish between terms when applied to real-life situations</td>
<td>Allele</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fitness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Natural Selection</td>
</tr>
<tr>
<td>Application</td>
<td>… apply terms in scenario-based questions</td>
<td></td>
</tr>
</tbody>
</table>

While evolutionary theory includes other obvious important concepts – e.g., Hardy-Weinberg equilibrium, genetic drift, sexual selection, etc. – we felt that the objectives in Table 1 represent a good stable of knowledge for students who are being introduced to the concepts in the setting of a college biology course for the first time. The choice of these specific learning outcomes and the scaffolded structure of assignments combined to make the outcomes *attainable* by our students. We felt that these learning objectives were neither too difficult nor too easy for our population.

Throughout the curriculum we endeavored to incorporate *relevant* examples that students would not be considering for the first time and that would resonate in settings outside the classroom. By examining antibiotic resistance, lactose intolerance, skin color and sickle cell anemia (with malaria acting as the selective pressure) we were able to illustrate evolutionary concepts with topics that we anticipated held interest for students in other contexts. Antibiotic resistance has been a popular topic in both the scientific and mass media for the past decade or more (Desilva, Muskavitch, & Roch, 2004). Lactose intolerance is very likely commonplace in our student population, with 75% of African-Americans, 51% of Latino/Hispanics (Scrimshaw & Murray, 1988) and 70-90% of Africans (de Vrese et al., 2001) experiencing the condition. The significance of skin color and the concept of “race” are ever-present in our society. Given the sensitive nature of the topic, however, professors in a traditional instructor-centered classroom may choose to omit this topic. The potential for discussion to veer away from the strict evolutionary issues may cause professors to worry about having sufficient time for content delivery while simultaneously wanting to encourage discussion that students will find engaging and interesting, even if it strays from evolutionary theory. In contrast, the flipped classroom approach that we employed (described below) is an ideal paradigm for the consideration of the evolution of skin color. The biological concepts are delivered at home through completion of the assignment, including a formal assessment. Classroom time can then be devoted to reinforcement of the concepts while at the same time allowing students to confront troublesome knowledge along biological as well as sociological and political avenues. Finally, our institution has a relatively large population of students with African heritage, especially from Western Africa. The prevalence of sickle-cell anemia in this region is especially relevant to these students.
In order to satisfy the *time-oriented* element of the SMART guidelines, we provided learning opportunities via a natural selection learning module, assigned at regular intervals during the course of the semester. For each assignment, students were directed to access a folder, stored on our institution’s Blackboard system, which contained necessary instruction and material for students to complete two tasks.

**Task 1 – Complete a Natural Selection Learning Module followed by an on-line quiz**

At regular intervals throughout the semester, students were instructed to open and view a short Microsoft PowerPoint presentation. These presentations contained a self-directed, culturally relevant lesson that illustrated one or more concepts in natural selection. Figure 1 shows a portion of the presentation that students completed for the antibiotic resistance module, along with some sample quiz questions for that module.

The student learning outcomes associated with these presentations (Table 1) were continuously assessed using on-line quizzes that the students were required to complete after viewing the presentation. The quizzes allowed us to place more emphasis on specific and attainable learning objectives, including recall of important terms, comprehension of evolutionary concepts and the application of these concepts (Bloom, 1956). Importantly, the same topics were found in multiple modules, giving students an opportunity to see and consider topics repeatedly, a known factor in improved retention and performance (Rock 1957).

**Task 2 – Watch a video clip and complete a reflective writing assignment**

For each module, in addition to the presentation and quiz, students were instructed to watch one segment of a 7-part series, titled *Evolving Ideas*, available on the Public Broadcasting Service (PBS) website. Each segment provides a short, 7-10 minute presentation on a concept in evolution by natural selection (Table 2).

Associated with each video was a reflection question that asked students to consider one or more of the concepts presented and to write a response on our on-line Blackboard system. In some cases, the reflection was a purely subjective investigation of how the student felt about the topic. In other cases, students were asked to recall and summarize the primary concept of the video. The viewing of the video and reflective writing assignment were assessed only for completion. By providing students with a low-stakes environment in which to consider topics in evolutionary biology, we hoped to create a space where students could express prior beliefs and any challenges to those beliefs that the assignment may have provoked.

**Final Exam**

We also completed a summative assessment by including questions about evolution through natural selection on the cumulative lecture final. Out of the 75 questions on the final, we included 15 questions designed to probe students’ recall, comprehension and application of the chosen concepts (Table 1).
Sample quiz questions

1. The triangle shaped strain was found to be most susceptible to amoxicillin (T/F)
2. A change made in the DNA sequence of an organism is called a __________
3. A change made in the DNA sequence of an organism can convert an existing gene into an alternative form called a(n) __________
4. The collection of bacteria in Peter’s middle ear is called a __________
5. The antibiotic amoxicillin imposes a (2 words) __________ __________ on the bacterial population.

Figure 1. A sample of slides from the online presentation for antibiotic resistance module, along with representative quiz questions
Table 2. Video segments and associated student learning outcomes. Adapted from http://www.pbs.org/wgbh/evolution/educators/teachstuds/svideos.html

<table>
<thead>
<tr>
<th>Video Segment:</th>
<th>Reflection Question:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Isn’t Evolution Just A Theory?</td>
<td>&quot;Agree or disagree, and why: Once a theory has been proven to be true, scientists should forget about it and move on to other, more important subjects.&quot;</td>
</tr>
<tr>
<td>2. Who Was Charles Darwin?</td>
<td>Charles Darwin was concerned about publishing data that suggested that every species had not been created by divine force, but had arisen from a common ancestor. Do you feel like there are any similarities today? Are there any scientific data that you would be worried about publishing because they would be considered controversial or taboo? If so, which ideas and why? If not, why not?</td>
</tr>
<tr>
<td>3. How Do We Know Evolution Happens?</td>
<td>The video discusses &quot;transitional forms&quot; when talking about the evolution of whales from a wolf-like ancestor. Based on your understanding from the video, how are transitional forms, found in the fossil record, used to support the theory of evolution? Give an example, either from the video, or from another species, of a transitional form.</td>
</tr>
<tr>
<td>4. How Does Evolution Really Work?</td>
<td>In your own words describe each of the 4 aspects of natural selection that are described in the video. Do not just list the four aspects, describe them.</td>
</tr>
</tbody>
</table>
| 5. Did Humans Evolve? | For the following list of organisms, place them in order from those that are most closely related to humans to those that are more distantly related. Thinking back to the video, describe the number of "spelling mistakes" (the DNA differences) that are found as you go down the list and relate that to evolutionary distance from humans. Use http://www.timetree.org/ and the species names given to find the evolutionary distances.  
Norway Rat - Rattus norvegicus  
Baker's Yeast - Saccharomyces cerevisiae  
Horseshoe crab - Carcinoscorpius rotundicauda  
Chimpanzee - Pan troglodytes  
Blue Whale - Balaenoptera musculus  
Dog - Canis familiaris |
| 6. Why Is Evolution Controversial Anyway? | Do you agree or disagree with this statement? And why or why not? "Scientific explanations are based on empirical evidence. Science can explain the evolution of life on earth based on scientific evidence. But, it cannot supply the basis for ethical behavior or explain the existence of God or the human soul. On the other hand, religious discourse is based on metaphor and symbolism. Religion can supply the basis for ethical behavior and explain the nature of God and the human soul. But it cannot offer scientific explanations based on symbol and metaphor." |
Results

Quizzes

Task 1 required the students to complete a Module on natural selection including an independent review of a PowerPoint presentation on a culturally relevant example of evolution, followed by an on-line quiz. We designed the questions so that they would be drawn from the first three categories from Bloom’s taxonomic hierarchy (Recall, Comprehension and Application). Analysis of student performance over the semester revealed a general improvement trend for two of the three taxonomic levels. In both Recall and Application questions, student performance showed a general, though not statistically significant, improvement over the course of the semester (Figure 2). For the Recall questions, the performance was steady over the first two weeks (73.9±20.5%, 73.1±17.6%). In week three the average increased to 77.9±16.5% and in week four it peaked 85.3±10.5%. For our Application based questions, performance was 46.6%, 46.4±17.3%, 75.5% and 72±8.5%.

Interestingly, performance on the Comprehension questions was variable, showing no discernible trend over the course of the semester. As discussed below, the question design in this category may require refinement in order to accurately assess student knowledge.

![Figure 2. Performance on quiz questions, ordered according to the first three levels of Bloom’s taxonomy, over the course of the semester. W1=Week 1, W2=Week 2, W3=Week 3, W4=Week 4.](image)

Final exam

We completed a summative assessment through inclusion of 15 questions from the evolution curriculum on the final exam. For the final exam we continued to draw from the first three taxonomic levels and we also continued to use culturally relevant examples in our assessment.

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As expected, student performance was higher on the Recall questions (82%±11% correct) compared to the Comprehension (62.5±20.5% correct) and Application questions (67.9±16.2% correct) (Figure 3).

For each question on the final we anticipated that at least 70% of students would answer a question correctly, drawing on previously established standards for benchmarks (Suskie, 2009). Out of the four sections, students in three sections (74.7% of students) met or exceeded the benchmark (Figure 4). We also found an interesting, though not statistically significant, tendency for students to perform better on the final exam questions relating to evolution and natural selection than they did on the other topics (72.6±5.6% on evolution questions versus 67.3±4.6% on the rest of the final, $p = 0.13$)

**Participation in discussion board**

We found rates of participation in the discussion board to be very high for the first assignment (96.6%) followed by a decrease during the remainder of the semester. (Figure 5). For every reflection at least 75% of the students participated. In addition, we found that 58% of the class had 100% compliance with the assignment, completing a reflection assignment for all 6 weeks. Together these data reflect an affinity for the assignment even though it was assessed only for completion and comprised a relatively small (less than 10%) portion of the overall course grade.
Figure 4. Section analysis for summative assessment. 75% of sections and students performed above the benchmark. Overall, performance on evolution questions suggestively exceeded performance on the questions from the remainder of the curriculum that comprised the final exam ($p = 0.13$).

Figure 5. Participation rates for discussion board reflection questions.

Discussion

Our experience shows that the use of SMART guidelines to generate a curriculum for teaching evolution holds promise for overcoming the obstacles that stand in the way of student understanding. More generally, we believe that the use of SMART guidelines as a
mechanism to create a flipped classroom allowed us to craft a learning environment that is student-centered and supportive.

Despite the generally positive results, we observed areas where students struggled or where the impact of our pedagogical strategy was unclear. For example, with our continuous assessment we found that student performance on questions designed to measure comprehension was highly variable. We realize that a contributing factor to explain this observation is our failure to make the concept of inheritance explicit in our learning modules. In particular, the performance on the final weekly quiz dropped dramatically. This quiz covered material presented in a module on sickle cell anemia and malaria, a topic we informally recognize as one of the more difficult. Malaria acting as a selective pressure causing the persistence of the sickle allele is an especially troublesome concept. Increasing the opportunities for students to identify selective pressures and their impact will be a focus of future efforts.

Based on the classic interpretation of Bloom’s taxonomy we also expected that students’ performance on Comprehension questions on the summative assessment would occupy a median position between Recall and Application questions. Our finding that student performance on Comprehension questions was similar to Application questions may reflect a similarity in the difficulty encompassed by our questions at these two levels of the taxonomy. We will analyze our assessment to determine if a greater distinction between the questions is required.

On the cumulative final we found a number of concepts for which students failed to meet the benchmark.

1. Gene mutation as the initial step in the evolution process when presented in context.
2. The spread of alleles through a population during the natural selection process.
3. Identifying a selection pressure
4. Role of Vitamin B6 in the evolution of human skin color

We plan to address 1 and 2 by modifying every module to include an activity that begins with a genetically homogenous population that experiences the introduction of a mutation followed by the generation of novel alleles. Making inheritance and its underlying mechanisms explicit in all of the modules will reinforce concepts 2 and 3.

For concept 4, the assessment tool may be the issue because this question was an outlier among the Application questions in terms of students’ performance. A possible contributing factor is that the question that we included on the final was phrased as a negative, which has been shown to be problematic, especially for questions requiring higher levels of cognitive reasoning (Tamir, 1993). Breaking this question down into parts that leads the student step-wise from the broader evolutionary aspects of skin color to the finer details may help to improve student performance and pinpoint the problem areas. We feel that the evolution of skin color presents a challenge because it requires students to understand the basics of two unrelated physiological mechanisms, the synthesis of vitamin D and breakdown of vitamin B6 (Jablonski & Chaplin, 2003). Given its importance general-
ly in society and specifically for our student population, we will retain this module despite the difficulty level. Our strategy to address this difficulty is to split this module into two parts, dealing with each mechanism separately, thereby providing ample opportunity for students to struggle with this troublesome knowledge.

The use of SMART guidelines appears to point to a neat and linear progression of learning from beginning to end. However, our experience showed that the process is far messier and hardly linear. Students struggled with both conceptual understanding of evolutionary theory and displayed reactions to various aspects of evolutionary theory that evidenced a conflict with deeply held personal beliefs. As opposed to dismissing our students’ prior beliefs about evolution, we provided a platform for them to air their personal beliefs via the Blackboard discussion board or blog (Alters & Nelson, 2002). We found that even though students were simply being assessed for participation on the discussion board, often students did not post single-sentence or single-paragraph responses. Instead, a majority of the students posted meaningful and well developed responses to the posed questions, such as the two examples below:

“A lot of ... religious believers grew up going to church and learned God created everything. At first I had difficulties in my science classes because they were teaching me something different from what I learned and believed in.”

“It never ceases to amaze me how organisms with similar physical features turn [out] to have different genetic characteristics. I would never in million years believe that whales are more closely related to wolves as opposed to sharks.”

The usefulness of this exercise is that it allowed students to occupy the liminal space (Meyer & Land, 2003). During a student’s acquisition of threshold knowledge, there is a period of consideration and examination. Students often engage in both excursive and recursive thinking, where they will reach out toward a new concept or understanding and then retreat to a set of prior knowledge (Cousin, 2006). In our discussion board we found numerous examples that indicate students were struggling with the concepts of natural selection and evolution. In order to draw students into the liminal space of the threshold experience and get them to engage deeply, it is essential for the instructor to create and maintain a supportive learning environment (Meyer & Land, 2006). Here the role of the instructor becomes essential in presenting a series of carefully crafted challenges that would gently guide the struggling student as they traverse the liminal space (Taylor, 2006). For future classes we will refine our learning opportunities to allow for immediate incorporation of student struggles that are revealed in the low-stakes assignments.

Our overall strategy of using SMART objectives to design our flipped classroom has produced promising results. We found that, in general, students performed better on the questions related to evolution and natural selection than they did on the final exam overall. While this difference was not statistically significant, it is a suggestive result that indicates our curriculum is having the desired effect. As discussed, we have identified areas
where the curriculum can be improved and refined suggesting that future sections may see a statistically significant effect. This also raises the question of whether this curriculum design could be applied to all course topics within General Biology courses, or indeed across multiple disciplines. Should instructors choose to adopt a flipped classroom approach, SMART guidelines could be particularly helpful in designing curricula.

