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SoTL and the Institutional Review Board: Considerations before navigating the application process for classroom research in higher education

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Abstract: One of the more challenging areas of Scholarship of Teaching and Learning (SoTL) research can be navigating the components of human subjects research protections implemented by the Institutional Review Board (IRB). The authors of this article, a faculty developer and a current and former research compliance coordinator, discuss the history of IRB in relation to SoTL research and explicate some of the foundational components of IRB protocols for SoTL projects. In particular, the authors explore what constitutes “research” for SoTL projects, explain the different IRB types of review, and offer some sample SoTL projects with respect to their IRB implications.

Keywords: Institutional Review Board, Scholarship of Teaching and Learning

Introduction

One of the more challenging areas of Scholarship of Teaching and Learning (SoTL) research can be navigating the components of human subjects research protections established by the Office of Human Research Protections and implemented by the Institutional Review Board (IRB). The literature has shown that interacting with the IRB can be a challenge for faculty who are unfamiliar with human subjects research protections and/or the scholarship of teaching and learning (see, for example, Lopus, Grimes, Becker, & Pearson, 2007; Wright, Finelli, Meizlish, & Bergom, 2011). Despite the pervasiveness of SoTL in higher education (evidenced through conferences such as IS-SoTL, publications such as the *Journal on Excellence in College Teaching* and the *Journal of the Scholarship of Teaching and Learning*, and the growth of SoTL initiatives at research institutions such as the University of Michigan’s Investigating Student Learning Grant program), guidelines for faculty regarding how to navigate the human subjects research requirements for SoTL projects. For example, McKinney (2007) provides an excellent and extensive guide for designing SoTL research projects, but only mentions IRB in passing as one of many challenges “on the horizon for starting (and completing!) SoTL projects” (p. 25). As we explored the SoTL literature, we found only one article (Pritchard, 2001) that included guidelines aimed at SoTL researchers that both discussed the components of IRB review while also providing examples of how this might apply in a SoTL context. We found no guidelines that were written from the combined perspectives of IRB professionals and faculty developers.

In the remainder of this article, we use our shared experience to discuss the history of IRB in relation to SoTL research and explicate some of the foundational components of IRB review for SoTL projects. In particular, we explore what constitutes “research” as it relates to SoTL projects, explain the different IRB types of review, and offer some sample SoTL projects

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with their IRB implications. We hope that this reflective piece will offer some clarification for faculty members, particularly those who are new to SoTL research or who are first-time IRB applicants.

SoTL as Human Subjects Research

As Hutchings argues, the ethical issues embedded within SoTL research “are not simply occasions for caution, but windows into our aspirations and values as educators” (Hutchings, 2003, p. 28). SoTL researchers are being asked to engage in questions of ethics and values within their teaching and research (Pritchard, 2002). The possible risk to students as a potential vulnerable population must be weighed against the need to assess the effectiveness of teaching and learning. Swenson and McCarthy (2012) elaborate, “faculty must attend to competence in teaching by using scientifically sound practice and safeguarding the very students who are participants in the pedagogical research” (p. 22). Pecorino, Kincaid, & Gironda (2008) call for a separate “ethical review process” for classroom research (p. 2). While students can certainly be empowered by participating in research on teaching and learning, particularly when they participate as co-PIs or co-authors, students have also been perceived as a vulnerable population in three main areas: the power differential between students and teachers who will be grading current students who are also research subjects (Hammack, 1997; Pecorino, Kincaid, & Gironda, 2008); the value judgments made by teachers who incorporate new texts, assignments, assessments, technologies, or learning procedures for the purpose of SoTL research (Burman & Kleinsasser, 2004; Pecorino et al., 2008); and the “dual-role conflict” (Hammack, 1997) created when “the research may be intended, in part, to further the career of the teacher/researcher by generating publications or conference presentations” (Pecorino et al., 2008, p. 5; see also Burman & Kleinsasser, 2004). Submitting research on classroom practice to the IRB for review is a crucial step for investigators who wish to ensure that their students are protected as research subjects. Moreover, many SoTL journals require that researchers have obtained IRB approval before they will publish research based on data collected from human subjects.

The Scholarship of Teaching and Learning (SoTL) is a body of research and literature that has grown rapidly in the decades after its initial definition. At present, several definitions of SoTL exist. Even as McKinney (2007) notes the importance of “recogniz[ing] the diversity in definitions or understandings of SoTL that exist even among experts in the field” (p. 5), some common features have emerged across a variety of SoTL definitions. Based on these common features, we define SoTL research as the following:

- An inquiry or investigation of classroom practice [including online environments] in higher education (Huber and Hutchings, 2005; Menges & Weimer, 1996),
- Using a systematic and intentional (and perhaps disciplinary) methodology (Cambridge, 1999; Kreber, 2001),
- Resulting in a scholarly product, such as a conference presentation or journal article manuscript, to be publicly disseminated (Huber & Hutchings, 2005; Cambridge, 1999; Kreber, 2001; Richlin, 2001; Savory, Burnett & Goodburn, 2007; Shulman, 1999),
- That can be built upon by colleagues also engaging in SoTL research (Shulman, 1999).

As a faculty developer and a current and former research compliance coordinator who often partner with one another to help faculty navigate the relationship between SoTL and the requirements necessary for conducting human subject research, we have found that a shared definition between our offices has been a helpful component of this work. After working

together over several years on shared projects, we looked to the literature for a “how-to” guide that we could offer to faculty who were novices in the field of SoTL research. With the exception of Pritchard (2001, 2002), we struggled to find this kind of resource.

The literature reports that IRB approval can be perceived as a barrier for instructors wishing to contribute to the scholarship of teaching and learning (Lopus et al., 2007; Wright et al., 2011) with some arguing that “the cost of the [research ethics committee] process for researchers conducting classroom-based studies may outweigh the benefits to the student subjects and other interested parties” (Lopus et al., 2007 p. 69). While the IRB as a perceived barrier is not unique to SoTL researchers (researchers in other fields may experience similar confusion regarding the application process), it is important to note that researchers who are new to SoTL may be experiencing the IRB for the first time. Since SoTL research occurs across a wide variety of disciplines, researchers applying for IRB approval may not have received any previous training or have any past experience of working with the IRB. Moreover, the IRB application, protocol, and review process can be confusing to navigate because the IRB’s regulatory definition of “research” can differ from common definitions of research used by faculty members (Pritchard, 2002; see Table 1).

Table 1

Comparative Definitions of Research

Faculty Perspective(s) of Research	IRB Perspective of Research	SoTL Perspective of Research
<p>“Systematic self-critical inquiry” that is “made public” (Stenhouse, 1981, 103; 104)</p> <p>“Gather[ing] information to answer a question that solves a problem” (Booth, Colomb, & Williams, 2008, p. 10)</p> <p>“Contributes not only to the stock of human knowledge but also to the intellectual climate of the university. Not just the outcomes, but the process, and especially the passion, give meaning to the effort” (Boyer, 1990, p. 17)</p>	<p>“A systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge” (Protection of Human Subjects, 2009, § 46.102(d))</p>	<p>An inquiry or investigation of classroom practice in higher education, using a systematic and intentional (and perhaps disciplinary) methodology, resulting in a scholarly product to be publicly disseminated that can be built upon by colleagues also engaging in SoTL research.</p>

The first step toward a successful relationship between SoTL researchers and IRBs is to have a common understanding of the regulatory framework in which IRB professionals are trained to think about research. Research with human subjects has been regulated by the federal government since the 1970s with the passage of the National Research Act of 1974. The act was passed in response to public outcry amidst the 1973 Congressional hearings on human

experimentation, an effort led by the late Senator Edward Kennedy. These hearings put in the forefront several instances of research conducted without any ethical standards in place to protect human participants. Some of the most cited examples are the Tuskegee syphilis study (Schuman, Olansky, Rivers, Smith, Rambo, 1955), the Tearoom trade study (Humphreys, 1970), and the Milgram studies of obedience (Milgram, 1963). The 1974 Act established the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, which in 1979 issued the Belmont Report. This report laid out the three basic ethical principles for the conduct of human subjects research: respect for persons, justice, and beneficence. In 1984, with this report as the foundational background, the federal agencies responsible for the oversight of human subjects research promulgated the “Common Rule.”

The Common Rule is the federal policy for the protection of human subjects involved in research and what all IRB professionals use as their regulatory framework. The Common Rule has been adopted by several federal agencies and it dictates the requirements for assuring compliance by research institutions as well as the requirements for obtaining and documenting informed consent of research participants. The Common Rule also regulates how IRBs are created, how they function, and the criteria used for IRBs to review and approve human subjects research. The key terms here are “research” and “human subjects.” Historically, as the National Commission title suggests, these terms have been understood to apply solely to biomedical and social/behavioral research. However, as more higher education institutions formalized IRB functions in a centralized office, an increased concern about conducting ethical research meant an expanded interpretation of the regulatory meaning of research. Under this expanded interpretation, a SoTL project that otherwise does not fall under traditional psychological or sociological human behavioral research may still necessitate an IRB inquiry. SoTL researchers should also note that their disciplines might have additional ethics codes that may apply to their classroom research (see, for example, Swenson & McCarthy, 2012).

What Constitutes “Research” and “Human Subjects” according to the federal regulations?

In *The Nature of Research*, Brew argues “there is no one thing, nor even a set of things, which research *is*. It is obviously a complex phenomenon” (Brew, 2001a, p. 21). Brew’s own scholarship, in which she explores the relationship between research and teaching, has attempted to further clarify how academics experience research in a variety of ways from different perspectives. For example, based on one study of 57 researchers, Brew identifies four qualitative conceptions of research that she refers to as “domino,” “layer,” “trading,” and “journey” (Brew, 2001b, p. 280). As varying definitions of research are a common foundation for academic work, particularly across diverse disciplines, faculty may feel startled when the validity of their scholarship as research is questioned by an IRB professional.

The IRB defines research as “a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge” (Protection of Human Subjects, 2009, § 46.102(d)). Each part of this definition is an important component that influences the determination of whether a SoTL project falls within the purview of the IRB. An IRB professional, when reviewing a SoTL project, should first ask:

- 1) Does this meet the regulatory definition of research?

In order to answer this question, an IRB professional will apply all parts of the definition of research to the project with a specific focus on the key phrases “systematic” and “designed to

develop or contribute to generalizable knowledge.” Another question that may be asked is “What is the intended purpose of the investigation?”

Example: If while teaching an introduction to biology course, an instructor wants to see if her students learn better with new online laboratory modules than from a traditional textbook, this most likely will not meet the regulatory definition of research. While this might represent a systematic investigation because she plans to use a scientific method to collect and analyze data between two semesters of classes that use the two different instructional methods, it is equally important to note that the intention behind the analysis is solely to improve her own teaching practices and her students’ learning experience. As opposed to being designed to contribute to general knowledge about best teaching practices for biology courses, this inquiry is too limited in scope to meet the regulatory definition of research. When looking at SoTL projects in relation to the regulatory definition of research, one of the most important things to remember is that it must meet the definition in its entirety.

Using this example, with the same parameters described above for the inquiry, rather than solely trying to improve her teaching, the instructor now intends to design the study so that her results will be appropriate for publication and contribute to generalizable knowledge regarding the benefits of using technology to help students learn. Because her study design now includes the intention to contribute to this body of knowledge that can be used by other biology teachers at other institutions and in diverse classroom contexts, it now is more likely to meet the regulatory definition of research. However, it is important to note that designing a study with the intention to publish the results does not automatically make the project generalizable. For instance, if the design of a classroom research study is so unique that the knowledge it creates cannot be transferred to other classroom contexts, the intention to publish will have no impact on the determination of whether the project falls within the regulatory definition of research. One of the most crucial differences between faculty understandings of research and the regulatory definition (and perhaps one of the most frustrating differences), is that publication equates research for faculty, but this is not always the case for the regulatory definition. For example, non-academic publications (for example, articles in newspapers) describing an instructor’s experience with their students in a non-identifiable way would not be classified as “research” that would need to be approved by the IRB.

Upon determining that a SoTL project meets the definition of research, an IRB professional will next ask:

(2) Does this meet the definition of human subjects?

“Human Subjects” are defined as “a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information” (Protection of Human Subjects, 2009, § 46.102(f)).

If the answer to both of these questions is no, then the project does not require further inquiry by the IRB. However, if the answer to either question is yes, then the definition of human subjects has been met.

Broken down even further, the first part of the definition of human subjects references obtaining data through “intervention or interaction.” The federal definition explains this component as “both physical procedures by which data are gathered (for example, venipuncture) and manipulations of the subject or the subject’s environment that are performed for research purposes” as well as “communication or interpersonal contact between investigator and subject” (Protection of Human Subjects, 2009, § 46.102(f)). In addition to face-to-face contact between

researcher and subject, data collection through online venues or non-face-to-face procedures also meets the regulatory definition of human subjects. Examples of this kind of data collection might include online surveys, phone interviews, and surveys collected via email or postal mail.

SoTL projects often meet the definition of human subjects because they involve interventions or interactions with students such as manipulating the classroom environment.

Example: An instructor wants to learn about the differences in his students' classroom experience when they are exposed to fresh air versus not exposed. He designs a SoTL project to measure the differences using a classroom that in one semester will have opened windows and in the following semester, the windows will be closed. Assuming this project has already met the regulatory definition of research, it would also meet the definition of human subjects because the classroom environment has been manipulated for research purposes.

Another important component of the definition of human subjects is the reference to "identifiable private information." Private information is further explained in the federal regulations as "information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public" (Protection of Human Subjects, 2009, § 46.102(f)). Private information must also be classified as "individually identifiable (i.e., the identity of the subject is or may readily be ascertained by the investigator or associated with the information)" (Protection of Human Subjects, 2009, § 46.102(f)). If a SoTL project does not obtain data through intervention or interaction, but does include the use of identifiable private information, then it would meet the definition of human subjects.

Example: A Sociology professor has given her students a journal assignment in which they are supposed to record their observations during their commutes to and from campus and connect what they observe to what they are learning in class. This journal assignment is explained by the professor to be a confidential communication between the instructor and her students. The class in which the assignment is originally used has six students. After the third iteration of the course, and the third cycle of using this assignment with additional groups of 20 and 25 students, respectively, the professor begins to notice a trend in her students' journal entries regarding their observations of everyday violence and she would like to design an exploration of this pattern. Assuming that her investigation meets the regulatory definition of research, there are several questions related to the human subjects definition that an IRB professional might consider.

- 1) Were the journals collected through interaction or intervention with the students *for the purpose of research*?
No. The data was collected as a classroom assignment and not for research purposes.
- 2a) Are the journals private information?
Yes. The students were fulfilling a specific writing assignment, which they reasonably expected would be kept private by their instructor because the professor described the journals as confidential.
- 2b) Are the journals identifiable?
Maybe. The first group of journal entries were submitted by a small group of students. Depending on the level of detail given in the journal entries, the data may be identifiable. This is less likely, but still possible, in the larger groups of students.

3) Does this investigation meet the regulatory definition of human subjects?

Maybe. The human subjects definition has two parts, interaction or intervention *and* identifiable private information; at least one of these criteria must be met. If the answer to question 2b is no, then neither part has been met. However, if the answer is yes, then this investigation meets the definition of human subjects.

Based on the above examples, it is clear that applying the regulatory definitions of research and human subjects is not always a simple process. This is why we recommend always establishing a relationship with your institution's IRB professional or research compliance office and consulting with them ahead of time when there is uncertainty about whether IRB review is needed. Below, we elaborate on the different types of IRB oversight.

Exempt vs. Expedited vs. Full IRB Review of Research

If it is determined that your classroom research meets both the regulatory definitions of research and human subjects, you will want to continue with an application for IRB review. In this section, we will further define and explain the different criteria and thresholds that may suggest the appropriate type of IRB review. There are three main types of review that can be applied to studies involving human subjects: exempt, expedited, and full review. Each type of review can involve different paperwork and requirements for the researcher based on local institutional policies. Below, we define each of these types and offer examples of classroom research projects that meet criteria for a particular type of review. It should be noted that while regulations provide minimum criteria for research qualifying for a certain type of review, it always remains within the purview of the local institution under which the IRB is housed to implement more stringent policies and practices related to the protection of human subjects involved in research based on local context and other factors.

Generally speaking, *exempt research* is often reviewed using a less formal, yet still thorough process, where the determination of exemption can be made independently by a designated member of the IRB or an IRB Administrator who is delegated responsibility for making such determinations. The federal regulations from the Office of Human Research Protections do not require that exempt determinations be made by IRB professionals; however, it is considered a best practice to consult with an IRB professional regarding whether the research meets criteria for exemption. The application for exemption should therefore cover many of the same relevant areas as a non-exempt IRB application and protocol that undergoes expedited or full board review. In order for the determination of exemption to be made, sufficient and explicit information must be provided regarding the purpose and scope of the study, the voluntary nature of participation, recruitment of participants, informed consent process, and data analysis and storage in the same level of detail as a non-exempt protocol. The difference is that when a determination of exemption is made, it means that the study is "exempt" from IRB review and continuing review and monitoring of the research by the IRB. [Note: research involving prisoners or an incarcerated population never qualifies for exemption]. Even though the research may be classified as "exempt" there is still a presumption that an investigator has a duty to adhere to the ethical principles outlined in the Belmont Report.

There are six categories whereby research may be determined to meet exemption criteria. We describe five of these categories below; the sixth rarely applies to SoTL research because it involves food quality and consumer acceptance studies.

Table 2

Categories of Exempt Research with Examples

Category for Exemption	Example of Research Project
Category 1 is “research conducted in established or commonly accepted educational settings, involving normal educational practices.” For the IRB, “normal educational practices” include two areas: “research on regular and special education instructional strategies, or research on the effectiveness among instructional techniques, curricula, or classroom management methods.”	<i>Example:</i> An instructor of legal analysis wants to compare his use of the Socratic method with small-group work in two sections of the same class. This kind of classroom research can be categorized as exempt under Category 1 because the instructor is studying the effectiveness of instructional techniques.
Category 2 is “research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior.” There are two exceptions to this category that make a project not exempt: “if (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.” An exception to this category is research that involves surveying children or observing children’s behavior if the investigator is involved in the observation.	<i>Example:</i> A math instructor wants to collect information on whether a new test instrument is impacting her students’ learning. This test instrument is a regular component of the class that all students engage with as part of the class activities. This kind of classroom research can be categorized as exempt under Category 2 because the math instructor is studying a particular educational test and how it affects student learning.
Category 3 is “research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under Category 2, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.”	<i>Example:</i> A faculty member would like to survey state governors who are taking part in a continuing education program at her institution regarding their experience with the program and applications to their professions. This kind of classroom research can be categorized as exempt under Category 3 because the research subjects are elected officials.
Category 4 is “research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.”	<i>Example:</i> A physics instructor is now offering a “blended” version of an introductory course that is incorporating additional technology components. To study the effectiveness of the course, he wants to compare student test responses in

	the blended version with anonymous test data from an earlier “traditional” offering of the course. This kind of classroom research can be categorized as exempt under Category 4 because the instructor is using data from a previous course in a way that subjects cannot be identified.
Category 5 is “research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine:(i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.”	<i>Example:</i> A faculty member at an institution of higher education has been asked by the Department of Education to submit a report on the effectiveness of her institution’s McNair Scholar program, which is federally funded. Part of the data being collected is student’s classroom research projects. This kind of classroom research can be categorized as exempt under Category 5 because the research is directed by the DOE to determine public benefit.

Definitions above are taken from Protection of Human Subjects, 2009, §45 CFR 46.101.