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Just-in-Time Teaching: A Tool for Enhancing Student Engagement in Advanced Foreign Language Learning

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Abstract

Scholars have indicated a need for further research on effective pedagogical strategies designed for advanced foreign language courses in the postsecondary setting, especially in light of decreased enrollments at this level and the elimination of foreign language programs altogether in some institutions (Paesani & Allen, 2012). This article seeks to contribute to the growing discussion regarding instruction in upper-level foreign language courses. The authors present how the pedagogical technique “Just-in-Time Teaching” (Novak, Patterson, Gavrin, & Christian, 1999), which has been successfully implemented in a wide array of academic disciplines for over a decade (Simkins & Maier, 2010a), could be integrated in different upper-division foreign language classes. Preliminary analysis reveals that Just-in-Time Teaching not only facilitates the learning of content material in advanced foreign language courses, but also can help create more opportunities for oral and written language production, which are often lacking at the advanced level (Darhower, in press; Donato & Brooks, 2004).

Keywords: Just-in-Time Teaching, foreign language, pedagogy, content-based instruction, learning management system.

Advanced Foreign Language in Higher Education

Engaging students in a foreign language (FL) classroom in the postsecondary setting can be challenging at any level. Adult FL learning is different from the study of other academic subjects, such as history, biology, or mathematics, in that it requires students to adopt “patterns and behaviors of a cultural community other than that shared by the student” (Tse, 2000, p. 70, based on Gardner, 1985). In addition to considering the host of factors unique to FL acquisition, many successful FL instructors incorporate general educational philosophies that have been effective across many disciplines. As such, there are numerous pedagogical resources on FL instruction that inform instructors on how to establish a fruitful FL experience for students, as well as empirical research on language acquisition. A large portion of these materials is centered on the learning and instruction

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that takes place in beginning and intermediate language FL classes; there appear to be fewer resources that focus exclusively on advanced-level FL instruction and learning, despite expressed concerns about the conspicuous gap between lower-level language and upper-level content courses in FL curricula (Redman, 2005, p. 135), and the demand for effective upper-level FL instruction to ensure FL program maintenance and survival (Paesani & Allen, 2012, p. 555). Therefore, to contribute to the discussion on how best to instruct advanced FL students and to provide suggestions on how to ease the transition from lower- to upper-division FL classes, we present a pedagogical strategy that has proven successful in several academic disciplines in higher education: “Just-in-Time Teaching,” henceforth “JiTT” (Novak, Patterson, Gavrin, & Christian, 1999; Simkins & Maier, 2010a). After delineating what constitutes effective FL instruction and the specific challenges of advanced FL courses, in this article we will explain the key concepts of JiTT, how educators can incorporate JiTT in advanced FL courses, and why the strategy can be particularly effective at this level. We will also discuss specific JiTT activities in one particular upper-level FL course, as well as some common challenges that might arise in a FL classroom when using JiTT. To conclude, we will offer some recommendations intended to assist first-time JiTT users as they implement the strategy.

**Effective Foreign Language Instruction**

As in all other academic disciplines, FL instructors who are dedicated to effective teaching constantly reevaluate and refine their craft in order to reach their students, who have diverse levels of motivation, aptitude, and prior experience with course material. In addition to other successful pedagogical frameworks, most effective FL educators adopt a learner-centered approach (National Association of District Supervisors of Foreign Languages, 1999)—an overarching teaching philosophy that places more importance on what a student does rather than the practices of the teacher (Mostrom & Blumberg, 2012, p. 399)—to promote deep learning of course content. Three essential characteristics of learner-centered instruction, as described by Mostrom and Blumberg (2012), are that students (1) assume responsibility for learning, (2) are actively engaged in the material in and outside of class, and (3) complete multiple formative assessments before a summative assessment (p. 399). Learner-centered classrooms are essential in FL instruction, as students need ample opportunities to interact with the material in a multitude of formats for language learning to occur (Haley, 1999).

The key characteristics of learner-centered instruction are compatible in many ways with seminal theories in the field of second language acquisition (SLA). For instance, Sociocultural Theory (SCT) as applied to SLA (Frawley & Lantolf, 1985; Vygotsky, 1978, 1986) sustains that since language is a socially and culturally embedded phenomenon, FL learning must take place in an environment rich with opportunities for communication; students learn much more through interaction and assistance from others in comparison to what students they can learn without mediation (Shrum & Glisan, 2010, p. 24). The distance between what students can do alone and what they can do with assistance is known as the zone of proximal development (ZPD) (Swain, Kinnear, & Steinman, 2011, p. 16). In addition to SCT, the Interaction Hypothesis (Long, 1983, 1996) maintains that FL learners achieve linguistic gains through plentiful experience...
with “negotiation of meaning,” or the succession of conversational exchanges that allow both speakers to understand one another (Pica, Holliday, Lewis, & Morgenthaler, 1989); this can only happen when students are active learning agents as opposed to passive receivers of information. Furthermore, proponents of the Output Hypothesis (Swain 1985, 1995) contend that learners must not only receive plentiful amount of comprehensible input (Krashen, 1982), but also they must have ample opportunity to produce the language in meaningful communicative contexts (Met, 2004). As one can see, the learner-centered approach and the aforementioned SLA theories value and encourage numerous opportunities for students to interact, participate, and negotiate meaning in the FL, all of which are key characteristics of a FL classroom that fosters language acquisition (van Lier, 1991, as cited in Antón, 1999, p. 304). In the later sections of this article we argue that JiTT is highly compatible with the characteristics of a learner-centered classroom and promotes the environment required to activate students’ ZPD and to support FL learning.

Challenges of Advanced FL Instruction

Students learn the necessary building blocks of communication in most beginning and intermediate FL courses. Relevant cultural information and other interdisciplinary content are also often incorporated per the Standards for Foreign Language Learning (Standards), which are the discipline-specific guidelines involving communication, cultures, comparisons, connections, and community promoted by the American Council on the Teaching of Foreign Languages (ACTFL) (ACTFL, 2006) that should be followed in any FL classroom. By and large, FL instructors of these levels are concerned with developing students’ communicative competence, which Celce-Murcia, Dörnyei, and Thurrell (1995) defined as the combination of the necessary linguistic, discursive, sociocultural, and strategic knowledge to make oneself understood in the FL (p. 10) - than are instructors of advanced FL classes that involve academic material. Additionally, in the lower levels, FL instructors typically are more cognizant of creating a nurturing, non-threatening atmosphere in order to reduce students’ anxiety levels (cf. Krashen’s (1982) Affective Filter hypothesis) for language learning to occur (Redmann, 2005). In contrast, advanced FL courses are usually content-based courses - focusing on FL literatures, cultures and civilizations, film studies, or linguistics - in which lowering students’ anxiety is not always a conscious goal for instructors. In these classes, FL learners must interpret and communicate in the FL in order to complete complex assignments and to master course content, some of which might be challenging material regardless of the language of instruction. As in Paesani & Allen (2012), we define “advanced-level” FL classes as those beyond intermediate language classes. Typically, but not always, these classes are designed for students pursuing a major or minor in the FL.

2 Even though learners in upper-level FL classes are expected to demonstrate higher levels of linguistic proficiency, it is common for classes to represent a range of abilities, from students who have only reached intermediate proficiency to students who can communicate at a superior or near-native level (Paesani & Allen, 2012, p. 555), all of which can affect students’ engagement and participation.

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For decades, scholars have written about the gap between language and content courses in FL programs, or between lower-division and upper-division courses (cf. MLA Ad Hoc Committee 2007). A number of authors have made significant contributions on how to fully engage students in advanced courses that focus on FL literature, (e.g., Barnes-Karol, 2003; Eigler, 2009; Paran, 2008; Scott & Tucker, 2002; Vogely, 1997), FL linguistics (Correa, 2011; Knouse, Gupton, & Abreu, 2013; Villa, 2004), FL film studies (Stephens, 2001), and FL culture (Mittman, 1999; Reeser, 2003). Although Paesani and Allen (2012) affirmed that great strides have already been made to address the conspicuous gap between lower-level (language) and upper-level (content) courses in FL curricula, they also asserted that “continued diligence, communication, and scholarly engagement” are nonetheless required to ensure a full understanding of the necessary pedagogical practices required to “increase the intellectual relevance of collegiate FL programs” (p. S71). For instance, instructors of FL advanced-level content courses must be careful not to dominate class time with lecture or teacher talk, which Donato and Brooks (2004) found to be pervasive, despite students’ presumed increased linguistic proficiency. Instead, instructors of advanced FL courses should exchange the traditional teacher-centered classroom for one focused on learner-centered activities and practices, such as JiTT. This type of environment allows teachers to engage students in “extended discourse” to reinforce fundamental concepts and to provide them with more opportunities to execute “advanced speaking functions” (Zyzik & Polio, 2008, p. 58) that are often lacking in advanced FL classes (Darhower, in press; Donato & Brooks, 2004).

In order to provide advanced-level FL instructors an additional technique that can engage students, as well as to decrease the tendency for teachers to dominate class time, we present JiTT as a “best practice” to accomplish these goals. In the following section, we will provide an overview of JiTT, its record of success in higher education, and how it can be implemented in advanced FL courses.

**Just-in-Time Teaching**

**Overview of Just-in-Time Teaching**

Just-in-Time Teaching (Novak et al., 1999) is a pedagogical technique that was first implemented in the late 1990s in an introductory physics course to address nontraditional students’ needs. Around the same time, higher education was experiencing a paradigm shift in which instructors began to critically evaluate the effectiveness of the traditional auditorium-style class lecture as the default pedagogical strategy (cf. Johnson, Johnson, & Smith, 1991; King, 1993; Laurillard, 1993, p. 108). Many professors were growing dissatisfied with students’ level of mastery of key concepts upon exiting introductory courses; consequently, instructors began to examine the quality of pedagogical techniques implemented in the classroom.3 Throughout the academy, a variety of innovative, learner-centered strategies began to replace the traditional lecture (cf. Herman, 2012, p. 1), and JiTT was among the practices introduced to captivate university students with diverse learning styles and a variety of academic and social backgrounds.

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3 Some scholars argue that an engaging lecture can be effective and can facilitate learning gains (cf. Daniel, 2012).
The JiTT originators designed their strategy based on constructivist theory: all students enter the classroom with background knowledge and all students use this knowledge to construct more knowledge. Under this perspective, the JiTT team considered it imperative to use students’ previous knowledge in order to enhance the learning of course material (Guertin, Zappe, & Kim, 2007, p. 508). In addition, since educational research has convincingly shown that students learn more and are more motivated in a course in which they are active participants as opposed to passive learners (Darcy & Henderson, 2010; Halpern & Hakel, 2003; inter alia), the JiTT originators wanted to create a strategy that engaged students, prepared them for class discussion, motivated them in and out of class, and stimulated curiosity about course content. Furthermore, since Web-based technology had become readily available, the creators capitalized on these technological tools in order to increase communication between students and instructors outside of class; this feedback would provide instructors vital information regarding students’ performance, progress, and remaining concerns.4

The JiTT technique starts with a pre-class activity (or “JiTT”), which is a Web-based exercise. The JiTT activity contains two or three multiple-choice questions or short-answer questions that target essential concepts. As described in Novak and Middendorf (2004), the two most integral forms of JiTT exercises are warm-ups (designed to introduce new concepts and stimulate class discussion) and puzzles (designed to integrate various concepts and to assess student learning following their working with material), though JiTT questions can exist in a variety of forms, depending on the academic discipline and the specific topic of study.5 Regardless of their form, “[w]riting good JiTT questions is one of the most important and challenging aspects of implementing JiTT pedagogy” (Marrs, 2010, p. 84). Effective JiTT questions are ones that “yield a rich set of students responses for classroom discussion, encourage students to examine prior knowledge and experience, require an answer that cannot easily be looked up,” evoke an emotional response, connect previously learned material and newly acquired information, and require students to use their own words (Novak & Patterson, 2010, p. 7). Students must complete the questions approximately two to three hours before class time and turn them in through a learning management system (LMS) (e.g., Blackboard or Moodle) or another Internet-based program. It is highly recommended for the JiTT exercises to factor into students’ grades on some level, and instructors can use a variety of scoring rubrics to assess students’ performance on JiTT exercises (cf. Marrs, Blake, & Gavrin, 2003). The instructor receives students’ answers to the JiTT activity just in time to fine-tune his or her lesson based on this feedback, hence the name of the technique. The teacher can then decide how to use class time in order to best address specific misconceptions, gaps in learning, and students’ concerns about content (Camp, Middendorf, & Subiño Sullivan, 2010, p. 26).

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4 Even though JiTT utilizes Web-based technology, Novak (2011) warns that the strategy should not be confused with “distance learning or computer-aided instruction,” since “all JiTT instruction occurs in a classroom with human teachers” (p. 65).

5 See Novak and Patterson (2010) for sample JiTT questions from various academic disciplines (p. 9), as well as the different categories of JiTT questions (p. 15).
On the same day that students complete the JiTT, the instructor begins the class by projecting a representative sample of open-ended responses or the distributions of answers to multiple-choice questions for the entire class to see; these responses serve to stimulate class discussion and are a point of departure for the teaching of key topics. Subsequently, instructors can choose to implement cooperative learning activities in class based on the JiTT questions and responses, which can decrease the amount of time spent lecturing to students and help them learn from one another, thus activating the ZPD.

The “teaching/learning feedback loop” (Figure 1) facilitated through the pre-class JiTT activity is the crux of JiTT pedagogy (Novak & Patterson, 2010, p. 6). Since students come to class prepared with the course material already activated, they participate more in class discussions and learn more from in-class assignments. From an instructor’s point of view, JiTT practitioners are more aware of students’ progress and can appropriately dedicate class time to the specific concepts or material with which their students need assistance. From a student’s point of view, learners have multiple chances to receive formative feedback before a major assessment, which in theory should inform their study habits outside of class as well as enhance learning (Cookman, 2010). When implemented correctly, JiTT is a highly successful technique.

Figure 1. The JiTT Feedback Loop (Novak & Patterson, 2010, p. 6).

JiTT in Higher Education

Over the past two decades, instructors from several academic disciplines in postsecondary education have incorporated the JiTT strategy (Simkins & Maier, 2010a). Even though the majority of JiTT practitioners are housed in the sciences (e.g., physics, biology, chemistry), JiTT has been implemented in a wide array of classes, such as

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psychoogy, anthropology, education, computer science, accounting, economics, history, and more (Patterson, 2004), due to its flexible nature and its design based on seminal theories in educational research (Simkins & Maier, 2010b, p. xvi). JiTT adopters have reported many benefits of using the strategy, such as increased student participation and preparation (Gavrin, 2010; Marrs & Novak, 2004), deeper learning of material (Formica, Easley, & Spraker, 2010; Guertin et al., 2007; Pace & Middendorf, 2010, p. 159; Marrs, 2010, p. 81; Martinez, 2012), improved motivation (Camp et al., 2010), improved critical thinking skills (Cookman, 2010), improved grades (Cookman, 2010), frequent formative feedback before major assessments (Marrs & Novak, 2004, p. 56-7), and decreased student anxiety (Edwards, Mehring, & Murphey, 2006). Since JiTT has been successfully integrated in a variety of academic subjects, we believe that FL instructors can also reap the same benefits by including JiTT in their classes, especially at the advanced level.