The distinction between research that is classified as exempt or non-exempt can be confusing in terms of interpreting and applying the criteria for a certain type of review. Even when research may appear to qualify for exemption, the research design, methodology or instruments may impose radically different procedures or present specific situational risks that in some way deviate from those that a research subject might normally encounter in everyday life. Implicit in research categorized as exempt is the notion that there is little, if any, associated risk. Even when the criteria for exemption appears relevant, if a determination is made that the threshold for the level of risk normally associated with exempt research is surpassed, then the research may be referred for expedited or full board review.

The Department of Health and Human Services recognizes that not all human subjects research warrants review by the full IRB, hence categories of research were developed for non-exempt human subjects research that may undergo an *expedited review* procedure. The term “expedited” is sometimes perceived as a less time consuming and perhaps less scrutinizing process. This misnomer can create confusion and a source of frustration among faculty members because expedited reviews, depending on the research study, can take time to approve (this is particularly true if revisions are suggested or more information is needed from the researcher before a determination can be made about whether to approve the protocol). When a research project meets criteria for expedited review, this means that the research is not exempt, but it also does not meet the threshold needed to undergo review by a convened meeting of the full IRB. In particular, expedited research must be categorized as minimal risk to subjects in order to undergo expedited review. While regulations provide minimum criteria for research to qualify for

expedited review (for example that it must not present more than minimal risk to subjects), it is local IRB policy that dictates the review process, and this process often varies based on institution. The IRB may determine a research project's eligibility for expedited review based on federal guidelines, local institutional policies, and requirements of any sponsoring agencies.

Typically, expedited review is conducted using a one or two IRB-member system of review. The two-member system is often referred to as a primary and secondary reviewer system and the review process involves close communication and coordination between the reviewers and compliance staff to reach consensus on the approval of the research. Although the review is normally conducted by one or two IRB members, all IRB members must be provided access to the study and may weigh in on the review and approval process. During expedited review there may be feedback provided to the investigator from reviewers that is relayed through the IRB professional staff to which an investigator must respond before gaining IRB approval.

Example: The same math instructor that was exempt under Category Two above wants to collect information on her students' learning with a particular test instrument, but she plans to create a separate survey that is not a part of normal course assessment to gather additional data. The students will be informed about the anonymous online survey and will be able to choose whether or not to complete the survey on their own time. Although the survey could be offered after grades have been submitted to avoid any perception of coercion, the instructor would prefer to offer the survey immediately after the test instrument has been used, which is in the middle of the semester. Despite the survey being anonymous, based on the demographics of the class and the questions being asked, there is a potential for answers being identifiable and thus a potential risk for coercion if the students are asked to complete the survey during the semester before they have received their final grades. To make sure that students are not experiencing unnecessary risk, this kind of classroom research would go through expedited review.

Full board review is applied to classroom research protocols when they exceed the threshold of minimal risk or deal with a vulnerable population that may warrant more oversight and monitoring by the IRB. Additionally, research that involves deception or that asks for a waiver of informed consent or a waiver of documentation of consent may require full board review. The regulations do not explicitly define what research must be reviewed by the full IRB, but instead outlines criteria for determining what types of research might qualify for exemption as well as those that meet criteria for expedited review. The criteria established by the federal government for both exemption and expedited review represent minimum criteria; therefore, IRBs have much latitude and responsibility for determining the thresholds for research that must undergo review by the full Board. The Common Rule stipulates that expedited review procedures may be used "for certain kinds of research involving no more than *minimal risk*, and for *minor changes* to approved research" (Protection of Human Subjects, 2009, § 46.110). Thus, when research presents more than minimal risk to subjects, review by the full IRB is required. The Common Rule defines minimal risk as "the probability or magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examination or tests" (Protection of Human Subjects, 2009, § 46.102). An increase in risk to participants in areas of social and behavioral research may be perceived and occur in many ways; for example, by recruiting vulnerable populations as research participants; audio or video-taping participants; using deception; and/or collecting information on participants that if confidentiality is breached, could significantly harm an individual's reputation, cause social stigmatization, or result in criminal liability. While these "triggers" for determining full board review are somewhat

subjective, they often are covered in institutional policies that also serve to define standard practices in the field.

Instances in which SoTL research would need to undergo review by the full IRB are rare. However, there are situations that might very well precipitate full review. For example, a number of federal funding initiatives allow prisoners access to post-secondary education and some colleges and universities have collaborations with prison systems to provide prisoners this access to higher education. Research involving prisoners or other incarcerated individuals is one of the exceptions to exemption; although no similar regulatory exception exists with respect to expedited review, standard practice in the field is that prisoner research, however innocuous, normally requires full review. This institutional policy then might require that an anonymous survey designed for the purpose of SoTL research and administered to a segment of a prison population who is participating in a post-secondary education program undergo review by the full IRB. Research methods that an IRB might consider as warranting full IRB review might include audio or videotaping focus group sessions or deceiving participants as to the purpose of the research. Deception might be a necessary condition to pursue the purpose and aim of the research, however, its use might necessitate full board review.

Example: If the same math teacher used in the preceding examples was gathering the same information with a group of students that could be classified as “at-risk” (for example, they are on academic probation and are taking the math course after already failing it once before), then the IRB may want to explore if this group could be put at additional risk if they were to participate in the study. In the case of “at-risk” students, the IRB may be concerned that the students’ reputation might suffer if included in a study, particularly if the group is small enough that participants might be identifiable when reporting the study’s findings. Additionally, if this instructor planned to use class time to conduct additional assessments that were outside of normal course procedures, a full review might be conducted to explore whether the use of class time for research would put the students at further academic risk.

Conclusion

Classroom research is a crucial component to growing our knowledge about how students learn and to better understand effective classroom practice. The information above can provide a clearer pathway for instructors who may be new to classroom research or for more experienced researchers who have yet to conduct research that involves human subjects. To review, we offer the following steps as a guideline for faculty considering SoTL research:

- 1) Develop a relationship with the IRB professional(s) at your institution so that you know who to contact for questions about the IRB application, protocol, and review process;
- 2) With the help of the IRB professional(s) at your institution, determine if your classroom investigation constitutes research of human subjects according to the federal regulations used by the IRB;
- 3) Based on several factors (including risk to participants and vulnerability of study population, among others), and with the help of an IRB professional at your institution, determine the type of review appropriate for your study.

It is important to note that each institution may handle their IRB review with slightly different practices than those described above, but the majority of the above recommendations are based on federal regulations and best practices in the field. SoTL researchers should always ask their institution’s IRB professional if they are unsure which type of review is appropriate for

a classroom research project, or if they unsure of how to proceed with an IRB application or during a review process.

References

- 45 C.F.R. § 46 (2009). Retrieved November 5, 2013 from <http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html>
- Booth, W.C., Colomb, G.G. & Williams, J.M. (2008). *The Craft of Research*. Chicago: University of Chicago Press. doi: 10.7208/chicago/9780226062648.001.0001
- Boyer, E.L. (1990). *Scholarship Reconsidered: Priorities of the Professoriate*. Stanford, CA: The Carnegie Foundation for the Advancement of Teaching.
- Brew, A. (2001a). *The Nature of Research: Inquiry in Academic Contexts*. New York: Routledge.
- Brew, A. (2001b). Conceptions of Research: a Phenomenographic Study. *Studies in Higher Education*, 26 (3), 271-285. doi: 10.1080/03075070120076255
- Burman, M.E. & Kleinsasser, A. (2004). Ethical Guidelines for Use of Student Work: Moving from Teaching's Invisibility to Inquiry's Visibility in the Scholarship of Teaching and Learning. *The Journal of General Education*, 53 (1), 59-79. doi: 10.1353/jge.2004.0018
- Cambridge, B. (1999). The Scholarship of Teaching and Learning: Questions and Answers from the Field. *AAHE Bulletin*, 52 (4), 7-10.
- Hammack, F.M. (1997). Ethical Issues in Teacher Research. *Teachers College Record*, 99 (2), 247-265.
- Huber, M.T. & Hutchings, P. (2005). *The Advancement of Learning: Building the Teaching Commons*. San Francisco, CA: Jossey-Bass.
- Humphreys, L. (1970). *Tearoom Trade: Impersonal Sex in Public Places*. London: Duckworth.
- Hutchings, P. (2003). Competing Goods: Ethical Issues in the Scholarship of Teaching and Learning. *Change: The Magazine of Higher Learning*, 35 (5), 26-33. doi: 10.1080/00091380309604116
- Kreber, C. (2001). Conceptualizing the Scholarship of Teaching and Identifying Unresolved Issues: The Framework for this Volume. In C. Kreber (Ed.), *New Directions for Teaching and Learning: No. 86. Scholarship revisited: Perspectives on the Scholarship of Teaching and Learning* (pp. 1-19). San Francisco, CA: Jossey-Bass.

Lopus, J.S., P.W. Grimes, W.E. Becker & R.A. Pearson. (2007). Effects of Human Subjects Requirements on Classroom Research: Multidisciplinary Evidence. *Journal of Empirical Research on Human Research Ethics: An International Journal*, 2 (3), 69-78.

McKinney, K. (2007). Enhancing Learning through the Scholarship of Teaching and Learning: The Challenges and Joys of Juggling. San Francisco: Anker Publishing.

Menges, R.J., Weimer, M., and Associates. (1996). Teaching on Solid Ground: Using Scholarship to Improve Practice. San Francisco, CA: Jossey-Bass.

Milgram, S. (1963). Behavioral Study of Obedience. *Journal of Abnormal and Social Psychology*, 67, 371-378. doi: [10.1037/h0040525](https://doi.org/10.1037/h0040525)

Pecorino, P.A., Kincaid, S. & Girona, B. (2008). Research and Experimentation in Teaching Effectiveness: The Ethical Review Process and the IRB. *International Journal for the Scholarship of Teaching and Learning*, 2 (1), 1-11.