While there are several convincing arguments that support the integration of JiTT in higher education courses, it is important to stress that JiTT is not a panacea for all instructors facing significant classroom challenges, nor does its implementation come without its own share of difficulties. When using the strategy for the first time, many JiTT instructors have confronted a sizable learning curve (Camp et al., 2010, p. 26; Cookman, 2010, 173-6); frustrations are to be expected, especially during the first few iterations of a course that implements JiTT pedagogy. Specifically, instructors have observed student resistance to the JiTT exercises, considering them too time-consuming and demanding (Cookman, 2010, p. 172-3). Students also have been known to wait until the last minute to complete the JiTTs or to find out the answers from other students in earlier sections before completing an assignment (Camp et al., 2010); both of these behaviors defeat the purpose of implementing the JiTT strategy. However, after fine-tuning JiTT questions, incorporating student feedback on the JiTT practice, and explicitly explaining to students the purpose of JiTTs and how to study using the strategy, instructors have been able to successfully utilize the technique to enhance student learning in their classes.

The good news is that since JiTT has been used in higher education for almost twenty years, many resources are readily available for the potential JiTT adopter. We highly recommend that instructors read about how to design a JiTT lesson plan (Novak et al., 1999; Novak, 2011, p. 66-8), what to consider when implementing JiTT (Maier & Simkins, 2010, p. 135-138), and how to develop effective JiTT questions (Novak, 2007; Novak & Patterson, 2010, p. 7-9) when preparing to implement JiTT for the first time. Many helpful online resources exist as well; for instance, the JiTT originators maintain their own website exclusively dedicated to JiTT pedagogy, and the Science Education Resource Center provides electronic resources and sample JiTT questions.

**JiTT in Foreign Language Instruction**

For all of the benefits described in the previous section, we believe that JiTT can be particularly advantageous in advanced-level FL classes: JiTT is flexible, facilitates an engaged, learner-centered classroom, and stimulates student participation and motivation. Though upper-level FL classes range in content from the humanities, as in a FL literature class, to the social sciences, as in a FL linguistics course, what these advanced classes


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have in common is that they focus on simultaneously teaching concepts to students and leading them to communicate about those concepts in the FL.

Regarding JiTT in FLs, one publication reported on the implementation of the strategy in a FL classroom. Edwards et al. (2006) affirmed that JiTT was highly effective when teaching English as a Foreign Language (EFL) in Japan. Specifically, students were less anxious, and they came to class more prepared, asked more questions, and learned more from classmates (p. 10), because JiTT helped lower their affective filters (Krashen, 1982).

Apart from the Edwards et al. (2006) article on the effectiveness of JiTT in EFL classrooms, previous work that has been done with JiTTs in FLs appears to consist solely of various activities submitted by Franklin (2009) to the Multimedia Educational Resource for Learning and Online Teaching (MERLOT), where she is a founding editor. These include materials for teaching mostly French, though there is one activity for heritage speakers of Spanish to work through a module on identity and bilingualism in America. The four activities for French include videos on culture in the Francophone world, a newspaper reading assignment, and a postcard creation exercise, all intended as warm-ups and designed for learners at various levels of proficiency. The activities seem to require that the instructor be familiar with JiTT pedagogy in order to understand how to fit them into the JiTT model. With the exception of one of the activities, “Cartes Postales de TV5 Monde,” and possibly one of the videos, “Learn French through Gastronomy,” there does not appear to be a way for the instructor to assess comprehension prior to class, which is the fundamental element of JiTT pedagogy.

As Edwards et al. (2006) first noted, there is a dearth of published work on the use of JiTT in FL teaching. We believe that the technique is currently under-utilized in these courses, perhaps due to a lack of information on how it may be employed. Therefore, in order to expand on our knowledge of JiTT in the FL classroom and further encourage FL instructors to consider how they may use JiTT in their teaching, we provide specific examples in the next section from an advanced-level content-based course.

**JiTT in Introduction to Hispanic Linguistics**

In this section we demonstrate how JiTT may be incorporated into an advanced FL class taught at many postsecondary institutions, Introduction to Hispanic Linguistics (IHL), although the technique is easily adaptable for any content-based FL course. IHL has become a frequent offering at many universities in the U.S. (Hualde, 2006) and includes an introduction to the major fields of linguistics of the Spanish language: the sound system (phonetics and phonology), word and sentence structure (morphology and syntax), meaning (semantics and pragmatics), and history and variation of the language (dialectology and sociolinguistics). Since this class is conducted in Spanish, students are expected to communicate in the language in order to participate and complete assignments and assessments, which can prove difficult for those students with lower linguistic proficiency. Students are also challenged by the heavy terminology of the course, as well as the fact that they may never have considered language as an object of
academic study (Knouse, Gupton, & Abreu, 2013; Villa, 2004). As such, JiTT pedagogy can be an appropriate technique for the IHL classroom, especially since the strategy has been successfully employed in many other introductory courses to engage students that initially show little motivation or background knowledge in a topic (Guertin et al., 2007). In addition, even though IHL covers content-specific material, it remains a FL course; JiTT can not only assist students with complex content, but it can also facilitate more opportunities for FL production in both written and oral forms at more advanced levels. In fact, presenting students’ answers anonymously to the class without correcting non-target-like forms could give students more incentive to pay closer attention to the linguistic structures they employ as they work with the FL.

Before implementing JiTT pedagogy, and as recommended by other JiTT practitioners (Camp et al., 2010, p. 26), we believe that it is essential to explain to students the goals behind this type of activity, which is new to most of them. Following is an example of language from a handout that was used in one of the author’s IHL classes and shows how JiTT can be described to students.

**Just in Time Teaching (JiTT)**

Readings are homework and should be completed before every class and done with care, especially since they are in Spanish and about a discipline that many are studying for the first time. In order to assist with the understanding of the readings, our class will, from time to time, complete JiTT questions on Blackboard. JiTT, or ‘Just in time teaching,’ is a proven methodology implemented to facilitate the learning of abstract and technical concepts (see [http://jittdl.physics.iupui.edu/jitt/what.html](http://jittdl.physics.iupui.edu/jitt/what.html) for more information on the topic if you’re interested). JiTT allows me to modify my lesson plan according to the class’ needs.

To complete a JiTT exercise, log on to Blackboard between 12:00-9:00am **before class** to answer the questions. JiTTs should take you no more than 5 - 10 minutes to complete.7 “Warm-ups” are designed to help me see how well you understood the assigned reading. Therefore, these activities will be evaluated on effort and completeness, not accuracy. “Puzzles” are designed for you to apply knowledge gained through readings and class discussion, and therefore, your answers will either be graded for accuracy or receive extra credit.

Consequently, before participating in the first JiTT activity, students had already been made aware of the rationale behind JiTT pedagogy, as well as the expectations for the exercises.

As mentioned previously, JiTT exercises form the essence of the strategy. The present authors, who have both implemented JiTT pedagogy in IHL, have found that JiTTs can

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7 As the example above shows, a modification was made for this particular class in the time at which the JiTT became available, because many of the students indicated that they did not have enough time to complete the work since they held part- or full-time jobs.
greatly assist the IHL professor in measuring how the class as a whole understands basic concepts in a reading. For instance, Figure 2 shows an example of a warm-up that students were to complete before coming to class on the first day of the morphology component of the course.

One major benefit of the exercise in Figure 2 is that, though it involved an application of the concepts in the textbook reading to concrete examples, students completed it quickly, and the LMS graded it automatically. The percentages calculated by the LMS from the results allowed the professor to quickly assess student comprehension of morphemes, allomorphs, and closed classes of words—key concepts in that particular chapter. An adjustment was made to the class discussion for that day to eliminate the discussion of open and closed classes of words, since no one had selected the wrong answer to that question, and to use that time to work on the concepts of morphemes and allomorphs, on which the results showed confusion. In class, the instructor showed the distribution of those results and invited debate about the correct answers.

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Figure 2. Instructor’s View of a JiTT Warm-Up Exercise on Morphology on Blackboard.8

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8 The three true-or-false questions translate as follows: (1) ‘There are two morphemes in corran ‘they run;’’ (2) ‘-s/ and -es/ are allomorphs of the plural suffix in Spanish;’ and (3) ‘Prepositions in Spanish are a closed class.’
Because students did not need to justify the answers they chose in the LMS on the JiTT in Figure 2, there was a chance that they had simply guessed; if this were true, using the results of the exercise to make last-minute adjustments to the lesson plan might not be successful. To address this possibility, the professor revised the subsequent assigned warm-up exercise to include an explanation of the answer chosen, which carried the added benefit of allowing students to use more advanced-level discourse in the FL. While JiTT activities are a great resource for FL teachers to be able to adjust class time to be used more effectively, these activities may also be used to increase in-class interaction among students. In the example that follows (Table 1), students were asked to prepare the following before coming to class.

Table 1. Example of JiTT Prompt to Increase In-Class Interaction in Introduction to Hispanic Linguistics.

<table>
<thead>
<tr>
<th>JiTT prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>¿Cuál de las hipótesis que examinamos en este capítulo te resulta más convincente como explicación de cómo se aprende una L2? ¿Por qué? (Koike &amp; Klee, 2003, p. 42). (Escribe al menos tres oraciones, y prepárate para defender tu respuesta y/o convencer a tus compañeros de clase sobre tu opinión.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selected student answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1: En mi opinión, sociocultural es más convincente como explicaciones sobre como se aprende una L2. Yo dice porque en sociocultural el contexto es más valioso con interacción y haciendo preguntas con sus amigos. En sociocultural un estudiante que esta aprendiendo de sus amigos y no por sí mismo. Sociocultural es más convincentes como explicaciones sobre como aprende.</td>
</tr>
</tbody>
</table>

| Student 2: La hipótesis interaccionista es mi hipótesis favorita porque el aprendiz no puede aprender una segunda lengua sin hablando en voz con otra gente. He tomado clases de español por cerca de 8 años y hizo más mejora cuando tome la clase de conversación en la uni. Aunque he aprendido mucho vocabulario más en otras clases de español, tuve mi comprensión máxima de la lengua cuando estuve en la clase de conversación porque estaba hablando con otra gente todo el tiempo, en la clase y a fuera. Cuando se practica por hablando, se comete errores y arreglarlos. Sin hablando, el aprendiz no sabe lo que puede hacer en actualidad con la lengua. |

9 Translation: ‘Which of the hypotheses we examined in this chapter seems most convincing to you as an explanation of how a second language (L2) is learned? Why? Write at least three sentences, and prepare to defend your answer and/or convince your classmates about your opinion.’

10 The learners’ responses display non target-like forms that are not reflected in the English translations, which are provided to help the reader understand the content of the exercises themselves.

11 Translation, Student 1: ‘In my opinion, [the] sociocultural [hypothesis] is more convincing as explanations about how a second language is learned. I say because in sociocultural the context is more valuable with interaction and asking questions with your friends. In sociocultural a student that is learning from his friends and not by himself. Sociocultural is more convincing as explanations of about how he learns.’

12 Translation, Student 2: ‘The interactionist hypothesis is my favorite hypothesis because the learner can’t learn a second language without speaking (out loud) with other people. I have taken Spanish classes for about eight years and I made more improvement when I took the conversation class at the university. Although I have learned much more vocabulary in other Spanish classes, I had my maximum comprehension of the language when I was in the conversation class because I was talking with other
This activity indeed provoked a lively class discussion in Spanish, as students had made sure to study all of the hypotheses in order to choose the most convincing one and, consequently, had a personal stake in the material. Based on their answers to this JiTT exercise, they were placed into groups in which each member had selected a different hypothesis. Their task was to try to convince the other group members that the hypothesis they had chosen was the most complete one. The professor monitored the groups and served as facilitator. Students became very passionate about their chosen hypotheses, and more than one student even changed his mind, based on the group discussion. This cooperative learning activity was successful in that students were led to go beyond the “telegraphic” FL production that can characterize learners’ speech even in upper-level classes (Donato & Brooks, 2004). In their discussion of these complex ideas, the students made use of Spanish to provide opinions and arguments, explore alternatives, and hypothesize; all of these language functions form part of the ACTFL Proficiency Guidelines for Speaking at the advanced and superior levels (Swender, Conrad, & Vickers, 2012). Moreover, students exchanged linguistic and content knowledge with one another throughout the group task; thus, this collaborative exercise based on the pre-class JiTT activity fostered a positive learning community and allowed students to operate within the ZPD.

The examples shown above of JiTT activities are only two possibilities for a course that covers many different subfields of Hispanic linguistics. Table 2 presents three more sample prompts for other subfields.

**Table 2. Possible JiTT Prompts in Introduction to Hispanic Linguistics.**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>En la oración a continuación, decide si las palabras subrayadas forman un constituyente. Explica brevemente. “Mi hermana escuchaba música”.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonetics/phonology</td>
<td>Eres profesor/a de español. Tus alumnos angloparlantes quieren saber lo que deben hacer para evitar un acento extranjero cuando hablan. ¿Qué les recomendarías? Incluye dos sugerencias específicas, usando el subjuntivo y/o el condicional.</td>
</tr>
<tr>
<td>History of the language</td>
<td>Le mencionaste a tu amigo que habías estudiado latín. Él te dijo que el latín era una lengua muerta. ¿Qué le contestaste? Escribe al menos tres oraciones completas, usando el pasado.</td>
</tr>
</tbody>
</table>
In our experience, students have adapted well to the inclusion of JiTT assignments in IHL classes. They appreciate the chance to focus in class on concepts that are problematic or difficult to understand on their own. While some have expressed that it is inconvenient to have to log on to an LMS to answer questions before class, adjustments can be made to the schedule to accommodate students who work or do not have access to technology off-campus, as shown above in the student handout. We have observed that even the most conscientious students have sometimes forgotten to do JiTT exercises at the beginning of the semester; this is part of the learning curve associated with implementing JiTT in the classroom and, as time goes on, students grow more accustomed to logging on to the LMS prior to class.

**Benefits and Challenges of JiTT in Advanced Foreign Language Courses**

We contend that there are many benefits to implementing JiTT in advanced-level FL classes. Throughout this section it will be shown how JiTT can facilitate a learner-centered classroom and provide assistance to the FL student and instructor alike. First and foremost, students have indicated to us that the JiTT exercises help them prepare for class. Since course content is activated through participation in JiTT exercises just prior to class time, they already have in mind what they want to share about a particular topic and may be more likely to express their ideas appropriately in the FL. Students have to make sure to thoroughly prepare homework assignments and readings in order to complete JiTT exercises. We believe that this preparation in both content and FL expression helps decrease the anxiety that commonly accompanies speaking in a FL at any level (Edwards et al., 2006; Krashen, 1982). As students prepare for and participate in JiTTs, this activity also helps to facilitate one of the essential characteristics of a learner-centered classroom: being actively engaged in and outside of class (Mostrom & Blumberg, 2012, p. 399).