Pritchard, I.A. (2002). Travelers and Trolls: Practitioner Research and Institutional Review Boards. *Educational Researcher*, 31 (3), 3-13. doi: [10.3102/0013189X031003003](https://doi.org/10.3102/0013189X031003003)

Pritchard, I.A. (2001). Searching for 'Research Involving Human Subjects:' What is Examined? What is Exempt? What is Exasperating? *IRB: Ethics and Human Research*, 23 (3), 5-13. doi: [10.2307/3564509](https://doi.org/10.2307/3564509)

Richlin, L. (2001). Scholarly Teaching and the Scholarship of Teaching. In C. Kreber (Ed.), *New Directions for Teaching and Learning: No. 86. Scholarship revisited: Perspectives on the Scholarship of Teaching and Learning* (pp. 57-68). San Francisco, CA: Jossey-Bass.

Savory, P., Burnett, A.N. & Goodburn, A. (2007). Inquiry into the College Classroom: A Journey Toward Scholarly Teaching. Bolton, MA: Anker Publishing.

Schuman, S. H., Olansky, S., Rivers, E., Smith, C.A., Rambo, D. S. (1955). Untreated Syphilis in the Male Negro; Background and Current Status of Patients in the Tuskegee Study. *J Chronic Dis*, 2 (5), 543-558. doi: [10.1016/0021-9681\(55\)90153-3](https://doi.org/10.1016/0021-9681(55)90153-3)

Shulman, L.S. (1999). Taking Learning Seriously. *Change: The Magazine of Higher Learning*, 31 (4), 10-17. doi: [10.1080/00091389909602695](https://doi.org/10.1080/00091389909602695)

Stenhouse, L. (1981). What Counts as Research? *British Journal of Educational Studies*, 29 (2), 103-114. doi: [10.1080/00071005.1981.9973589](https://doi.org/10.1080/00071005.1981.9973589)

Swenson, E.V. & McCarthy, M.A. (2012). Ethically Conducting the Scholarship of Teaching and Learning Research. In R.E. Landrum & M.A. McCarthy (Eds.), *Teaching Ethically: Challenges and Ppportunities* (pp.21-29). Washington, D.C.: American Psychological Association. doi: [10.1037/13496-002](https://doi.org/10.1037/13496-002)

Linder, K.E., Elek, E.D., & Calderon, L.

Wright, M.C., C.J. Finelli, D. Meizlish & I. Bergom. (2011). Facilitating the Scholarship of Teaching and Learning at a Research University. *Change: The Magazine of Higher Learning*, 43 (2), 50-56. doi: 10.1080/00091383.2011.550255

Student views of instructor-student rapport in the college classroom

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Abstract: Building upon past research on the positive learning outcomes associated with rapport building in the classroom, this study examines the specific behaviors instructors utilize in college classrooms to build rapport with undergraduate students. Participants (N=230) answered open-ended survey questions about their instructors' rapport-building behaviors. A total of 514 behaviors described as rapport building were categorized into five themes: attentive behaviors, common grounding behaviors, courteous behaviors, connecting behavior, and information sharing behaviors.

Keywords: rapport, instructor-student relationships, learning outcomes, instructor behaviors

Introduction

Interpersonal communication is everywhere, and the college classroom is no exception. Dobransky and Fymier (2004) support this assertion by claiming that instructor-student relationships in the classroom are often interpersonal in nature. Many researchers claim that interpersonal relationship building is necessary for the effective transmission of ideas between instructors and students to occur. For example, Worley, Titsworth, Worley, and Cornett-Devito (2007) state that instructor-student relationships are not only important for effective communication to take place, but are vital for student learning. Tsui (1996) also notes, "establishing a good relationship with students is extremely important in creating a conducive learning atmosphere in the classroom" (p. 164). This emphasis on building relationships with students begs the question, how does an instructor build good relationships?

Extensive research has examined this question by studying instructor-student relationships and the learning outcomes associated with certain behaviors. A wide variety of behaviors are associated with positive classroom outcomes, including: self-disclosure (Mazer, Murphy, & Simonds, 2007), humor (Gorham & Christophel, 1990), nonverbal immediacy, (Frymier & Houser, 2000), clarity (Chesebro & McCroskey, 1998), fairness (Faranda & Clark, 2004), and rapport building (Frisby & Martin, 2010).

Building rapport, as a relationship variable, has only recently received scholarly attention in instructional settings (e.g., Catt, Miller, & Schallenkamp, 2007; Frisby & Martin, 2010; Frisby & Myers, 2008; Nguyen, 2007). Frisby and Myers (2008) support this claim and assert that instructor-student rapport is an understudied phenomenon. Recent research indicated that rapport building is indeed an important variable for student learning, but the specific behaviors that students view as rapport building have not been examined in detail. Frisby and Martin (2010) state, "Thus far, rapport seems to be a positive interpersonal construct utilized in the instructional setting. However, it remains unknown exactly which instructor behaviors lead to building rapport with students" (p. 160). The current study qualitatively examines the specific instructor behaviors that students define as rapport building in the college classroom. By providing

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concrete examples of how students describe rapport building in the college classroom, this study provides practical advice for both new and seasoned instructors looking to enhance the learning environment in their classrooms.

This study is situated in the literature on rapport building, and adds a qualitative component to the current understanding of rapport as potentially beneficial in the college classroom. A review of past research on rapport building frames the current study of student views of rapport-building behaviors in the college classroom.

Literature Review

Rapport is a behavior that is defined and operationalized in different ways. Faranda and Clark (2004) define rapport as building a relationship based on mutual trust and harmony, and Nadler (2007) explains rapport as positive mutual attention marked by affinity and harmony. Gremler and Gwinner (2000) explain rapport building in two different, but related, ways: a personal connection and an enjoyable interaction.

Rapport Research in Organizational Contexts

Recent research on instructor-student rapport grew out of past examinations of rapport building in various organizational contexts such as corporate negotiation (Nadler, 2007) and retail employee-customer relationships (Gremler & Gwinner, 2008). This research demonstrates a variety of behaviors that contribute to building rapport between individuals. Research focusing on corporate negotiation (Nadler, 2007) suggests that rapport is built through nonverbal behaviors such as facing the other person, leaning forward, making eye contact, and mimicry of the other person through posture, facial expressions, tone of voice, and mannerisms. Nadler's (2007) research also reaches beyond the scope of nonverbal communication, and asserts that one can build rapport by conducting face-to-face meetings, chatting informally before conducting business, and through self-disclosure.

Gremler and Gwinner (2008), in a study on rapport building tactics used by retail employees with customers, found five significant themes of rapport building behaviors. These behaviors included uncommonly attentive behavior, common grounding behavior, courteous behavior, connecting behavior, and information sharing behavior. Uncommonly attentive behaviors refer to behaviors that were viewed as above-and-beyond by the customer. Common grounding behaviors refer to attempts by the employee to show what he/she has in common with the customer. Courteous behavior is exemplified through considerate behaviors that appear to have the best interests of the customer in mind. Connecting behavior is explained as an employees' attempt to form a bond with the customer. Last, information-sharing behaviors refer to an employee sharing information with the customer that is perceived to make the customers' experience better.

Effects of Building Rapport in the Classroom

Rapport building between instructors and students is increasingly viewed as essential to a positive classroom experience. Faranda and Clark (2004) list rapport as one of the top six attributes that students believe are present in good instructors, and early research on rapport

building (i.e. McLaughlin & Erickson, 1981) suggested that rapport is crucial characteristic of being an “ideal” instructor.

Schrodt and Witt (2006) explain the potential benefits of rapport building, stating, “few can deny the fundamental importance of instructors establishing...rapport with students at the beginning of a new semester” (p. 3). Frisby and Myers (2008), drawing from research by Roach, Cornett-Devito, and Devito (2005) succinctly explain the potential benefits of rapport building in a classroom setting:

Intuitively, an instructor who maintains positive rapport with students would also achieve a sense of liking from them, increase students’ state motivation, and enhance students’ satisfaction, in part because student’s feelings of liking for instructors often evolves into liking for the course and increased learning. (p. 28)

The effects of rapport building between instructors and students align with assumptions of the Affective Learning Model (ALM) (Rodriguez, Plax, & Kearney, 1996). The ALM posits that favorable instructor behaviors are essential to building relationships between students and instructors, which can help create positive student affect toward both the instructor and the class, which in turn may improve cognitive learning. Affective learning refers to students’ feelings about course content, about enrolling in another course with similar content, and about the course instructor (Frisby & Martin, 2010). Cognitive learning refers to the process of a student gaining knowledge related to course material and developing intellectual skills (Bloom & Krathwohl, 1956). The ALM has been utilized by Communication Studies scholars to examine how instructor behaviors such as immediacy (Rodriguez et al., 1996) and rapport building (Frisby & Martin, 2010) can increase students’ affective and cognitive learning.

Although the benefits of classroom rapport have been demonstrated, an in-depth look at how exactly to build rapport in the classroom is missing from the research (Frisby & Martin, 2010). Since the ALM demonstrates that instructor behaviors can enhance cognitive learning, an understanding of the specific ways that rapport can be built in the classroom is warranted. By analyzing student reports of behaviors that build rapport in the classroom, this study contributes to the literature on rapport building by providing specific behaviors that instructors can use to enhance the classroom environment, which in turn may lead to increases in student learning.

Research Question

Due to the perceived similarities in interpersonal communication between the employee-customer relationship and the instructor-student relationship in the classroom setting, the theoretical framework provided by Gremler and Gwinner (2008) guides the data analysis in the current study. Viewing college students as customers is a widely discussed and highly debated topic in higher education (George, 2007). However, this research project is not meant to be part of that debate. Instead, this project is designed to focus on how interpersonal communication behaviors can effectively be utilized in the classroom. Specifically, this paper seeks to better understand the rapport-building behaviors that instructors can use to build positive relationships with college students.

Consequently, the following research question was posed:

RQ: What specific instructor behaviors do students view as building rapport in the classroom?

Method

Methodological Framework

Following the lead of Gremler and Gwinner (2008), the Critical Incident Technique (CIT) was used to guide the research methodology for the current study. CIT is a qualitative research method developed by Flanagan (1949; 1954) that has been used in a variety of social scientific research scenarios. Hughes (2007) describes the CIT method as follows:

As its name suggests, critical incident technique involves the study of *critical incidents* - or significant instances of a specific activity - as experienced or observed by the research participants. Detailed analysis of critical incidents enables researchers to identify similarities, differences and patterns and to seek insight into how and why people engage in the activity. (p. 49)

Findings from the CIT method are typically used to support practical outcomes, such as improving customer relations in the service industry (Gremler, 2004) or refining pedagogical effectiveness with students (Kain, 1997). Drawing from Stephen Brookfield's (1995) widely cited research on critical teaching, Philan (2012) asserts that the use of critical incidents are regularly "deployed in part to provide access to students' view of teaching practice" (p. 32).

Instruments

To answer the above research question, college students in a general education public speaking class were recruited to participate in a self-administered survey. The survey took approximately 20-30 minutes to complete and students completed the survey online at a convenient time outside of class. The survey included both open-ended and close-ended questions, however only the open-ended questions were examined for this study. The survey began with basic demographic questions and then offered six open-ended questions on rapport building. Specifically, students were asked to describe how their public speaking instructor built rapport with them in their public speaking classroom. For example, students were asked to respond to the following open-ended question: "What behaviors do you see from your instructor in the classroom that makes you feel that he/she has built rapport with you?" A brief definition of rapport was provided in the survey to ensure that participants were familiar with the concept.

Participants

Participants were recruited from public speaking classes at a large Midwestern university and received class credit for participating. All participants were enrolled in a public speaking class taught by a graduate teaching assistant or part-time lecturer. A total of 230 participants completed the survey, and the sample was evenly split between males and females (47% male, n=108; 53% female, n=122). The majority of the sample was freshman (57%, n=132), with all undergraduate class levels represented (27% sophomores, n=62; 10% juniors, n=24; 6% seniors, n=13). The study included students in a variety of academic majors, as the class was a general education option at the university. Participants completed this survey beginning at the semester's midterm, which allowed students sufficient time to examine how their instructor built rapport in the classroom.

Data Analysis

All information that could identify student participants or public speaking instructors was removed from the survey responses prior to beginning data analysis. Since both of the authors were teaching public speaking courses during the semester the survey was completed, and knew many of the other instructors, removing the identifying information maintained the confidentiality of participants and the instructors they referenced. Responses to the open-ended questions regarding behaviors that build rapport in the public classroom were first coded independently by both authors using the themes provided by Gremler and Gwinner (2008). The authors interpreted units of analysis as words, sentence fragments, complete sentences, or multiple sentence responses, allowing the flexibility to interpret the participant responses. In order to adapt the themes from an employee-customer relationship to an instructor-student relationship, the authors met several times to discuss coding discrepancies and to create new guidelines for how to code specific behaviors. After several rounds of coding and discussion, the authors determined that all five themes were well adapted to categorize behaviors in the instructor-student relationship, and each coded half of the data set to obtain final category counts discussed below.

Results

A total of 514 behaviors described as building instructor-student rapport were categorized into the five themes provided by Gremler and Gwinner's (2008) study. The five themes used to code the data were: uncommonly attentive behaviors, common grounding behaviors, courteous behaviors, connecting behavior, and information sharing behavior. The current data set included 133 (25.9%) uncommonly attentive behaviors; 122 (23.7%) connecting behaviors; 106 (20.6%) information-sharing behaviors; 97 (18.9%) courteous behaviors; 56 (10.9%) common grounding behaviors. Many student responses included reference to more than one type of rapport building behavior, indicating the dynamic nature of the construct. Although not prompted to do so, several students included behaviors that hindered the development of rapport in the classroom; these examples are discussed below as they provide examples of behaviors to avoid in the classroom. Specific behaviors found in each category and examples from student responses are discussed below.

Uncommonly Attentive Behaviors

Uncommonly attentive instructor behaviors are demonstrated when instructors offer intense personal interest and recognition to students. Specific instructor behaviors in this category include: calling students by name, demonstrating excitement for their job, prompt email responses, willing to meet students outside of class, getting all students involved in class, commitment to students' success in the class, and displaying a positive, enthusiastic attitude. Example student responses demonstrating uncommonly attentive behaviors include:

He offers several class days in which attendance is not required yet he stays the entire class period to help us with whatever we need. He is very eager to help us, as well as help us get the best grade possible and improve.

She does a great job on including everyone in the class, whether it be on a class activity or random questions throughout the lecture.

She is very enthusiastic about what she is teaching and likes doing her job. [She] has taken time to know us on a first name basis and takes time to answer every question, no matter how small.

Uncommonly attentive behaviors were mentioned 133 times and accounted for 25.9% of all rapport building and maintaining behaviors, making them the most frequently mentioned type of behavior.

Connecting Behaviors

Connecting behaviors were mentioned 122 times by participants and accounted for 23.7% of the rapport building behaviors. Connecting behaviors include references to humor, pleasant conversation, and friendly interaction. Responses in this category describe instructors as funny, easy going, approachable, informal, calm and collected. Telling jokes, making students feel comfortable, and not intimidating students all demonstrated connecting behaviors. Example student responses of connecting behaviors include:

He talks informally which helps make the students more comfortable speaking up in class... he is a fun person, which positively connects him with everyone.

He is really laid back when talking to us... and he'll make jokes and stuff that make us laugh and feel comfortable.

My instructor is very casual in the way she leads the class, and the atmosphere is relaxing.

He incorporates jokes and humor into his lessons that makes them more enjoyable and more interesting to listen to.

Information Sharing Behaviors

Information sharing behaviors accounted for 106 (20.6%) of total rapport behaviors. Information sharing behaviors include dimensions of instructor credibility and clear communication with students. Instructors who demonstrate information sharing behavior give advice, impart knowledge, and communicate clear expectations regarding student work. Students' descriptions of instructors as intelligent, experts, and challenging were included in this category. Supportive nonverbal communication behaviors including instructors smiling, nodding and making eye contact with students were also included in the information-sharing category. Example student responses describing information sharing behaviors include:

When students are giving speeches he smiles and nods throughout as though he is following along with what we are saying, instead of jotting down notes the entire time.

When it comes to grades, all marks are commented upon so that the grade is fair. We, as students, know what is expected of us and therefore know how to obtain the grade we want.

He gives good examples and show video clips; all of his points seem valid. He comes prepared in the sense that he knows what he wants to lecture about beforehand, and he makes it quick and painless.

She speaks with confidence and uses examples that prove credibility.

Courteous Behaviors

Courteous behaviors display honesty, empathy, and respect to students. These behaviors were mentioned 97 times by participants (18.9% of total). Responses in this category describe instructors as flexible, supportive, inclusive, consistent, fair, and willing to listen. Instructors who demonstrate courteous behaviors are described as being open to questions, trusting students, understanding, and creating an environment where students feel they can speak openly. Examples of responses describing courteous behaviors include:

He listens to what I say and respects everyone's opinions.

I feel she does aim to create an atmosphere of trust throughout the classroom, which makes it [easier] to speak in front of my peers.

He listens to our contributions and tries to respond to them specifically. Everyone's ideas and questions are respect[ed] and answered.

Common Grounding Behaviors

Common grounding behaviors were mentioned the least, with 56 (10.9%) responses mentioning rapport building behaviors in this category. Common grounding behaviors occur when instructors speak on the student's level and find similarities with students. Student comments in this category typically describe instructors who are personable, relate to students, are down to earth, and not condescending. Responses describing common grounding behaviors include:

She talks about things that pertain to us. She clearly understands the life of an undergraduate student.

He is very personable and easy to talk to.

They show that they understand our class and our issues as a college student.

He uses a lot of things that relate to people our age and makes us feel incorporated with the material. He is also young so that makes it easy to connect with him.

Rapport Hindering Behaviors

Although participants were asked exclusively about behaviors that build rapport, several students described specific instructor behaviors that hindered rapport. These ranged from vague dissatisfaction to detailed accounts of behaviors or specific incidents that hurt the development of instructor-student rapport. Students mentioned instructors who fail to learn student's names and do not share similar interests with students as hindering rapport. Additionally, instructors who are inconsistent and not responsive to student questions fail to build rapport. Examples of rapport hindering behaviors included:

I feel that the rapport is okay in class. Our teacher gets angry easily but he is also very nice at times. He is a little tricky to understand.

While I do respect my public speaking instructor, she has not built rapport with me because we do not share similar interests. She is very into science fiction, video games, and does not like going outside and this is the opposite of me. I like an active life and don't really like video games. Thus our interaction is nothing more than a [teacher] and student.

I don't feel like my instructor [built] any rapport with me or the other students enrolled in the class. He missed six classes of a Tuesday/Thursday section. His lectures rarely pertained to what was actually in the book. Instead he told complicated "debate team" lectures that only slightly related to the readings, which we never discussed in class. He changed assignment due dates on short notice.

These responses are certainly important to consider, as students provided examples of rapport hindering behaviors without being prompted. While the responses indicating a lack of rapport were not coded or included in the overall analysis, these behaviors are clearly viewed differently than the behaviors described in the rapport building categories above and should be examined more closely in future research.

Discussion

The current study examined how instructors at a large Midwestern university build rapport with undergraduate students. The research question driving the study was, "What specific instructor behaviors do students view as building rapport in the classroom?" To answer this research question, 230 undergraduate students completed a survey about their public speaking instructors. Data were deductively coded using a thematic framework from a prior study (Gremler & Gwinner, 2008). Data analysis yielded a total of 514 rapport-building behaviors, which aligned with the five themes provided by Gremler and Gwinner (2008). Implications of themes found in the data, in order of their prevalence, are briefly noted with practical implications for instructors to consider. In addition, participant responses are discussed in relation to learning outcomes. Limitations of the study and future research are also discussed.