Secondly, since JiTT activities are completed outside of class, students have multiple opportunities to privately indicate to the professor when they feel lost on a topic, which is not uncommon in an advanced-level, content-based FL course. In turn, students’ responses allow the teacher to gather detailed information regarding the level of each individual student’s comprehension and class preparation. Since another crucial ingredient of a learner-centered classroom is multiple chances for formative feedback before summative assessments (Mostrom & Blumberg, 2012, p. 399), JiTT pedagogy undoubtedly provides ample opportunities for informative, non-threatening feedback on students’ progress before a culminating exam or final project. Formative assessments serve two purposes: they inform students on how to make adjustments to their study habits in order to enhance academic progress, and they inform the teacher of which students could benefit from subsequent academic support, whether language- or content-focused. In addition, these formative assessments in FLs are a part of the new assessment paradigm and can empower learners (Shrum & Glisan, 2010, p. 424). Shrum and Glisan also underscore that empowered learners can become more involved in their own learning process, seek assistance when needed, and be part of a FL learning community. Taking responsibility for one’s learning is the third element of a learner-centered classroom, per Mostrom and Blumberg (2012, p. 399).
Thirdly, students enjoy having their responses incorporated into class lessons in the FL. Since they know that their work might be featured at the beginning of a class lesson, we believe they are more inclined to complete the JiTT exercises to the best of their ability in both content and linguistic form in the FL.

Fourthly, a particular benefit of incorporating JiTT in advanced FL classes is that of enabling the practice of receptive and productive skills in the FL. As in Tables 1 and 2, JiTT exercises provide a venue for the development of skills and progression along the ACTFL Proficiency Guidelines for speaking and writing. As many SLA theories have explained, students need multiple opportunities to interact in the FL for gains in acquisition to take place; yet, these opportunities are often underutilized in upper-level FL classes (Darhower, in press; Donato & Brooks, 2004). Therefore, JiTT is a viable strategy that could help remedy the deficit of conversational exchanges in this academic setting, and FL instructors may integrate JiTT to facilitate extending student discourse beyond responses to simple questions in the FL. Darhower (in press) upholds that instructors of upper-level FL classes must conscientiously provide regular opportunities for learners to produce the FL in all major time frames (i.e., past, present, future), but especially in the past, so they can move beyond an intermediate speaking level to advanced oral proficiency (cf. Section 4. “Discussion and Implications”). In order to accomplish this goal, FL instructors can easily frame JiTT prompts in such a way that students focus on these targeted forms through meaningful discussions in the FL about course content (cf. Table 2). Even though this discussion is mostly geared toward non-native speakers of the FL, it is important to note that abundant opportunities to produce the FL could be equally beneficial for heritage or native speakers so that they may practice a different register of discourse and to preserve or enhance their language skills, particularly in writing (cf. Kagan & Dillon, 2004; Peyton, Lewelling, & Winke, 2001; Villa, 2004, p. 94).

Finally, JiTT pedagogy is very compatible with the Standards (ACTFL 2006). In upper-level FL courses, JiTT pedagogy can help instructors incorporate interpersonal and integrative communication activities in class. The “Comparisons” standards lend themselves particularly well to JiTT exercises, as questions can be crafted to lead students to compare their native language to the FL. However, it is the “Connections” standard 3.1 that stands out in particular with regard to JiTT: “Students reinforce and further their knowledge of other disciplines through the foreign language” (ACTFL, 2006). Implementing JiTT in the FL classroom along with the Standards deepens student engagement with upper-level, content-based course material—FL literatures, cultures, film studies, or linguistics classes—and aids comprehension in what are new fields of study for many students.

Of course, the techniques of JiTT are not without discipline-specific challenges. One is the very use of the FL. Some students may not possess the proficiency in the FL to fully comprehend JiTT prompts, which would make it difficult for them to show they understand the content being assessed. Even when students do understand the JiTT prompt, it is possible that they are not able to use the FL to answer in a way that fully shows their comprehension, and this may or may not be obvious to the professor who...
reads their responses. However challenging JiTT exercises may be for FL learners, it is clear that providing students with more opportunities to use the FL to complete advanced-level tasks both in and outside of class is an important benefit. It seems that the advantages of JiTT pedagogy far outweigh any difficulties in its actual implementation.

Conclusion

As shown throughout this article, JiTT provides a unique opportunity for those who teach upper-division FL classes to adapt to learners’ needs by engaging in the “feedback loop” (Novak and Patterson, 2010) created through the use of technology. By using JiTT warm-ups and puzzles, the FL instructor can assess student preparation and learning. In the FL classroom, warm-ups ensure that students have prepared whatever material they were to cover for class, usually reading assignments. This means that, ideally, students don’t experience terminology for the first time during a lecture, but rather are already primed to engage in discussion and ask for any needed clarifications when they enter the classroom. Puzzles help the instructor check that the students have not only understood the class material, but that they are able to communicate about it appropriately in the FL. JiTT is also a strategy that can provide students with regular opportunities to produce the FL at the “advanced” level, facilitates a learner-centered classroom, and lends itself well to subsequent collaborative tasks so that students may work in the ZPD. Furthermore, JiTT can be implemented to assuage what is often for learners a difficult transition between lower-level language classes and upper-level content classes in FL (e.g., Mittman, 1999; Redmann, 2005).

Of course, JiTT is meant to supplement what is already happening in the classroom and in no way takes the place of instruction. It is another tool for FL teachers to place in their repertoires of instructional methods and should be used strategically, along with other tried-and-true pedagogical techniques. To ensure successful JiTT implementation, we would like to reiterate some suggestions already highlighted in this article. First, we recommend that FL instructors read the readily available JiTT literature thoroughly, access online materials, and consult with other JiTT practitioners before using the technique for the first time. Second, we suggest that instructors explicitly describe to students the purpose of JiTT, what their role is, and how their participation is essential for success; this should be done not just at the beginning of the semester, but repeatedly throughout the course. Students should know that JiTT is designed not only to help them with learning course content, but also with producing the FL at the advanced level and beyond. Finally, and perhaps most importantly, it is critical to monitor students’ progress with JiTT and make adjustments according to what works best for each class. Possible adjustments could include increasing or decreasing the number of JiTT exercises per week or allowing students to turn in JiTT exercises earlier than the typical JiTT time frame (i.e., two to three hours before class), due to commitments outside of class. Minor modifications can help students view JiTT pedagogy as an asset, rather than a burdensome requirement.

We invite other JiTT users in the academic community, as well as interested FL instructors, to join in a conversation about other ways in which JiTT might be integrated

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in the FL classroom. We have shared here our experiences and recommendations, based on practice, as well as previously published work on JiTT; however, empirically-driven research into specific gains or benefits for students in classes that use JiTT, as compared to students in classes that do not, would shed more light on how best to implement the strategy. Indeed, research that examines students’ perceptions of JiTT pedagogy would also be helpful. We would be particularly interested in seeing examples of JiTT exercises from classes in FL literatures and cultures, especially as we attempt to address the need for effective pedagogy in upper-division content-based FL classes (Paesani & Allen, 2012). We also have reason to believe that JiTT could have a place in beginning or intermediate language instruction, and we encourage FL educators to devise lesson plans that incorporate JiTT pedagogy at these levels. We look forward to the conversations and collaborations that may result.

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Revisiting the Art of Undergraduate Teaching in Higher Education: One Person’s Journey Towards Enlightenment

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Abstract
The purpose of this article is to offer reflections regarding teaching undergraduate students spanning a forty-five year career in higher education. The author discusses his teaching philosophy coupled with his perspective focusing on the “best” pedagogical practices that he has used to enhance student learning. The selected methods are grounded in over ninety semesters of classroom teaching experience much of which is empirically supported by scholarly literature. Hopefully the author’s sharing of his life-long journey and commitment to undergraduate education will help sustain dialogue about the importance of pedagogical excellence.

Keywords: Undergraduate education, higher education, pedagogy, experiential learning, teaching practices.

For the past three years I have been transitioning to retirement as part of a phased retirement program that allowed me to teach a reduced course load coupled with less demanding research and service obligations. This semester I will complete my 90th semester of teaching (excluding summer school) culminating a forty five year journey instructing all levels of undergraduates within the context of an accredited College of Business. During this interim period of transition I have continued to give much thought as to what constitutes successful undergraduate teaching and felt compelled to share my insights with my colleagues. My normative model is not all inclusive nor is it entirely based on empirical research although I have tried to meet some rigor of academic integrity. My pedagogical philosophy is grounded in many experiences: numerous conversations with other professors from a variety of disciplines; attendance at multiple seminars focusing on the challenges of teaching at the university level; application of empirically tested teaching methods gleaned from the literature; suggestions from instructional experts who critiqued my classroom methods; feedback from students regarding the learning value of my various classes; publication of my instructional methods in refereed journals, and lastly, reflection and continual adaptation of experiential learning in and outside the classroom (Douglas, 1980, 1987-88, 1990, 1993, 1994, 1997, 1998, 2002, 2003, 2004, 2006; Douglas &

1 Corresponding author’s email: Max.douglas@indstate.edu
Adams, 1999a, 199b; Douglas & Chandra 2003; Douglas & Husted, 1984). To add expanded credibility to my pedagogical paradigm I should note that I have earned several teaching awards at my university and have consistently received outstanding student course evaluations throughout my lengthy career in higher education.

My Philosophy of Teaching—the Abridged View

The foundation of my instructional paradigm is based on the following mantra: Students want to know how much you care before they care how much you know. Hence being an effective educator involves integrating both your HEART and MIND into the teaching/learning process. I believe that students should be co-determiners of their learning and accept responsibility to contribute to the class in a substantive fashion. Experiential methods should be strategically integrated so that students feel empowered to be partners in and outside the classroom. We cannot rely only on deductive reasoning and monolithic lectures to distribute knowledge. Students need to be engaged in “productivity” not just “activity”. Robert Greenleaf, father of servant leadership makes it clear that false busyness does not tap the inner spirit of students—hence, careful thought and preparation must precede each classroom encounter (1979, pp. 61-62). Experiential activities must be carefully selected and implemented so that the students’ critical thinking skills are refined. Simply pulling an activity to fill time is often unproductive and may result in unintended consequences. To avoid this common “tyranny of the urgency”, I suggest using the hour immediately before class to review the material and methods you want to utilize that day. If going to class is “just another meeting”, the results will be fraught with diminished learning opportunities.

It has also been my practice to assess the learning and decision making styles of my students either formally or informally. For example, in my senior-level Management seminar I use the Gregorc Style Delineator Instrument during the first evening of class (2012). This time-tested assessment divides students into four Decision-Making styles based on how respondents mediate with their environment under stress: abstract random, abstract sequential, concrete random, concrete sequential. I find that the majority of my undergraduates are concrete random which means they learn best with methods that are couched with practical examples and high levels of visual stimulation—graphs, colorful power points, films, hands-on learning assessments etc. On the other side of this equation is me as my dominant decision making style is abstract sequential which means that under stress I tend to revert to theory and higher level thinking supported by frequent use of research to support my perspective regarding various topics. I tend to use complex sentences and technical jargon assuming that my audience will be salivating on each sentence. Well, if I only wanted to resonate with 2-3 students who happen to mirror my perception of the world, then all would be great. The “good news” is that my secondary style that is relatively close to my primary style is concrete random; hence, I have an above average level of understanding regarding how to navigate between the world of theory and practice and consequently I try to use a portfolio of methods attending to the learning style of most of my undergraduates. Our debriefing of this exercise during the first evening is extensive. For example, after students complete Gregorc’s assessment I compile a frequency distribution of their respective primary and secondary decision making styles.
and record them on the board. I then compare my own profile and discuss the implications of this data regarding teaching and learning. In addition I ask students to compare their more dominant decision making styles to leadership charts developed by Dr. Gregorc. These charts depict leadership behaviors commonly associated with each of the four decision making styles. As a capstone activity I ask my students to begin their journal (a semester long project) by making an entry after class explaining the learning value of this assessment. This enhanced awareness among class members of the variety of decision making modes also provides them insight when selecting their reading partners for a class project.

In short, I view students as collaborators in the learning process rather than passive vessels who “take and regurgitate” notes. Students should come to class with a sense of eustress and anticipation; my primary role should be to serve as a facilitator and guide so that we can uncover the meaning and value of the assigned reading. Moving students to accept and embrace this form of empowerment often requires patience and thinking outside the box. The following discussion will highlight a few pedagogical strategies that have proven successful at least based on the surrogate measures of student course evaluations, peer assessments, and scholarly publications relative to my teaching methods. In terms of the more recent focus on assessment of learning, the data is still being compiled and reviewed. However, given the importance of undergraduate teaching, I thought it might be of value to share my insights.

**Liftoff-The First Class Session**

Approximately two years ago my university designed a new marketing program centered on the following slogan: *More From Day One*. The rationale behind this mantra was to send a message to all university stakeholders that students, especially freshmen, should be expected to “hit the ground running” at the beginning of the semester. To help freshmen make a smooth transition from high school, a University College was recently established to provide academic advising, professional mentoring, and targeted workshops geared to a variety of topics such as time management, study strategies, note taking, and learning style assessments. Instructional expectations were also ratcheted up for faculty and staff. But retention and success depends on many transitional issues one of which is a continuing commitment to excellence in the classroom. Hence it became imperative that faculty review how they used the first day of class.

“More from day one” fit perfectly with my teaching philosophy as I have always considered the first day of class as sacred ground. Simply calling the roll, distributing the syllabus, offering a few comments and dismissing class is indeed a missed opportunity to begin the process of building a partnership with your students hopefully culminating in a learning community. First I suggest that faculty may want to begin this process before entering the classroom by being able to pronounce the name of each student as this gives a message to your class that “your name” is important. You may also want to send an email to your class before your first meeting explaining a few of the highlights of the class and welcoming them to your world of challenge and excitement. Tell them something about yourself in order to begin the process of “breaking the ice”. At this point you
could ask them to think about an icebreaker question that they might want to share during your first meeting. I have asked students to simply share any of the following: their favorite song; their favorite movie; their favorite food; their favorite teacher etc. This process opens the door to beginning a conversation thereby encouraging students to feel comfortable speaking in class. In my leadership class I ask my students to select an animal which they feel reflects their perception of effective leaders. This exercise always provides threads for integrating a variety of topics relative to the study of leadership—an appetizer that whets a student’s desire to come back for more. Choice of animals such as lions, beavers, bears, hawks, cheetahs, dogs, cats etc. lend themselves to commentary/questions about how animal behavior relates to leadership topics such as hierarchy, role expectations, power, authority, patience, teaming, use of threat, and dominance.

Of course, I do have to manage the time allocated to this process unless I want to use another class meeting to distribute the syllabus and discuss the content and methods that will be used to foster learning in the course. It is important that the instructor “sits” during this process if possible and uses a conversational tone of voice. Professors are trying to establish a collaborative culture and this is a critical first step towards empowering your students. I do walk through the key expectations and timeline for the course explaining with conviction how the assignments will be of learning value as they contemplate their professional careers. Although I welcome questions I am aware that students may be a bit overloaded the first day; hence I also encourage emails to help clarify any element contained in the syllabus. I often end my first class stressing that OUR syllabus is a COVENANT based on mutual trust and distributive leadership - the very foundation of Peter Senge’s Learning Organization - let’s begin our journey (Pierce & Newstrom, 2014, p. 55).

**Fostering Student Engagement: The Socratic Process**

To paraphrase Socrates, it may be better to pose the right question than give the right answer. Hence, the use of the Socratic process is heavily based on rich exchanges between the professor and students carefully exploring the complexities and implications of a variety of subject matter. This process requires professors to carefully develop a set of reflection questions that challenge students to both understand a concept and be able to apply it to both practical and complex dilemmas. Some authors have referred to this method as fraught with higher levels of risk because the professor must be ready to facilitate complex issues and often redirect conflicting views so as to mediate a host of perceptions and value systems (Lam, 2011). Although this white water rafting frequently challenges students and professors to leave their comfort zone, the learning value can be exponential. One must be open to ending some classes “without closure” just as Socrates would do when teaching philosophy to his students.

One story of Socrates’ teaching methods may illustrate leaving class open-ended. During one class Socrates was trying to stress the vagaries of Hedonism and pointed to the importance of distinguishing between needs and wants. Socrates criticized the marketplace and the many cosmetic goods that people buy unnecessarily only to satisfy their Hedonistic drive for pleasure. After he dismissed class, some students were perplexed as they saw...
many advantages to the marketplace and found it difficult to comply with the ideals of sacrifice being advocated by their professor. Later in the day a few of Socrates’ students observed him shopping in the marketplace moving from tent to tent examining a variety of goods. They thought - “what a hypocrite” and could not wait to go to class the next day. Before class commenced one student asked Socrates why he was visiting a marketplace that he had malign in class the previous day. Socrates responded as follows: “I was simply observing all the wants I do not need.” This story illustrates that learning often takes place in and outside of class - the goal of every educator. In short, professors who use the Socratic process are more likely to inculcate a thirst for discovery and critical thinking rather than simply “covering material” in a sequential monolithic manner.

Conversational Teaching: Understanding the Dialogic Method

When one is truly engaged in conversation with another party, active listening is present and both participants often lose track of time—sometimes reaching a mindset referred to as flow (Pierce & Newstrom, 2011, p. 111). At the heart of this deep surface listening and understanding is dialogue whereby each party is openly sharing their thoughts, values and perceptions. Stephen Covey advocates that we must first “seek to understand, and then be understood” (p.237). This should be the goal of every class session but too frequently professors depend on discussion and debate rather than deliberation and dialogue. Covey and others stress that although discussion and debate can be useful, these methods tend to create a win-lose environment that can result in anger, defensive reasoning, emotional outbreaks, and group divisiveness (pp. 207-209). If educators are going to establish a win-win culture of discovery and learning, they must build a classroom culture of trust and openness. Dialogue is based on sharing insights and using the following active listening skills: don’t interrupt the speaker, deliberate via paraphrasing before responding, share your interpretation of an issue without attacking the other party and keep the tone of your comments professional and nonthreatening (Yankelovich, 1999, pp. 41-46).

Facilitating the lines of demarcation between dialogue and discussion can be challenging but if you pose the right reflection questions and give students time to deliberate, then the chances for dialogue are enhanced. One method used by an American Indian tribe was the “talking stick”. You can use this method to foster dialogue. Students can only share when they have the talking stick. The stick is placed on a desk or passed to students who want to share (Covey, 1989). This discipline helps minimize judgmental and marginal listening hopefully fostering careful thought before sharing ideas. One can also use some version of the talking stick in small groups to introduce the method and then debrief the process carefully explaining the differences between the Ds of communication: debate, discussion, deliberation and dialogue. If you can establish this mindset with your class then you may truly enter the “zone of learning” and the passage of time will seem of little consequence - students WILL be engaged and boredom should be at a minimum.

Beyond Participation - Nurturing Classroom Contribution

James Clawson, respected author and leadership consultant, makes it very clear that collaborative organizations rely heavily on employees who are viewed as KPCs - key proc-
ess contributors (2012, p. 41). These transformed employees accept expanded responsibility and use their talents to seek creative solutions to complex problems. KPCs thrive in an empowered workplace - what Peter Senge calls a learning organization (Pierce & Newstrom, 2014, p. 51). I believe that this cultural paradigm should be used to cultivate learning within undergraduate courses. To extrapolate using Douglas McGregor’s classic set of assumptions as a benchmark, professors must see students as Theory Y contributors who can be motivated with challenging assignments, thought-provoking Socratic dialogue and experiential learning rather than relying on Theory X approaches such as pop quizzes, threat and fear of failure (Pierce & Newstrom, 2014, p.42).

Achieving this metamorphosis for co-determined learning may be best achieved by following some carefully crafted teaching guidelines offered by Dennis Gioia regarding how to facilitate true contribution within the classroom (1987). Gioia suggests that we often use participation and contribution as synonyms but there is a vast difference. KPCs offer substantive responses to a variety of assignments always adding value to the dialogue/discussion. Participants may offer comments that have good intentions but lack depth of thought and preparation. We have all had to monitor the “talking head” who believes that simply saying something will earn “participation” points. However, the perpetuation of unproductive comments actually wastes valuable learning time and can derail dialogue if not curtailed. Here are some ideas for establishing a classroom based on contribution:

1. Reward contribution by assigning at least 15% of your grade point distribution to this process.
2. Briefly explain the difference between participation and contribution within the context of classroom dialogue.
3. Provide students a copy of Gioia’s article entitled Contribution! Not Participation in the OB Classroom and ask them to submit an email stating that they understand the gist of the article and will attempt to become “contributors” to help build a community of learners.
4. Practice empirically tested methods for leading classroom dialogue:
   a. Have students exchange their thoughts with a partner before offering their insights to the class—sometimes called pair sharing.
   b. Use one-minute reflections to have students jot down their ideas on paper before contributing to class.
   c. Use reflection breaks and allow students to sit quietly for a moment and simply cogitate regarding their pending response.
   d. Use centering before beginning class by asking students to close their eyes, clear their mind and focus on a place that creates a sense of peace and quiet.
   e. Ask students to send email responses to you before class meets so that you can respond privately and provide suggestions that may enhance the quality of their response.
   f. Use the 60 second rule—namely, learn to tolerate silence rather than feeling compelled to fill the void as this impatience may condition students to become passive as they wait for you to take control.
Using these and other creative approaches to facilitating rich communication among members of class will require professors to play many roles such as active listener, facilitator, conflict manager, synthesizer, orchestra leader, questioner, coach and even gate closer (strategically using extinction and carefully worded sanctions to curtail unproductive comments). If innovative methods and professorial leadership are integrated successfully, specific types of student behavior should evolve as the semester progresses. Gioia suggests that the following student behaviors mirror his perception of contributors:

1. Cite pertinent examples based on personal and/or professional experience.
2. Offer observations that thread concepts with class dialogue.
3. Provide succinct summaries that recap key ideas from the readings or cases.
4. Ask thoughtful questions that lead to a deeper understanding of concepts/theories.
5. Play the devil’s advocate to generate further thought.
6. Respectfully disagree with professor or classmates in a constructive manner so as to promote further explanation of issues.

Balancing the fulcrum between participation and contribution requires a huge commitment from both professors and their students. Gioia warns that instructors must not succumb to the mindset that many raised hands and comments result in high level learning. Quality must be balanced with quantity. Students must understand that they will be required to be prepared to use their cognitive and emotional intelligences to the fullest of their ability often refraining from blurting out ill-conceived opinions that are not grounded in careful reasoning. Perhaps one of the greatest challenges for professors is balancing process with content. Following the pathway of contribution requires time and patience. Professors may find that what they do address in class results in higher levels of learning rather than simply covering topics in a monolithic linear fashion. In the end, this form of conversational teaching may achieve one of the primary goals advocated by the late Stephen Covey—give individuals a voice; in the classroom context, this means allowing students to be co-contributors in the learning process (Pierce & Newstrom, 2011, p. 283).

**Building a Culture of Trust**

At the heart of learning is open empathic communication all of which depends heavily on the existence of trust between professors and their respective students. Traditionally undergraduate students have been leery of their professors perceiving them as aloof and omniscient pontificates of knowledge. This type of cognitive dissonance may contribute to one of two extremes: blind trust where students accept every professorial comment as infallible or suspicion where students exude minimal trust regarding professorial intentions. (Covey, 2006, p. 289) Both of these mindsets erode learning opportunities. If a culture of trust based on high levels of critical thinking and open communication is to be established within the classroom, this hierarchal paradigm of the professoriate must be changed. Building this collaborative rapport will be a gradual process but certain teaching strategies may facilitate this paradigm shift.

My experience has reinforced that trust can best be established and sustained by honoring the principle of integrity. Acting with integrity requires individuals to demonstrate both
competency and character (Covey, 2006, pp. 54-57). Given that most professors possess reasonable levels of competency - i.e., they know their subject matter, perhaps the most crucial part of the integrity question lies with character. As suggested prior, students want to know how much you care BEFORE they care how much you know. Hence instructors need to emulate key character attributes such as honesty, credibility, and humility. Ideally this modeling will be reciprocated by your students so that smart trust drives the learning process. Smart trust promotes high levels of critical thinking that encourages thoughtful dialogue and rich exchanges of complex ideas (Covey, 2006, p. 290). Although not necessarily profound, the following steps may help build a community of trust within the classroom:

1. Practice full disclosure and transparency when designing your syllabus and supporting handouts. Clearly explain the learning goals for your class, your teaching style, your grading system, expectations for student performance, deadlines for all assignments, availability for office hours, etc. There should be no hidden agendas. After you explain the details of the course syllabus, encourage questions.

2. Walk your talk—strive to ensure that the content and teaching style you deliver are congruent with the curricular expectations of your university’s catalogue and handbook. Tell your students that the syllabus is a covenant based on mutual trust. They will be asked for periodic feedback to help insure that their journey remains on track. Reinforce that trust requires collaboration and mutual accountability so both of you will have to live up to the learning goals and expectations outlined in the playbook.

3. Show humility by indicating that if you make a mistake or fail to adequately explain a complex topic you will acknowledge this misstep and reteach the material. This may require some professors to remove their mask of egotism and control and can be uncomfortable. Stephen Covey Jr. beautifully portrays the value of humility as part of the trust equation: A humble person (professor) is more concerned about what is right than being right, about acting on good ideas than having good ideas, about enhancing new truth than defending an outdated position, about building the team than exalting self, and about recognizing contributors than being recognized for it. (p. 64)

4. Always treat your students with respect and dignity. Learn their names and be sensitive to the implications of personality and cultural differences as you strive to move towards the contribution model. Introverts may be slower to enter the dialogue but may provide the greater substance of thought. Some international students may find the Socratic process of engagement a bit threatening so walk softly as you try to incorporate a broad array of student responses (Cain, 2012, pp. 186-191). The bottom line is that even though conflict and disagreements may surface during the learning process civility and mutual respect should serve as the guideline for all classroom dialogue.

5. Credibility requires both professors and students to uphold their commitments. James Clawson stresses that promise keeping is the foundation for building and sustaining personal and organizational trust (p.81). Stress that being prepared for class and meeting deadlines for assignments is expected. Professors must also strive to return graded papers and tests within reasonable time frames. Also, if a
professor has scheduled office hours, KEEP them. This is part of promise keeping.

6. Lastly, instructors may ask students to sign a covenant acknowledging that they understand the requirements for the course as outlined in the syllabus and that they are willing to meet these expectations. This is becoming a common practice in industry regarding codes of ethics in that new employees must sign that they have read and understood the behavioral expectations of the company and are willing to comply (McKay, 2013, p. 1). Management experts have demonstrated that high trust organizations execute in a more efficient and effective manner (Clawson, pp. 87 & 205). It seems that this finding can be extrapolated to the undergraduate classroom meaning that mutual trust between professors and their respective students should result in higher levels of learning.

**Story Telling with a Purpose**

Being an effective teacher and leader are closely intertwined. Some leadership experts have reported that successful leaders are usually great storytellers (Clawson, p. 232). Even the late Stephen Covey suggests that “to teach is to learn” (p. 265). Therefore, if you strategically integrate an occasional story and relate its purpose to the content or process of class, it may contribute to enhanced learning.

Many professors have heard the term “war stories” which has been associated with wasting the time of students because the content and purpose of the story is often totally unrelated to the topic being discussed in the classroom. However, stories that are selectively integrated and serve to enhance the understanding of subject matter can be of value and are frequently a way of personalizing the learning process. Stories can be gathered from life experience, reading trade books, studying cases, work experience, films and consulting assignments, etc. The story of Socrates in the marketplace related in the discussion above is one example of how a story can be used to reinforce a key point.

Let me tell YOU a story. Getting buy-in to the Socratic teaching process can be difficult as some learners would prefer a more direct presentation of material that allows them to primarily take notes and remain relatively uninvolved in class dialogue/discussion. Students who prefer a traditional lecture method may consider the in-depth dialogic processing of certain topics to be a waste of time. Most experienced professors have observed the nonverbal expressions of student boredom seemingly conveying the message, “Get to the point”. If I sense this ambivalence I have often stopped to share my “near death experience” while swimming in the Mediterranean Sea with my brother in 1964. I put two diagrams on the board—a straight line labeled A to B and a saw toothed line (graph) labeled A to B. As I explain how my brother and I noticed that we were being gradually drawn further from shore, I tell them that my brother yelled to one of his friends from New Jersey who was an experienced ocean swimmer - **WE NEED HELP**. His friend Mike headed toward us and told us NOT to swim in a straight line but to swim diagonally towards shore in order to break the current. Fortunately, he was on our outside and after about 25 minutes of “tacking” we may it safely to shore, breaking the undertow. At this point I return to the board to reinforce that the mathematics of geometry may not always result in
success - the shortest path between two points may not be a straight line. I then ask if any of my students have sailed - sometimes I find one or two that understand what it means to tack in order to move a sail boat if there is no wind (sometimes called being in the irons). I then stress that learning can be very similar and I tend to use tacking to carefully process complex ideas and this may involve some digressions and minor detours in order to fully understand the nuances of the topic. Hence, the Socratic process of teaching/learning is seldom a straight line method and is best viewed as a “tacking” approach. In short, sharing this story involving a sailing metaphor may help all students better appreciate the learning value of the Socratic teaching process.

Classroom Technology: Balancing Substance and Sizzle

The late Stephen Covey warns us that technology is a good servant but terrible master (2001, p. 2). Because of this caveat I am extremely cautious about quickly adding new forms of technology to the classroom unless I can be persuaded that it may enhance the learning process. With the increased emphasis on distance/asynchronous learning, many faculty have created blended classes that use various forms of teaching technology such as blackboard, on-line chat rooms, video streaming, skyping, creative power point presentations, document scanning/distribution, u-tube scenarios and social networking. Most classrooms now have “smart stations” that allow faculty to use the computer and related technology as part of their teaching portfolio.