Rapport Building (and Hindering) Behaviors

How does an instructor build rapport with undergraduate students? According to the current study, there are many ways this can occur. These behaviors, organized into five different themes, provide practical insight into how rapport building can occur in the classroom. The five themes are: uncommonly attentive behaviors, connecting behaviors, information sharing behaviors, courteous behaviors, and common grounding behaviors. Rapport hindering behaviors are also discussed.

The study's participants most often mentioned uncommonly attentive behaviors in their responses to survey questions about building rapport. This finding provides valuable insight into the importance of putting effort into treating students as individuals, as opposed to simply seeing students in the collective sense. These behaviors will, no doubt, produce extra work for instructors, but can pay dividends in the long run with a positive classroom environment and potentially increased student learning.

Connecting behaviors were mentioned the second most frequently by participants. These behaviors closely align with past research on similar behaviors, such as humor (e.g. Gorham & Christophel, 1990) and immediacy (e.g. Frymier & Houser, 2000). It is clear that participants feel a need to have a personal connection with their instructors for mutual trust and harmony to occur. This finding calls instructors to move beyond simply providing rote knowledge to students and to connect with students on an interpersonal level.

The third most often mentioned behaviors were information sharing behaviors. This finding supports past research that behaviors such as clarity can enhance learning (e.g. Chesebro

& McCroskey, 1998). Participants in the study wanted to have clear expectations and feedback from instructors. This finding has implications for instructors to make a serious effort in areas such as syllabus design, feedback for assignments, and even nonverbal responses to classroom discussion. In short, students want to know what to expect in their classes and want to know where they stand, in regard to the class.

Participants mentioned courteous behaviors 18.9% of the time in their responses. Students regularly mentioned that they needed to feel safe and understood by their instructors. This finding provides practical implications for how instructors deal with behavioral issues in the classroom, how they facilitate classroom discussion, and how instructors handle student absences. The findings do not imply that instructors should let students walk all over them, but instead it suggests that students feel rapport with instructors when instructors treat them with a level of compassion and respect.

Common grounding behaviors were only mentioned 10.9% of the time, making it the least noted type of behavior. This finding should come as a relief to instructors who might feel a pressure to be “cool” or to be friends with students. Participants valued behaviors such as providing clear expectations and providing personal, timely feedback at a much higher rate than common grounding behaviors. This finding suggests that although some students want their instructors to speak to them at the student’s level, there are other more effective ways for instructors to build rapport with students.

The rapport-hindering behaviors mentioned in the study provide valuable advice for instructors on what to avoid in the classroom. Although participants were not explicitly asked what hurts instructor-student rapport, several felt justified to mentioned behaviors that would hinder rapport. This finding does two things. First, it shows that rapport can potentially be lost just as easily as it can be built with students, thus providing an opportunity for training on what not to do in the classroom in regard to interpersonal relationships. Second, this accidental finding provides opportunities for future research specifically on behaviors to avoid with undergraduate students.

Both the rapport-building and rapport-hindering behaviors discovered in this study have practical implications for college instructors at any level and can provide useful information for training and the evaluation of instructors. Although rapport building is certainly not the only criteria for teaching effectiveness, the positive outcomes of rapport have been consistently demonstrated (e.g. Frisby & Martin, 2010). The specific behaviors found in this study can be offered as suggestions for beginning instructors on how to develop rapport. By providing examples of how to build rapport with students, new instructors will be able to implement these specific behaviors early in their teaching career. Experienced instructors can also benefit from this research, for both reflection and evaluation purposes. The findings of this study could certainly be added to graduate student teaching training and evaluation, as well.

Effects of Rapport Building

For the current study, specific conclusions are not drawn regarding the causality of learning outcomes associated with the use of each type of rapport-building behavior. Other studies have shown positive learning outcomes to be associated with rapport building (e.g., Schrodtt and Witt, 2006; Frisby and Myers, 2008; & Roach et al., 2005). The results of this study provide qualitative support to past research on rapport building, by showing that there is a perceived connection with instructor-student rapport and learning outcomes. Several participants

highlighted the connection between rapport and learning, by providing their personal evaluations of how rapport-building behaviors influences the classroom environment and positive feelings towards the course and instructor:

My instructor gives the class positive mutual attention and has a great personal connection with everyone. The instructor makes class very enjoyable. The instructor is GREAT.

I like that my teacher makes jokes, and never says really negative things in front of the class about how we did with our speeches. And even just if we are doing little exercises he always points out the positives, which makes it easier to feel comfortable going in front of the class

I feel very connected to my instructor. He really can compare to everyone in the class, has a great sense of humor and seemingly, quite a bit in common with me personally. He encourages verbal participation and really gets a great response because of his personality. I consider his class my favorite of the semester.

These comments support the existing research on positive benefits of instructor-student rapport and demonstrate a few ways that specific rapport behaviors can enhance the classroom environment. It is clear that specific instructor behaviors such as uncommonly attentive behavior, common grounding behavior, courteous behavior, connecting behavior, and information sharing behavior can enhance the student experience. While claims cannot be made regarding the effectiveness of each specific category of behavior, the findings here demonstrate that students value rapport building behaviors, especially uncommonly attentive behaviors and connecting behaviors, in the classroom.

On a related note, the current research also adds to the body of literature on the Affective Learning Model (Rodriguez et. al, 1996), which seeks to explain how instructor behaviors can affect student learning. Much of the prior research incorporating the ALM has used quantitative research methods. This study, however, provides an additional layer of analysis to ALM. The study strengthens the claims of the model by giving a voice to college students on the subject of instructor-student rapport and providing concrete examples of rapport-building behaviors. These behaviors, as seen through the lens of ALM, influence instructor-student relationships, which can also potentially promote affective and cognitive learning.

Limitations and Future Research

Students in this study reported on the rapport behaviors of their public speaking course instructor, which is different from other recent studies on instructor-student relationships. Other studies (e.g. Sidelinger, 2010) have followed a methodology utilized by Plax, Kearney, McCroskey, and Richmond (1986) that recommends students report on the instructor they had in their class *prior* to completing a survey on instructor-student relationships. This methodology is used to ensure diversity among instructors, subject areas, and classroom experiences (Frisby & Martin, 2010). The current study took the opposite approach and studied rapport in a specific instructional setting, the public speaking classroom, to provide a more controlled environment as a point of comparison. The rapport building behaviors described by students in this study may not necessarily generalize to other classroom settings, and further research is needed to determine if students report similar rapport behaviors in other types of courses.

Studying instructor-student rapport in public speaking classes in a large university setting has implications for guiding future research in other educational settings. Future research could

include studying instructor-student rapport in liberal arts universities, online classrooms, other subject areas, and intercultural educational settings, among others. The methodology of this study to examine instructor-student rapport in one specific general education setting can provide a point of comparison for rapport building in other educational contexts.

Additionally, all of the participants in this study were enrolled in a public speaking class taught by a graduate teaching assistant or part-time lecturer, which means that none of the participants reported on rapport building with a full-time faculty member. Although participants were not asked to report the age or experience level of their instructor, many graduate teaching assistants in the department studied are relatively close in age to the undergraduate student population, which may make it easier to build instructor-student rapport. For example, one participant stated:

My teacher is younger, which automatically makes him easier to relate to as a student.

Instructor-student rapport, specifically in the area of common grounding behaviors, may look different when the instructor is a tenured-faculty member, rather than a graduate student. However, a growing number of graduate teaching assistants serve as instructors and could use the findings from this study to assist them as they begin their teaching career. Based on United States Department of Labor (2010) data, there are 108,000 graduate assistants employed in American universities, demonstrating the increasing frequency with which undergraduate students are taught by graduate teaching assistants. Further research is needed to examine rapport with different ranks of instructors.

Also, although the self-administered survey has many advantages, this method of data collection is not perfect. Since students had no supervision, they may not have taken the survey seriously, and thus may rush through the survey simply to get credit for completing it. Also, since students could take the survey wherever and whenever, there is no way for controlling the outside factors may influence students while taking the survey. Future research could include interview data to still allow for qualitative inquiry, while limiting potential distractions.

Conclusion

Studies have consistently demonstrated the positive learning outcomes associated with instructor-student rapport. This research extends previous findings by offering insight on specific instructor behaviors that students describe as building rapport in the classroom. These behaviors provide practical guidelines for instructors on how to build rapport with students, and, on the other hand, behaviors to avoid.

Interpersonal communication is vital to student learning and building rapport has been shown to be an effective way of communicating with students. By engaging in uncommonly attentive behaviors, connecting behaviors, information sharing behaviors, courteous behaviors, and common grounding behaviors, instructors will hopefully experience improved instructor-student relationships, which will lead to more effective teaching, and, ultimately, improved student learning.