But I remain skeptical that the new technology of teaching should supplant the rich face-to-face dialogue of the traditional classroom. I have now graduated to “white boards and dry erase markers” coupled with an occasion integration of a power point slide, film, YouTube excerpt, or virtual discussion board. However, many of my upper division students tell me that they prefer the Socratic process and engagement in the learning process. Without sounding overly critical, some of my students have grown to detest ritualistic power point presentations and find them demotivating. Therefore, it seems that we need to strategically integrate our emerging technology, especially within the traditional undergraduate classes.

One example of technology that I have used successfully has been the use of a contemporary film coupled with a listening guide (Douglas, 1984, p. 21). After some instruction, I learned to lower our multiple screens, load up a DVD, adjust the picture and sound, and “push” the right button to begin the film. But the value of this process is far beyond being able to view this film on a blue-ray DVD and bigger screen. Films must be carefully selected for content and fit with the subject matter you are teaching. Students must be given a preview of the purpose and content of the film and then encouraged to peruse their listening guide so that they can take notes where appropriate. In my senior-level Management seminar I use Mr. Holland’s Opus showing the film in two parts. Since this is an evening class, we see the first half of the film, complete the questions on our listening guide, take a break and come back to debrief the film using the questions posed within the listening guide. These questions challenge students to apply assigned readings to various scenes within the film. Assigned readings deal with a variety of topics such as McGregor and Maslow’s classic articles on motivation, Stephen Covey’s book entitled
The 8th Habit, Fred Luthans’ article entitled Psychological Capital, and Lead like Jesus... by Ken Blanchard and Phil Hodges (Pierce & Newstrom, 2011). This method is based on a model entitled FILM: Film Integrated Learning Modules (Douglas, 1984). Hence, the pedagogy has been tested and published; but more importantly, the use of technology has been carefully integrated into class to enhance the understanding of assigned readings.

In short, it seems that we must be careful not to simply use technology to appease the new generation of visual learners. Professors must examine the new technology from an epistemological perspective—does it add value to the learning process or is it simply entertaining. Once this question has been resolved, then professors need to balance traditional teaching methods such as the Socratic process with periodic integration of carefully selected technology. The ultimate goal should be to minimize the sizzle and enhance the substance of the learning process.

The Teacher as Servant: Striving for the Ideal Paradigm

If individuals choose to devote their lives to undergraduate education, they should consider modeling the philosophy of servant leadership. This paradigm of leadership was first coined by Robert K. Greenleaf and was given more formal attention in his first book entitled Teacher as Servant: A Parable (1979). In his first publication Greenleaf attempted to inspire a team of college students to accept a paradoxical view of leadership—namely, that true leaders exist to serve the needs of others first. Greenleaf’s unorthodox view of the leadership process created much controversy as it was diametrically opposed to the traditional leadership theories more heavily grounded in a top-down hierarchical model where the leader gives orders to subordinates to execute the directives of top management. Greenleaf’s philosophy has been carefully examined and reviewed by numerous authors regarding its applicability in various contexts. Given the movement towards service learning and experiential teaching within higher education it seems reasonable for professors to consider adopting Greenleaf’s paradigm as a guide for effective instruction. According to Hays, incorporating servant leadership attributes within the classroom added value to the higher education learning process (2008). Key results from his research showed the following:

1. Students manifested higher levels of self-efficacy while feeling like key process contributors.
2. Students’ critical thinking skills were enhanced.
3. Students learned to be accountable for their own learning complemented with increases in pro-active behavior, self-leadership, and personal autonomy. Students experienced an exponential increase in trust resulting in enriched dialogue.
4. Students began to appreciate that the respective roles of teacher and learner are closely aligned.
Another interpretation of Greenleaf’s original thoughts suggested that servant leaders can enhance employee productivity by developing an organizational culture based on the following: active listening, trustworthiness, stewardship, and authenticity. (Douglas, 2003, p.6) Active listening requires deep surface listening based on paraphrasing the sender’s message, maintaining good eye contact with the messenger, maintaining a conversational tone of voice, removing physical barriers to communication and reading non-verbal cues from the sender. This level of listening is an ideal foundation for Socratic teaching. Of critical importance is that the participants in the dyadic communication process refrain from forming judgments and interrupting the sender before they are finished - a classroom tendency during discussion of highly complex and/or controversial topics. Of equal importance is to avoid marginal listening is which the recipient simply tunes out the message of the sender resulting in frequent misunderstandings - a common pattern towards the end of class or when a student’s emotional trigger has been pulled.

Trustworthiness speaks for itself in that effective leaders want to avoid the extremes of gullibility and suspicion among their workers while encouraging regular constructive feedback that is based on sound judgment (Covey, 2006, p.293). In class, professors should strive for the same type of Theory Y climate whereby students feel comfortable contributing value added ideas during class dialogue. In terms of higher-end learning we allude to this process as enhancing critical thinking skills, especially the upper stages of Bloom’s taxonomy (Clark, 2013).

Thirdly, the author promotes a sense of stewardship which fits with viewing the employees as the most important asset of the organization. Effective stewards provide employees with opportunities to expand their professional skills while engaging them in challenging projects. (Douglas, 2003, p.8) Again, this servant leadership principle seems to dovetail with higher education teaching as Theory Y oriented professors also want to view students as the most important asset of the university providing them assignments that stretch their capabilities and groom them for their next level of classes.

Lastly, servant leaders tend be authentic (Autry, 2001, p.10). They strive to model integrity and are transparent with their employees in all forms of transaction. This often includes abiding by a code of conduct and a willingness to collaborate on decisions within the workplace. Managers who are authentic are willing to take off their masks and emulate humility - sometimes admitting mistakes and asking for help. It seems reasonable that ethical professors will manifest the same level of openness and commitment to the learning goals and assignments outlined in the course syllabus. Contemporary professors must be willing to admit missteps and seek feedback from students and colleagues regarding suggestions for improving the learning process.

**Let the Journey Continue**

In short, my suggestions for successful teaching highlighted above seem to mesh well with the inherent philosophy that undergirds servant leadership - namely, *service to others before self*. More traditional professors may have to change their paradigm of teaching from omniscient sage on stage to facilitator/guide. This migration process may be en-
Enhanced by encouraging students to be active participants in their undergraduate education complemented by teaching practices that nurture co-determined learning, dialogue rather than simply discussion, smart trust, substantive reflections and feedback via contribution and value added integration of technology. This transformational process is not a quick fix nor does it provide THE answer to the ART of successful teaching. Moving towards a more experiential paradigm of teaching/learning will require risk-taking and a willingness to learn from mistakes. Like change expert Eric Abrahamson (2000) suggests, it may require constant tinkering with an occasional overhaul of the course. (p. 76) But staying in the safe harbor of monolithic lecturing will most likely result in many missed learning opportunities. Perhaps it is time for LIFTOFF!

References


Complicated Spaces: Negotiating Collaborative Teaching and Interdisciplinarity in Higher Education

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Abstract

This study focused on the socially-constructed meanings, implications, and institutional factors that influence the extent to which faculty members engage in collaborative teaching at a research university. Drawing upon theoretical foundations of interdisciplinarity and collaborative teaching and in-depth findings from faculty focus groups, we illustrate the various models of collaborative teaching currently in use by faculty and the structural conditions governing these teaching experiences. Findings suggest that while collaborative teaching experiences are emerging as teaching innovation and are potentially beneficial to students, they are institutionally challenging and often incongruent to the dominant culture of the research university.

Keywords: Collaborative teaching, interdisciplinary teaching, higher education, innovative instruction.

The practice of collaborative teaching in higher education has developed significantly in recent years (Bacharach, Heck, & Dahlberg, 2008; Evans, Tindale, Cable, & Hamil Mead, 2009; Lester & Evans, 2009). Interdisciplinary and collaborative teaching, together, have emerged as an important theme in colleges and universities, including large research universities (Sapiro, 2004). For many institutions, beginning to meet growing demands for integrated and interdisciplinary education will require faculty and administration to redefine what the typical undergraduate experience looks like.

Despite this interest in developing a collaborative teaching and learning environment, the literature that supports the connection between interdisciplinary approaches and collaborative teaching is lacking. Even when interdisciplinary, collaborative teaching models exist, the assessment of their impact on teaching and learning is rare, and most assessments of interdisciplinary approaches to teaching or research have focused on tangible

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outcomes such as grants, papers, and patents, leaving intellectual outcomes largely unexamined (Lattuca, Voigt, & Fath, 2004).

In an attempt to provide further understanding of the relationships between interdisciplinary and collaborative teaching, our research explores socially-constructed meanings, implications, and institutional factors that influence the extent to which faculty members engage in interdisciplinary (and multi-disciplinary) collaborative teaching at a research university. To set the stage, we draw upon the theoretical and empirical foundations of interdisciplinary and collaborative teaching. We focus on the ways in which these educational approaches are currently defined, the necessary connection between these two ideas, and the suggestions for best practices. This literature review is followed by findings from faculty focus groups we conducted at a research institution. It is here we illustrate the various models of collaborative teaching currently practiced by faculty and the structural conditions governing their inter/disciplinary teaching experiences. Specifically, we provide insight into the conceptual orientations for these educational approaches, tie these models to the literature, and discuss “best practice” suggestions for continued collaborative and interdisciplinary teaching. We begin with a review of the conceptual and empirical literature of interdisciplinary and collaborative teaching.

**Literature Review**

*Interdisciplinary Teaching and Learning*

We found that definitions of interdisciplinarity applied in teaching and learning contexts span across several decades. For instance, Newell and Green (1982) define interdisciplinary studies as “inquiries which critically draw upon two or more disciplines and which lead to an integration of disciplinary insights” (p. 2). The integration aspect of this definition is crucial, and it is what differentiates interdisciplinary studies from multidisciplinary studies. In an interdisciplinary experience, the assumptions and perspectives of different disciplines must intersect and inform one another, and the instructors must make this integration explicit for the students. The responsibility for integration rests with the instructors; otherwise, integration will not take place (Minnis & John-Steiner, 2006; Oitzinger & Kallgren, 2004). Interdisciplinarity is useful in answering questions that are too complex for a single discipline by constructing a single “more comprehensive perspective” (Newell, 2010, p. 6).

*Impact on Students*

According to Minnis and John-Steiner (2006), interdisciplinary learning experiences should theoretically help students apply and integrate disciplinary knowledge to solve real-world problems, and equip them with the skills they will need to adapt and function in today’s changing environment. Interdisciplinary programs and courses can help students develop critical thinking and problem-solving skills that they will need in their careers by requiring them to synthesize different disciplinary perspectives to create a new framework (Davis, 1995; Oitzinger & Kallgren, 2004). In a meta-analysis of available research, Johnson, Johnson, and Smith (2000) found that when students are asked to inte-
grate two different and opposing viewpoints, it can drive them to use higher-level reasoning strategies more often than in other learning settings. The students also showed better, more accurate retention, greater knowledge of the subjects studied, and better decision-making (Johnson et al., 2000). Evans, Tindale, Cable and Hamil Mead (2009) further found that an interdisciplinary approach to teaching professional communication skills to Master of Accounting students had a positive impact on the learners, who displayed gains in understanding, performance, and confidence in professional communication situations, evidenced by both student surveys and final grades.

**Impact on Instructors**

Although most of the benefits of interdisciplinary teaching in the literature focus on students, instructors stand to gain from interdisciplinary teaching experiences. While teaching such courses, instructors will often face issues on which they cannot reach an interdisciplinary consensus, and this divergence can lead to growth in the instructors (Lester & Evans, 2009). The integration of disciplinary perspectives, even when unsuccessful, can force instructors to re-examine their own disciplinary understandings, develop new understandings of their and others’ disciplines, and navigate differences across departmental cultures (Burkhardt, 2006).

Despite the many benefits to interdisciplinary teaching and learning, there are several potential pitfalls and caveats that must be considered when implementing an interdisciplinary program. First, instructors must consider whether students will be prepared to integrate the material. In many instances, students have become accustomed to being the passive recipients of knowledge, not the active constructors. Oitzinger and Kallgren (2004) found that, in order for students to benefit from an interdisciplinary program, instructors first had to provide training on how to be an active learner. This required some deprogramming of the students’ passive learning styles.

In addition to considering how interdisciplinary approaches may disrupt students’ expectations for a course, instructors and program proponents must consider how such an approach may conflict with other faculty and administrative expectations. Interdisciplinary programs violate the status quo in many university and college cultures, where their departments exist in relative isolation from one another and often have their own values and norms (Burkhardt, 2006). As a result, interdisciplinary forays have a high tendency to struggle and eventually fail (Burkhardt, 2006; Wieman, Perkins, & Gilbert, 2010). According to Wieman et al. (2010) in their discussion of an evidence-based model for adopting innovative teaching methods in science education, “the department is the necessary unit of change” (p. 8), therefore it is essential for faculty to have departmental support in developing innovative programs such as interdisciplinary curricula, especially in more market-driven university settings where a focus on research is valued over a focus on teaching (Augsburg, 2006). Appropriate displays of support could include incentives for professors to teach with members of other departments, recognition for those who have shown dedication to improving their teaching, and openness to changes that may increase the expense of instruction, such as smaller or modified classes (Wieman et al., 2010).
Developers of interdisciplinary programs must also successfully integrate the disciplines engaged if the students are to do the same (Minnis & John-Steiner, 2006; Oitzinger & Kallgren, 2004), which is often more challenging than faculty anticipate (Minnis & John-Steiner, 2006). Integration of disciplinary epistemologies, methodologies, and often opposing perspectives must be built in to the curriculum. Newell and Green (1982) suggested that “the critical factor in successful interdisciplinary teaching seems to be the willingness to engage other disciplines and to adopt temporarily their assumptions and worldviews” (p. 8), indicating that student buy-in may also be critical.

The discussion of interdisciplinarity thus far reflects Newell and Green’s (1982) assertion that collaboration is usually a requirement for interdisciplinary programs. Instructors are needed to provide their expertise in the disciplines involved, which ensures that students are immersed in the theories, methodologies, perspectives, and major tenets of the disciplines that they will be required to integrate throughout the program. The following section covers the foundations and practices of collaborative teaching, the benefits and difficulties related to this pedagogical approach, and suggestions within the literature for successful faculty collaboration.

**Collaborative Teaching**

Co-teaching began primarily as a special education endeavor, to help make inclusion a more successful practice (Cook & Friend, 1995). Cook and Friend (1995) defined co-teaching as “two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space” (p. 2). As the literature on co-teaching began to evolve, so did the terminology. Co-teaching, team-teaching, and collaborative teaching have been used to define teaching that involves more than one instructor, and it is often difficult to differentiate between these three ideas. According to Cook and Friend (1995), team-teaching is a variant of co-teaching where both members share the instruction of the students. Collaborative teaching is often vaguely defined in the literature, and some have used co-teaching and collaborative teaching interchangeably (Stang & Lyons, 2008). Lester and Evans (2009) presented their collaborative approach to team-teaching wherein both instructors were responsible for planning the curriculum, coming to a consensus on how the class material should be presented, providing the instruction, and assessing student learning. Because their approach involved a more rigorous degree of collaboration than most team-teaching definitions, Lester and Evans (2009) defined their approach as *collaborative teaching*. Collaborative teaching is therefore viewed as including a level of cooperation not required by team-teaching specifically, or co-teaching in general.