References

- Bloom, B. S., & Krathwohl, D. R. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals, by a Committee of College and University Examiners*. New York: Longmans.
- Brookfield, S. D. (1995). *Becoming a Critically Reflective Teacher*. San Francisco, CA: Jossey-Bass.
- Catt, S., Miller, D., & Schallenkamp, K. (2007). You are the Key: Communicate for Learning Effectiveness. *Education, 127*, 369-377.
- Chesebro, J. L., & McCroskey, J. C. (1998). The Relationship between Teacher Clarity and Immediacy and Students' Experiences of State Receiver Apprehension when Listening to Teachers. *Communication Quarterly, 46*, 446-455. doi: 10.1080/01463379809370114
- Dobransky, N., & Frymier, A. (2004). Developing Teacher-Student Relationships through out of Class Communication. *Communication Quarterly, 52*, 211-223. doi: 10.1080/01463370409370193
- Faranda, W. T., & Clarke, I. (2004). Student Observation of Outstanding Teaching: Implications for Marketing Educators. *Journal of Marketing Education, 26*, 271-281.
- Flanagan, J. C. (1949). Critical Requirements: A New Approach to Employee Evaluation. *Personnel Psychology, 2*, 419-425. doi: 10.1111/j.1744-6570.1959.tb01413.x
- Flanagan, J. C. (1954). The Critical Incident Technique. *The Psychological Bulletin, 51*, 327-358. doi: 10.1037/h0061470
- Frisby, B. N., & Martin, M. (2010). Instructor-Student and Student-Student Rapport in the Classroom. *Communication Education, 59*, 146-164.
- Frisby, B. N., & Myers, S. A. (2008). The Relationships among Perceived Instructor Rapport, Student Participation, and Student Learning Outcomes. *Texas Speech Communication Journal, 33*, 27-34.
- Frymier, A. B., & Houser, M. L. (2000). The Teacher-Student Relationship as an Interpersonal Relationship. *Communication Education, 49*, 207-219. doi: 10.1080/03634520009379209
- George, David (2007). Market Overreach: The Student as Customer. *The Journal of Socio-Economics, 36*, 965-977. doi: 10.1016/j.socec.2007.01.025
- Gorham, J., & Christophel, D. M. (1990). The Relationship of Teachers' Use of Humor in the Classroom to Immediacy and Student Learning. *Communication Education, 39*, 46-62. doi: 10.1080/03634529009378786

Gremler, D. D. (2004). The Critical Incident Technique in Service Research. *Journal of Service Research*, 7, 65-89. doi: 10.1177/1094670504266138

Gremler, D. D., & Gwinner, K. P. (2000). Customer-employee rapport in service relationships. *Journal of Service Research*, 3, 82-104. doi: 10.1177/109467050031006

Gremler, D. D., & Gwinner, K. P. (2008). Rapport-building Behaviors Used by Retail Employees. *Journal of Retailing*, 84, 308-324. doi: 10.1016/j.jretai.2008.07.001

Hughes, H. (2007) Critical Incident Technique. In Lipu, Suzanne, Williamson, Kirsty, & Lloyd, Annemaree (Eds.) *Exploring Methods in Information Literacy Research* (pp. 49-66). Charles Sturt University, Wagga Wagga, N.S.W: Centre for Information Studies.

Kain, D. L. (1997). Critical Incidents in Teacher Collaboration on Interdisciplinary Teams. *Research in Middle Level Education Quarterly*, 21, 1-9.

Mazer, J. P., Murphy, R. E., & Simonds, C. J. (2007). I'll See You on "Facebook": The Effects of Computer-mediated Teacher Self-disclosure on Student Motivation, Affective Learning, and Classroom Climate. *Communication Education*, 56, 1-17. doi: 10.1080/03634520601009710

McLaughlin, M. L., & Erickson, K. V. (1981). A Multidimensional Scaling Analysis of the "Ideal Interpersonal Communication Instructor." *Communication Education*, 30, 393-398. doi: 10.1080/03634528109378494

Nadler, J. (2007). Build Rapport--and a Better Deal. *Negotiation*, 3, 9-11.

Nguyen, H. T. (2007). Rapport Building in Language Instruction: A Microanalysis of the Multiple Resources in Teacher Talk. *Language & Education: An International Journal*, 21, 284-303. doi: 10.2167/le658.0

Philan, L. (2012). Interrogating Students' Perceptions of their Online Learning Experiences with Brookfield's Critical Incident Questionnaire. *Distance Education*, 33, 31-44. doi: 10.1080/01587919.2012.667958

Plax, T. G., Kearney, P., McCroskey, J. C., & Richmond, V. P. (1986). Power in the Classroom VI: Verbal Control Strategies, Nonverbal Immediacy, and Affective Learning. *Communication Education*, 35, 43-55. doi: 10.1080/03634528609388318

Roach, K. D., Cornett-DeVito, M. M., & DeVito, R. (2005). A Cross-cultural Comparison of Instructor Communication in American and French Classrooms. *Communication Quarterly*, 53, 87-107. doi: 10.1080/01463370500056127

Rodriguez, J. I., Plax, T. G., & Kearney, P. (1996). Clarifying the Relationship between Teacher Nonverbal Immediacy and Student Cognitive Learning: Affective Learning as the Central Causal Mediator. *Communication Education*, 45, 293-305. doi: 10.1080/03634529609379059

Schrodt, P., & Witt, P. (2006). Students' Attributions of Instructor Credibility as a Function of Students' Expectations of Instructional Technology Use and Nonverbal Immediacy. *Communication Education*, 55, 1-20. doi: 10.1080/03634520500343335

Sidelinger, R. (2010). College Student Involvement: An Examination of Student Characteristics and Perceived Instructor Communication Behaviors in the Classroom. *Communication Studies*, 61, 87-103. doi: 10.1080/10510970903400311

Tsui, A. (1996) Reticence and Anxiety in Second Language Learning. In K. Bailey, D. Nunan, and M. Swan (Eds.) *Voices From the Language Classroom: Qualitative Research in Second Language Education* (pp. 145–167). Cambridge: Cambridge University Press.

United States Department of Labor (2010, May). *Occupational Employment and Wages: 25-1191 Graduate Teaching Assistants*. Retrieved from <http://www.bls.gov/oes/current/oes251191.htm>

Worley, D., Titsworth, S., Worley, D., & Cornett-DeVito, M. (2007). Instructional Communication Competence: Lessons Learned from Award-Winning Teachers. *Communication Studies*, 58, 207-222. doi: 10.1080/10510970701341170

Teacher immediacy and student learning: An examination of lecture/laboratory and self-contained course sections

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Abstract: This study examined teaching assistant's immediacy in lecture/laboratory and self-contained classes. Two hundred fifty-six students responded to instruments measuring teachers' immediacy behavior frequency, perceptions of instruction quality, and cognitive learning. No significant difference was identified when comparing lecture/laboratory and self-contained teaching assistants' immediacy behaviors. But all students who observed frequent immediate behaviors demonstrated higher affective and cognitive learning. Teaching assistants' ratings had significantly higher levels of faculty-student interaction for self-contained sections but lecture/laboratory sections were significantly higher for student effort/involvement.

Keywords: teacher immediacy, introductory course formats, graduate teaching assistants, affective learning, cognitive learning.

Teacher immediacy represents a compositive set of verbal and nonverbal behaviors generating perceptions of psychological closeness with students (Andersen & Andersen, 1982). Teachers perceived as highly immediate demonstrate “consistent eye contact, movement, vocal variety, gestures, humor, and personalized examples during class; whereas, nonimmediate teachers tend to read from notes, stand behind a podium, use monotone delivery, few gestures, little humor, and abstract examples” (Andersen, 1986, p. 115). An instructor perceived as more immediate is rated by students as more responsive at efforts to influence or modify classroom behavior. Students comply with or conform to the wishes of the more immediate teachers because the perception of immediacy generates more referent, respect, or liking power (Richmond & McCroskey, 2000).

Teaching assistants, or beginning teachers, in the process of developing strategies for effectiveness in the classroom would benefit by implementing immediacy behaviors (Anderson, 1979; Christophel & Gorham, 1995; Gorham, 1988; Richmond, Gorham, & McCroskey, 1987; Sanders & Wiseman, 1990; Witt & Wheelless, 2001). According to McCroskey and Richmond (1992), “immediacy creates a more engaging atmosphere for the teacher-student relationship” (p. 102). Not every teacher naturally teaches employs high levels of immediacy, but training could increase instructor immediacy (McCroskey & Richmond, 1992). “One likely teacher response, when instructing students in the classroom, is to retreat – retreat to reading lectures with as little eye contact as possible with students, retreat to threats of low grades as a motivator, retreat to research and other aspects of the professional role” (McKeachie, 2002b, p. 54). A wide variety of training techniques provide a means for instructors to become more immediate and to develop a level of comfort with the practice (McCroskey & Richmond, 1992). Research (Collins, 1976) indicates that teachers trained to increase immediacy feel more positive towards teaching. Teaching assistants across academic disciplines trained in immediacy could demonstrate more

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positive classroom outcomes for students as well as improved attitudes on the part of the instructors.

This research compares graduate teaching assistant immediacy between formats of courses often used (lecture/laboratory and self-contained). Teaching assistants in a lecture/laboratory format supplement the professor's mass lecture with discussion, exercises, and assignments. The lecture/laboratory format provides a shared responsibility between the course director/lecturer and discussion group leader because there exist two sources of information or instruction in the course. The relationship of the lecturer and the laboratory leader/discussion section instructor are different because the lecturer only deals with the mass of students whereas the discussion section provides a smaller and more intimate setting conducive to discussion and more individualized instruction. The self-contained format, using teaching assistants, combines responsibility for lectures, labs, and all other material included in the course. The self-contained section has only one source of instruction, the teaching assistant.

The present study first describes the context where teaching occurs in the classroom. Next, immediacy is examined as a communicative behavior and related to the classroom. Finally, data from students regarding teaching assistants immediacy, impact on affective and cognitive learning, and the Student Instructional Report II are analyzed and results discussed.

Teaching Context, Immediacy, and Immediacy in the Classroom

Teaching Context

The structure of instruction, whether in lecture/laboratory or self-contained instructional setting should influence the perception of the instructor's immediate behaviors. The workload of a teaching assistant ordinarily requires an effort between 360-380 hours per semester for a half-time (50%) academic year appointment. Teaching assistants conduct instruction in a laboratory situation, year in year out all over the country. Laboratory instruction is widely accepted as important in order for learners to experience phenomena directly and understand the construction of new knowledge (Coppola, 2002). Coppola (2002) maintains laboratory teaching assumes that first-hand experience remains superior to other methods of developing the same skills. Lecture/laboratory teaching assistants supplement the professor's lecture, unlike the stand-alone teaching assistants responsible for both lecture and laboratory information. A typical lecture strives to present a systematic, concise summary of the knowledge (McKeachie, 2002b). Teaching assistants in both the lecture/laboratory and self-contained sections facilitate "learning by doing" laboratory activities. Teaching assistants in the self-contained sections combine the responsibility for the presentation of information in laboratory and lecture.