Collaboration is the necessary underlying process for collaborative teaching to occur. According to McDaniel and Colarulli (1997), collaboration among instructors theoretically varies along four dimensions: 1) the degree of integration of ideas and perspectives; 2) the degree of interaction between faculty and students during the learning process; 3) the degree to which active learning and engagement is encouraged; and 4) the degree of faculty interdependence in the collaborative process. Higher levels of collaboration take place when faculty actively integrate their individual perspectives, both faculty interact
with students, active learning is built into the curriculum, and faculty move from an autonomous approach to planning and implementation to a more interdependent one (McDaniel & Colarulli, 1997).

**Impact on Instructors**

This high degree of collaboration may have its benefits. For faculty members, collaborative teaching can serve as a professional development experience, wherein each member learns from the other’s teaching styles, can become more creative in delivering class materials, yet still receive feedback on their own performance (Lester & Evans, 2009; Neumann et al., 2006). Other research has shown that collaborative teaching encourages instructors to be more reflective in their practice (Lester & Evans, 2009).

Collaborative teaching can also provide moral support that college instructors may not otherwise receive (Neumann et al., 2006). Collaborating faculty have an avenue through which to address the problems and issues that arise in planning and facilitating a course. Lester and Evans (2009) found that a collaborative approach led them to develop an ebb and flow where they learned to both lead and follow one another. Additionally, they noted that a collaborative approach naturally created a more democratic classroom, and students became equally responsible in the process of the course (Lester & Evans, 2009).

**Impact on Students**

With regard to learning outcomes, Carpenter et al. (2007) found no significant difference between achievement scores for graduate students in a solo-taught course and a collaboratively taught course. There were, however, significant differences between the two groups in terms of students’ expressed comfort with the material (Carpenter et al., 2007). This finding is especially important as these courses involved research and statistics, an area that can intimidate some students. Wenger and Hornyak (1999), using open-ended student evaluations, found that students enjoyed the learning environment of collaboratively taught classes. Collaborative teaching enhanced the students’ interest and created a more informal classroom environment (Wenger & Hornyak, 1999). Dugan and Letterman (2008) found that student evaluations of collaboratively taught courses were higher than those of serially team-taught courses.

As with interdisciplinary approaches, there are difficulties related to collaborative teaching that instructors must take into account. Students of collaborative learning environments can experience confusion over which instructor to approach with questions about the class, and can feel extra pressure as a result of being graded by two different people (Bacharach et al., 2008). From an instructor perspective, collaborative teaching is time-consuming. In fully collaborative environments, faculty members plan, implement, and assess the course together. This process requires a time commitment above and beyond that of a solo-taught class (Lester & Evans, 2009; Neumann et al., 2006). During the instructors’ first implementation of a collaboratively taught course, the time required is even greater. In addition to developing the curriculum, the instructors must also deal with the interpersonal issues inherent in collaboration (Lester & Evans, 2009; Neumann et al.,
Communication is the key to successful collaboration, and members of the teaching team must learn to disagree amicably by developing trust (Robinson & Schaible, 1995). Neumann et al. (2006) also found that many faculty expressed concerns that having more than one instructor present may prevent students from developing rapport with faculty members.

Evolving Practices and Disciplinary Grounding

In exploring how interdisciplinary and collaborative teaching can help meet the evolving needs of higher education and its students, we also investigated programs and courses that touted successes in various areas of collaborative and interdisciplinary teaching and learning. Effective interdisciplinary and collaborative teaching endeavors that had some sustainability and were positive experiences for instructors and students were usually the result of two intentional activities of the instructor: taking responsibility for integration (Minnis & John-Steiner, 2006; Newell & Green, 1982), and commitment to in-depth collaboration (Lester & Evans, 2009; Neumann et al., 2006; Robinson & Schaible, 1995).

Taking Responsibility for Integration. As faculty in the Water Resources Program, Minnis and John-Steiner (2006) surveyed the students in the program’s three interdisciplinary courses. Integration was not intentionally built into the course curricula, and they found that students were having difficulty synthesizing the information on their own (Minnis & John-Steiner, 2006). Newell and Green (1982) provide examples of programs where faculty made synthesis of disciplinary viewpoints explicit. In a sophomore-level Natural Sciences course on energy, students were asked to evaluate coal, oil, nuclear fuel and emerging alternatives from geological, physical, ecological, and political perspectives. In a freshman course on the autonomy of the individual, students were required to consider the question, “is the individual free?” from economical, sociological, and psychological perspectives. In many instances, it is a well-designed question that can drive students’ integration of disciplinary ideas.

Commitment to In-depth Collaboration. Faculty undertaking an interdisciplinary, collaboratively taught course should also begin with the expectation to communicate and collaborate extensively (Lester & Evans, 2009; Robinson & Schaible, 1995). Benjamin (2000) argues that instructors must have the right intentions in approaching interdisciplinary collaborative teaching, and that these intentions should reflect a focus on improving teaching and learning and a commitment to in-depth collaboration. Within this extensive communication and collaboration, faculty should expect a period of trial and error in planning and implementation (Robinson & Schaible, 1995). In order for the teaching team to transition smoothly from one instructor to the next, construct consistent expectations of students, and synthesize their disciplinary viewpoints, faculty members must explore different approaches and techniques (Neumann et al., 2006). All of this experimentation takes place as instructors maintain course policies and expectations and learn more about their teaching. Faculty should also avoid viewing interdisciplinary collaborative teaching as a division of labor, as such an approach can impede not only the synthesis of disciplinary perspectives but also the teamwork necessary to collaboratively teach (Neumann et al., 2006).
The process of interdisciplinary and collaborative teaching can be very demanding for instructors, especially in the developmental stages of the course or program (Lester & Evans, 2009). Considering the commitment required to be successful, it becomes even clearer that departmental and administrative support is necessary for interdisciplinary and collaborative programs to succeed (Wieman et al., 2010). Departments must provide faculty with the time and resources to develop collaboratively taught courses and to learn to teach in this way. Department heads and administration must also provide moral support and show commitment for interdisciplinary and collaborative programs by making them a priority within departmental cultures (Kezar, 2005; Wieman et al., 2010). With this in mind, our project explored how and why interdisciplinary and collaborative teaching were currently being used through the lens of an in-depth case study at one institution immersed in the discourse.

Methods

The Research University as Research Setting

Our research was initially conducted based on emerging interests in interdisciplinarity and collaborative teaching at a Mid-Atlantic research university. Specifically, in 2009, a USDA Higher Education Challenge Grant was awarded in the College of Agriculture and Life Sciences (CALS) to develop an interdisciplinary, experiential-based curriculum in sustainable agriculture and food systems. An interdisciplinary group of faculty, staff and students from CALS departments, dining services, the college’s farm, plus several community partners collaborated to develop this curriculum via a new college based undergraduate minor called Civic Agriculture and Food Systems (CAFS). The goal was to develop a curriculum that provided students with knowledge and skills to incorporate agriculture and food system sustainability philosophies and activities into practice.

The CAFS minor aims to engender an authentic, interdisciplinary teaching and learning experience for students across the university. To further develop this educational approach, the CAFS minor taskforce collaborated with the university’s offices of teaching and learning and assessment to explore possibilities for improved collaborative instruction and evaluation of student learning. Funded by a 2010 Integrated Internal Competitive Grant program in the CALS, our interdisciplinary research team began to investigate the primary question: How is collaborative teaching being used on campus and by whom? Through a sequential, mixed methods approach, the research team drew upon survey and focus group data where several models were identified, and obstacles and opportunities related to collaborative and interdisciplinary teaching emerged. The remainder of this paper describes the quantitative data collection as a method for identifying focus group participants, but takes as its focus the qualitative aspects of our research in order to reveal the deeper meaning learned from faculty across the university who are currently involved in inter/disciplinary collaborative teaching arrangements.
Research Approach and Data Sources

The overarching purpose of our grant-funded research project was to investigate the role of collaborative teaching in enhancing interdisciplinary collaboration in education and scholarship. Both quantitative and qualitative methods were applied in our inquiry. The primary objective of the qualitative strand was to gain a deeper understanding of the collaborative and interdisciplinary teaching models currently being applied in a broad array of disciplinary contexts. In our Discussion section, we further develop these models by synthesizing them with the established trends we uncovered in the literature to present a set of best practice recommendations for both university and department administration, as well as instructors looking to incorporate interdisciplinarity and collaborative teaching in their own practices and policies.

Data collection for the quantitative strand took place during the spring semester of 2011. In the quantitative strand, a survey was employed to obtain a broad view of collaborative and interdisciplinary teaching currently taking place across disciplines in our institution. The survey included requests for demographic information and concluded with an invitation to participate in a focus group in which participants would discuss their experiences with collaborative and interdisciplinary teaching at significant depth. Focus groups were the chosen methodology for the qualitative strand of inquiry because it would allow us to get representation from a wide range of disciplines and see the interactions between participants’ differing perspectives on interdisciplinary and collaborative teaching. Approval for the use of focus groups with human subjects was obtained through our university’s Institutional Review Board.

The focus group invitation at the end of the survey resulted in 88 instructors expressing an interest to participate. We utilized the demographic information collected to ensure that faculty from a wide range of disciplines were present in the focus groups. Two focus groups were conducted in the summer of 2011 with a total of 11 faculty members participating, with seven participants in one group and four in the other. Participants were eight men and three women, and represented a range of years of experience, including assistant, associate, and full professors. Participants represented a wide variety of disciplines. A two-member team conducted each focus group. One member facilitated discussion while the other took detailed notes. All of the focus group facilitators were members of the research team and had in-depth understandings of the research questions. As part of the process, the audio of the focus group activities was recorded. The research team provided participants with an introductory writing activity as they arrived to the focus group. Participants were asked to consider two questions and take brief notes (Please provide a description of your experience with collaborative teaching and How do you define interdisciplinary teaching?), which were designed to help them begin to think about their previous interdisciplinary or collaborative teaching experiences, especially experiences that would fall into this category but that they had not previously considered as such. After participants had organized their thoughts and the priming activity concluded, the focus group was conducted. Each focus group took approximately one hour and fifty minutes.
Data Analysis

The audio recordings from both focus group activities were transcribed and coded by two of the focus group facilitators. The constant comparative method was applied to the data, and a family code list was derived through a two-phase, iterative process (Glaser & Strauss, 1967). We used the existing literature, expanded on in the literature review section, as a typology to explore our focus group data. The definitions of interdisciplinary and collaborative teaching derived from Lattuca (2001), Boix Mansilla, Gardner, and Miller (2000), and Lester and Evans (2009) served as the foundation for the theoretical lens that we applied throughout our coding process. The first phase in this process involved a series of reflections on the initial findings of the literature review, and the initial codes reflected a framework of the general experiences of instructors using collaborative and interdisciplinary teaching at the higher education level. The codes derived from the first phase in the process were used to inform and guide the coding of the transcript data. Through reflections on the literature review, it was anticipated that the focus group analyses would yield information relevant to the participants’ personal definitions of collaborative teaching, the structural realities of interdisciplinary and collaborative teaching, and the student and instructor learning implications therein. In undertaking the second phase of the analysis, the family code list was revisited and adjusted during multiple read-throughs of the transcripts so that it would reflect the experiences of instructors specific to the institution, resulting in a code list that was both informed by the literature and responsive to the participants’ experiences. Atlas.ti was used to categorize participants’ responses into themes. Themed responses were then re-examined for an additional layer of sub-categories. Analyses of the focus group data yielded six themes, with 21 total sub-categories within these themes. The following section focuses on two of the six emergent themes that proved most relevant to discussing next steps and best practices for interdisciplinary and collaborative teaching in the higher education setting: **Meanings of Collaborative Teaching** and **Structural Realities of Collaborative Teaching**. The remaining four themes addressed issues related to the logistics of teaching collaboratively and the implications of its use. In an effort to increase the focus of our paper and to conserve space, the remaining four themes are not discussed here, as they are not directly related to the topic at hand. Additional analysis may continue in the future.

Results

Within the context of the larger research project, here we report on results that illustrate the meanings, motivations, and realities of collaborative teaching derived from the faculty in our study. We begin by revealing three different forms of collaborative teaching where faculty disciplines are integrated in varying ways according to the purpose of the collaboration—giving meaning to interdisciplinary collaborative teaching. We conclude with the administrative and bureaucratic conditions that appear to play a significant role in governing faculty’s collaborative and interdisciplinary teaching experiences.
Meanings of Collaborative Teaching

Leader-based. Several faculty described their collaborative teaching experiences as a leader-based model. The leader-based model included both small (two instructors) and large (three or more instructors) teaching teams. This approach was further defined by the way in which the model was implemented. First, it was used as an approach for a lead faculty member to mentor instructors with less teaching experience, including new faculty members or graduate teaching assistants. When used in a mentoring capacity, the more experienced instructor served as a fail-safe for the novice instructor, who was still viewed as an active participant in the construction and delivery of the course, and was expected to make significant contributions. One passage from a faculty member explains the leader-based collaborative teaching approach well:

R8: It varies each time we teach it in response to my interactions with my teaching assistant. I was sort of thinking about it as a collaborative teaching experience. It still has the hierarchy of faculty-assistant relationship, but the teaching assistants have a lot of flexibility to develop their own teaching styles, their own material. I sort of help to facilitate that…

Second, the leader-based approach was used as a way to provide cohesion for courses with a large teaching team (three or more instructors), where one instructor would become “the glue” for the course. “The glue” would provide oversight and/or introduce each new instructor and section of the course, making explicit connections to the material that had already been discussed and tying these sections back to the big picture or overarching theme. This instructor would also lead the teaching team and ensure that the curriculum for the course was being properly addressed. Faculty participants expressed that they felt that having “the glue” was necessary to have a successful collaboratively taught course with a larger teaching team. The leader would often help the team discuss and come to agreement about what material would be taught.

Modular. The modular model of collaborative teaching was commonly used and perceived by participants as a cost- and resource-saving measure. This model often, but not always, involved a large teaching team of three to six instructors. In the modular model, courses were broken up into multiple sections, and each section covered by one instructor. Each instructor would develop the lesson plans, deliver instruction, and evaluate learning for their section independently of the rest of the teaching team with, in some cases, “mini tests” implanted within the course. Overall, the module approach was very strategic and illustrated both teaching dependence and independence. This is well explained by one particular participant:

R2: I taught one course where one person had half the course and the other person had half the course. And when the first instructor was done, he was out of there, and whatever I did, you know, was fine.

In spite of the instructors largely functioning independently of the rest of the teaching team, many still experienced intellectual constraints as a result of working with such a large group, such as feeling a lack of freedom in experimenting with different teaching

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techniques. In departments that did not have enough faculty to cover all the necessary courses, the modular model of collaborative teaching was often used. From this perspective, faculty acknowledged that the experience was largely dependent on the way the modular model was constructed. A larger number of modular teaching team members was often associated with unwieldy and in-cohesive experiences:

R10: It depends on the team, you know. I think it’s a real difference whether you try to teach with two or three people focused, or you basically have a group of five to ten faculty. And with five to ten faculty, a good number of them don’t know what the others are doing. You have absolutely no control over that.

Participants also expressed that, in modular models where instructors worked independently of one another, it was often difficult to know exactly what the students had been taught by the end of the course.

**Traditional.** The traditional model was viewed by participants as the best representation of what is meant by the term “collaborative teaching” as it is often used in the literature. The examples discussed typically involved a smaller teaching team, usually two instructors, who were both active and equal participants in the full timeline of the course. The instructors would collaboratively develop the course curriculum, develop lesson plans, deliver instruction, and evaluate student learning. The instructors shared equal responsibility for the decision-making within the course. In essence, as one participant stated, it is “more of a symphony than these separate players off doing their own thing.” It is also explained well here with an emphasis on the continuality of the teaching approach: “It wasn’t module or segmented, we were just, you know, right from conception to finish, we were both in there all the time teaching, sort of playing off each other.”

Transparency, open communication, solid interpersonal relationships, and the ability to reconcile individual teachings styles were seen as vital to the success of traditional collaborative teaching. In fact, this model was not seen as appropriate for all teaching teams in all situations. Experiences using or witnessing the traditional model were often described as challenging but positive. Here a faculty member describes a course taken as a graduate student as the inspiration drawn upon to teach collaboratively from an interdisciplinary perspective:

R10: …I had [a course] as a student with a collaborative teaching team, which [was] basically two faculty got together, which, first of all, [they] did that by choice. They choose each other as partners. It was a theorist and an experimentalist teaching the same topic, and that went exceedingly well. That was one of the best teaching experiences or learning experiences I ever saw as a student. It seems to depend a lot, at that level, on the chemistry between people and whether they do this on a voluntary basis or because they have to.
Structural Realities of Collaborative Teaching

Departmental/Administrative Support/Recognition. Although many participants expressed a belief that collaborative teaching could be beneficial for students, instructors, and the university, they noticeably expressed frustration with a general lack of support or recognition of collaborative teaching on the part of their departments and university administration. Most participants felt that their departments actively discouraged the use of collaborative teaching for budgetary reasons:

R11: It doesn’t happen easily. You know, it just doesn’t happen easily. So I had to kind of get what I wanted by framing it in a different way so that it made financial sense. So the department could say “we’re offering this course in all these sections, we know what’s happening in every section, and we know the quality of it…”

In light of these issues, many of the participants who actively engaged in collaborative teaching felt that they had to provide extra justification to their department heads for choosing to teach a course collaboratively, or had to frame a collaborative course in such a way that it made “fiscal sense” for the department. Participants also felt that use of the traditional model was unlikely to become more accepted until department heads and university administration actively recognized the benefit from using this technique.

Other participants shared how their experiences in collaborative teaching were derived from courses that were created through new grant programs that emphasized innovation in teaching and learning, often drawing upon interdisciplinary program aims. Participants expressed concern, however, that after the grant funding was gone departments were highly unlikely to provide the funding to allow the course to continue unless student numbers were high. One faculty participant expressed this concern by way of recognizing the tension between innovation and resource constraints:

R9: My frustration, in a lot of ways, comes from the fact that we love to put money into new initiatives, and then forget about the core educational minutia. All we want to do is get those numbers of students through the system.

The tension between resources and teaching innovation was further explored by another participant who called attention to the role of politics in making higher education decisions: “I hesitate to say this, but I do bristle when someone says it’s a resource issue when it’s a will issue. This is because we do find the resources when there is a will to put those resources somewhere.”

Obstacles/Opportunities Related to On-line Course Scheduling (e.g. Banner) and Management Systems (e.g. Blackboard). Participants expressed frustration in dealing with course management systems in administering a collaboratively taught course. These systems, and the way they are currently used by university administration, cannot accommodate collaboratively and interdepartmentally taught courses in a seamless way. Many participants stated that they were forced to undergo elaborate processes in order to set up
collaboratively taught courses in the management system in a way that properly recognized all instructors on the teaching team. This sometimes involved dual-listing courses in different department headings or expanding enrollments in a course so each instructor could take half. Many stated further that this elaborate process had to take place every time the course was taught, and expressed frustration with the lack of responsiveness on the part of the system. Participants discussed finding resources within the registrar’s office to help them navigate these processes, and that without help, the process could not be successful. The questions they ask of their systems managers are often left unanswered due to perceived ignorance or political willpower:

R5: We just have to reinvent everything again and again and again as if people are having this problem for the first time. I don’t know, as near as I can tell, the people that are in the driver’s seat have never been in a classroom.

The participant later elaborates on this point:

R5: I think, from the Banner point of view, I’m figuring they can fix this, but they just don’t want to spend the time and effort to get some of these information system aspects right. And I think part of the reason that’s the case is that they view this as a side issue.

The participants’ responses emphasized that they perceived the problem to be both how the software systems were designed, and the policies and procedures that had been put in place to regulate their use across the institution.

Obstacles/Opportunities Related to Resources, Tenure, and Institutional Mission. Participants discussed both obstacles and opportunities related to the resources required to collaboratively teach. On one hand, the context of a research university was seen as an advantage to collaborative teaching in that instructors had the opportunity to coordinate with others from different disciplines and expertise. It was also seen as a barrier to collaborative teaching where some participants felt that the university’s “focus on research may distract from the teaching mission.” Some participants felt that many in higher administrative positions were not in favor of innovative teaching strategies, such as collaborative teaching, that took away time away from research programs.

Several participants claimed that university administrative leaders did not have the appropriate amount of teaching experience and pedagogical knowledge to make sound decisions in how the university acted out its teaching mission, and that instead, many decisions were made from a fiscal perspective. Lack of necessary resources allocated to departments to support innovative teaching methods, including collaborative teaching, was noted as evidence. The focus, instead, is placed on developing standardized teaching practices to be resource efficient: “We talk about how great it is that we’re a research-active university and our professors are in the classroom, but we’re moving to ‘instructorizing’ just about everything to save money and time.”
Participants felt that participating in interdisciplinary collaborative teaching could hinder them acquiring tenure because of the perception that such courses were resource intensive and therefore inefficient. The emphasis on giving their home department enough credit for the interdisciplinary collaborative teaching experience was perhaps the most widely discussed risk. Some participants felt that “collaborative teaching in [their] department does not count for teaching credit.” And if they “taught a course outside of [their] department, collaborative or uncollaborative, that was simply not going to count toward their teaching load.” Others felt that they were expected to participate in the modular model of collaborative teaching. It was expressed by several faculty that if they declined to do so this would also prevent them from obtaining tenure. It was felt by the participants that collaborative teaching experiences were not always considered helpful when tenure was being determined.

Discussion

Our exploration of interdisciplinary and collaborative teaching within the literature and in the context of a research university yielded key insights into the potential contributions these approaches stand to make to higher education pedagogy. In the following sections, we discuss our findings from three perspectives: 1) all who work in higher education, 2) educators who work in the classroom, and 3) the administrators who support them. Each discussion includes suggestions for best practices as well as a call to arms for those in higher education to consider the relevance of these approaches in the context of their own colleges, universities, or classrooms.

Call to all: Recognizing variation in purpose for collaborative teaching

Not all collaborative teaching experienced at this research institution was defined in the same way. Leader-based, modular, and the traditional form of collaborative teaching were all experienced by faculty. Perceptions of these forms of collaborative teaching were also different. From our experience in this inquiry, the modular form was the most used. The modular model of collaborative teaching was also associated with the most negativity expressed by participants. In contrast, the traditional form was described as most challenging yet positive for the faculty. Traditional collaborative teaching teams were successful when transparency, open communication, and effective interpersonal relationships existed. Leader-based was more often used in a mentoring capacity linking senior faculty with less experienced junior faculty or teaching assistants. This approach was also utilized when teaching teams were large for the purpose of course cohesion. In exploring how interdisciplinary and collaborative teaching existed within the literature and on-campus, we found that the necessary intentional activities identified in the literature (taking responsibility for integration and commitment to collaboration) did not apply to all the models that existed at our institution. Although instructor responsibility for integration was necessary in the traditional model, it did not apply to all instances of leader-based or modular collaborative teaching. This was especially true in cases where integration was not one of the goals of the course, or where only one disciplinary perspective was presented. The different models also required differing levels of commitment to collaboration. Where traditional and leader-based experiences required high to moderate
levels of commitment, modular experiences required little instructor interaction. By integrating our findings from the literature and our qualitative inquiry, it became clear that different models served different purposes, and that the different models evoked strong affective reactions from instructors. Instead of assigning one model the title of “best practice”, it is useful, instead to examine using these models in their appropriate contexts.

The leader-based model serves as a useful way to introduce less experienced instructors to teaching at the higher education level. It can also provide the cost-saving benefits of the modular model while still helping students integrate the various perspectives and concepts in the course. Faculty generally viewed the leader-based model as a positive experience that forged a compromise between necessary resource reduction and providing beneficial experiences for students and instructors alike. Participants’ views of the leader-based model reflected the suggestion in the literature that interdisciplinary and collaborative teaching can provide valuable professional development experiences (Lester & Evans, 2009; Neumann et al., 2006).

The modular model proves to be more controversial, relating back to Neumann et al.’s (2006) warning to avoid treating interdisciplinary and collaborative teaching as a simple division of labor. Although useful in saving time and resources, the over-use of the modular model can be demoralizing for instructors and students alike. The modular model can save departments functioning with a reduced faculty, but perhaps should be viewed as a temporary solution.

The traditional model, often seen by participants as the ideal, involved great challenge and risk, yet great reward. However, through exploration of the literature and participants’ responses, it is clear that the traditional model may not be appropriate for every instructor in every course. Strong interpersonal dynamics, students who are capable of dealing with ambiguity, and course content that lends itself well to an integrative, democratic approach can result in a transformative teaching and learning environment (Bacharach et al., 2008; Lester & Evans, 2009; Neumann et al., 2006; Robinson & Schaible, 1995). Applying the traditional approach where it is not warranted, however, can result in confusion and frustration on the part of students and instructors.

Keeping these insights in mind, we assert that each model holds value in its own right. This value, however, is only accessed when these models are used appropriately by administration, department heads, and instructors. Thus, additional support for understanding and implementing collaborative teaching models in various contexts is essential.

Call to educators: Collaborative and interdisciplinary teaching and learning

Higher education is beginning to recognize a necessary shift in the way educators structure and deliver instruction in colleges and universities. Collaborative teaching is emerging in many departments from a range of disciplinary and interdisciplinary perspectives as one method for addressing this shift. Above we discussed the categorizations of the various models uncovered in the literature and on-campus, and the benefits and caveats attached to each model. Keeping contextual factors in mind, it is clear that both students
and instructors stand to benefit from the thoughtful implementation of interdisciplinary and collaborative teaching. Collaborative teaching offers opportunities to grow as an educator and to model effective collaboration for students. New forms of pedagogical knowledge, for example, were reported. Also, collaborative teaching allows for professionals to learn new concepts, theories, and measures that are directly and sometimes indirectly connected to course content.

We also suggest that the relationship between collaborative teaching and interdisciplinary learning and teaching aims needs to be explored further. Our research provides some framing to the larger relationship between the two areas of inquiry, but clearly more needs to be done. The epistemological implications of faculty and student’s cognition enhancement warrants further investigation, as well. While some faculty did not teach collaboratively from an interdisciplinary perspective, those that did highlighted several key points. First, interdisciplinary collaborative teaching provides multiple perspectives for educators and best help their students learn course content. Second, it allows for professional knowledge gains for enhanced understanding of concepts of complex systems and problems. Third, it enhances teaching abilities by engaging in dialogue with other colleagues.

Thoughtful and successful implementation of interdisciplinary and collaborative teaching, however, will require further experimentation on the part of college and university instructors, as our higher education institutions are not currently designed to accommodate such approaches (Oitzinger & Kallgren, 2004). In order to change the landscape of higher education pedagogy, instructors must take on the task of classroom-based trial and error within the contexts of their own programs in order to stimulate progress toward a more integrative, democratic approach to teaching and learning. It is instructors who then reveal the feasible, effective interdisciplinary and collaborative approaches to their department and university administration.

**Call to administrators: Moving forward with higher education innovation**

Collaborative teaching, like any other form of teaching, needs to be done well to work. To improve the implementation of collaborative teaching, resources and programmatic focus from administration are required. A disconnect exists between what administrators say and do, between the mission statement and the reality. Participants shared that new grant initiatives that emphasize teaching and learning innovation often lack sustainable administrative resources beyond a grant cycle. Some faculty express that administrators reduce teaching to a numbers game rather than one that reflects quality teaching scholarship, which was illustrated well by the participants’ perceptions of the use of the modular model, wherein large, unintegrated teaching teams were a barrier to ensuring student learning. Other faculty expressed willingness to engage in teaching collaboratively, yet it is discouraged by department administrators who perceive a loss of department credit value and resources. Still others voiced frustration that many administrative leaders make fiscal decisions about teaching resources with inadequate teaching experience or pedagogy knowledge.
A shift in the administrative ‘fiscal’ climate to support teaching innovations like collaborative teaching will prove challenging. Tensions between the two central academic missions (research and teaching) prevail in the 21st century. How best to reconcile or better balance them within a scholarship paradigm at a research intensive university warrants further investigation within the context of collaborative teaching. Overall, there is consensus that collaborative teaching is a worthy endeavor. It also comes with structural realities that need addressing. Wieman et al. (2010) stated that the department is the “necessary unit of change”, and this was reflected in the participants’ statements, as well. Many felt that change at a research university, and similar large institutions, would have to originate from the bottom-up, as opposed to top-down approaches. Department heads must serve as the advocates of their faculty to ensure they have the space and resources necessary for innovation. In the context of large research institutions, the responsibility will fall to them to direct their university’s climate back towards a focus on teaching and learning.

University administration can play a role in the current climate-shift by providing recognition and incentive to develop and implement interdisciplinary and collaborative courses and programs. Many participants noted that top-down approaches to such change often resulted in a lack of buy-in and simply going through the motions for many educators “on the ground.” Department heads must lead the charge within the context of their own programs; however, university administration must create the space and support for them to do so.

Conclusion

Instructors, department heads, and university administration have unique and necessary roles to play in integrating interdisciplinary and collaborative teaching into higher education. Interdisciplinary and collaborative teaching endeavors have a high tendency to fail, whether it is from a lack of faculty or student buy-in, a lack of sustained support from administration, or from department cultures that actively discourage such practices (Burkhardt, 2006; Wieman et al., 2010). In order to successfully integrate these beneficial approaches, a high degree of commitment is required from all three parties. To further validate the effectiveness of interdisciplinary and collaborative teaching, it falls to educational researchers to conduct a simultaneous effort to measure its impact on student learning.

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