The course formats of lecture/laboratory and self-contained sections operate in different environments at the institution of study. The course director in both environments, outlines the course, prepares the course objectives, chooses the text, and selects the type and order of the assignments (McKeachie, 2002b). For those students enrolled in lecture/laboratory sections, usually one-third of the educational instruction occurs in a large lecture hall from the course director's weekly lecture. The other two-thirds of instruction consists of two separate hour-long laboratories conducted by the teaching assistant. Students usually identify with the teaching assistant rather than with the lecturer who is perceived as a more distant figure (Wanzer & McCroskey, 1998). Moreover, students attending the self-contained sections interact only with the teaching assistant during a once-a-week three-hour class. In the self-contained class, the

student-teacher relationship is more dyadic, blurring the difference between lecture and laboratory. The course director, although responsible for the course objectives, content, and written examinations, most likely never meets the students in a stand-alone section. Therefore, students tend to view the self-contained teaching assistant as individually responsible for the course.

The self-contained section provides the teaching assistant with more autonomy and modification of the course material to fit the style of the instructor. Unlike the lecture/laboratory, self-contained teaching assistants have the opportunity of creating a class built on the notion of a community or team. Envisioning the classroom as a group with a task to accomplish, yet made up of differing personalities coming together to affect the outcome, calls on the teacher to model principles of effective communication and effective leadership (Book & Putnam, 1992). Teaching assistants instructing in self-contained environments can tailor the lecture, laboratory, and, if they desire, additional information or learning activities into the course. The course director's objectives and text are still utilized, but, unlike the laboratory-teaching assistant viewed as a facilitator, the self-contained teaching assistant assumes some aspects of a course director. Classroom communication of a self-contained section does not have a rigid lecture presentation; students have an opportunity to enhance academic, social, and personal knowledge through student-teacher interaction. Furthermore, students become important contributors to learning, rather than the teacher as the source of all knowledge and as the only one responsible for creating the opportunity to learn (Book & Putnam, 1992).

Self-contained sections, unlike the lecture/laboratory, have more of an opportunity for teaching assistants to incorporate other experiential, technological, or psychomotor activities into the course. Students gain personal experience not only through speeches, as in the laboratory classes, but by taking part in simulation learning. Experiential learning has both cognitive and motivational goals. Educators hope that abstract concepts become meaningful when students see that they are helpful in describing and understanding "real-life" phenomena (McKeachie, 2002a). McKeachie (2002a) maintains, "experiences in the laboratory will stir up questions in students' minds that will lead to active learning" (p. 246). Technology makes increased learning productively possible, allowing the learners to engage in an intentional process of analyzing and constructing meaning from information and experience. Psychomotor objectives, as Bloom (1964) outlined in his taxonomy, "emphasizes some muscular or motor skill, some manipulation of material and objects, or some act which requires a neuromuscular coordination" (p. 7). Clearly the self-contained teaching assistant has more opportunity to customize the learning environment through a variety of learning activities.

Immediacy

Mehrabian's foundational work (Mehrabian, 1969, 1971; Wiener & Mehrabian, 1968) includes verbal immediacy. Wiener and Mehrabian (1968) argue that "the kinds of words used to describe an event transmit information that is complementary, supplementary, or redundant to the information transmitted in other components in the communication, including the explicit verbal content" (p. 2). Clearly, as Mehrabian (1971) indicated previously, immediacy has verbal as well as nonverbal components and both can have an impact on learning in the classroom (McCroskey & Richmond, 1992). However, it was not until much later that the construct of teacher immediacy broadened to include specific verbal behaviors (Witt & Wheelless, 2001). The

term immediacy in this paper uses Mehrabian's originally intended immediacy, a term which includes verbal and nonverbal components.

Immediacy represents verbal or nonverbal expressions often in combination, to communicate relationally the desire to approach another within the context of a relationship (Witt & Wheelless, 2001). Relational messages are communicated primarily through nonverbal channels, whereas content messages are reflected primarily in verbal channels (Burgoon, Buller, Hale, & de Turck, 1984; Burgoon & Saine, 1978). Conceptually then, verbally-based behavior alternation techniques (i.e., content) may be interpreted within the framework of nonverbally-based immediacy cues (i.e., relational) (Plax, Kearney, McCroskey, & Richmond, 1986). Therefore, nonverbal and verbal components of teacher immediacy work in tandem – jointly to express the same message being communicated by the teacher to the receiver.

Nonverbal immediacy incorporates approach behaviors that increase or produce interpersonal closeness, sensory stimulation, and signal warmth and friendliness (Kearney, Plax, & Wendt-Wasco, 1985). Nonverbal immediacy behaviors such as eye gaze, smiles, nods, relaxed body posture, forward leans, movement, and gestures have the effect of reducing physical and/or psychological distance between teacher and students and apparently increasing affective learning (Andersen, 1979; Christophel & Gorham, 1995; Hackman & Walker, 1990; Plax, Kearney, McCroskey, & Richmond, 1986). Bloom (1956) defined affective learning as “objectives which emphasize a feeling tone, an emotion, or a degree of acceptance or rejection” (p. 7). When classroom teachers employ these nonverbal immediacy strategies, students indicate greater affect for the teacher, greater enjoyment of the class, and increased perceptions of having learned from the course (Richmond et al., 1987). The primary function of teacher's nonverbal behavior is to improve students' affect or liking for the subject matter, teacher, and class, and to increase desire to learn (Richmond & McCroskey, 2000). The test of this comment was conducted by Allen, Witt, and Wheelless (2006), which indicates that immediacy may be best viewed as a means of increasing affective learning which in turn increases cognitive learning. The relationship suggests that immediacy may provide a means of increasing the motivation of students to study or attend class.

Immediacy in the Classroom

Learning, particularly that which takes place in the traditional classroom setting, constitutes an interactional process (Richmond, Gorham, & McCroskey, 1987). People gravitate toward persons and things that they like, evaluate highly, and prefer; avoid or move away from things they dislike, evaluate negatively, or do not prefer (Mehrabian, 1971). A teacher perceived as immediate, communicates a positive attitude (Kearney, Plax, & Wendt-Wasco, 1985), that leads to increased liking, affiliation, and positive affect on the part of the student (Richmond & McCroskey, 2000). Immediacy behaviors reduce distances between people, and greater immediacy indicates greater mutual sensory stimulation (Andersen, 1979). Simply, immediate teachers are liked more than nonimmediate teachers (Richmond & McCroskey, 2000).

A positive interpersonal relationship between teachers and students influences the development of favorable attitudes toward the learning situation (Richmond, Gorham, & McCroskey, 1987) and the institution (Sweet, 1986; Tinto, 1975). Increased instructor immediacy increases student-teacher communication and interaction. If students communicate more with their teachers, then the student might get the information he or she needs (Richmond & McCroskey, 2000). Tinto (1975) defines academic integration largely in terms of scholarly

achievement but includes the student's involvement with the intellectual activities and services offered by the institution. Important to developing social integration are the frequency and quality of contacts students have with instructors (Sweet, 1986).

Parcarella and Terenzini (1980) notes that among the indicators of social integration, frequency of informal contact between students and faculty promotes positive attitudes and commitment. Additionally, the nature or quality of these exchanges has a bearing on student persistence. Most relevant in this regard are conversations with faculty involving intellectual or course-related matters (Parcarella & Terenzini, 1980). Tinto (1975) maintains that the student dropout, leaving the academic institution, is taken to be the result of the individual's experiences in the academic and social systems of the college. With respect to the academic system of the college, Tinto's Model argues that an individual's integration measures both grade performance and intellectual development during the college years (Tinto, 1975). Therefore, the student-teacher interaction in the classroom provides a critical influence on the student's sense of institutional integration in the educational setting, and the student's perception of affective learning, directly influenced by teacher immediacy, is associated with student retention. Higher affective learning enhances the popularity of the subject matter and increases student enrollment (Andersen, 1986).

Kelley and Gorham (1988) assert that immediacy relates to arousal, and increases attention, improves memory, as well as affective and cognitive learning. Immediate behaviors are seen as triggers to generate student arousal, contributing to student learning. When teachers employ verbal and nonverbal immediacy behaviors, students indicate increased perceptions of having learned from the course (Witt & Wheelless, 2001). Things vividly presented are more likely to be remembered by students. Hence, immediate teachers arouse students, draw attention to themselves, direct attention to the content, and produce more student learning (McCroskey & Richmond, 1992). Therefore, teacher immediacy creates student affect for the subject matter. Students become motivated to learn the subject matter because of the teacher's immediate behaviors, will do well in the content, and continue to learn long after the teacher who motivated them is out of the picture (Richmond & McCroskey, 2000). Plus, the student continues on in the academic institution (Parcarella and Terenzini, 1980; Tinto, 1975).

Immediate strategies constitute a crucial tool for those teaching assistants operating in a self-contained classroom environment. The dynamics of an intact course are drastically altered from that of a lecture/laboratory section, where the professor lectures and teaching assistants supplement the material. In self-contained sections teaching assistants are on their own, most of the time in extended periods, responsible for lectures, labs, and any other material included in the course. If the teaching assistant is not equipped with the immediacy techniques to function in the dynamics of a self-contained classroom no one is there to fill the gap. Therefore, teacher immediacy skills and techniques are even more important for teaching assistants in stand-alone sections. However, both lecture/laboratory and self-contained courses, taught by teaching assistants, can benefit from understanding and utilizing the importance of immediate behaviors. Immediacy creates an approach-oriented behavior signaling accessibility, involvement, arousal, and interest (Andersen, Nussbaum, Pecchioni, & Grant, 1999). Teacher immediacy creates greater verbal interaction in more immediate classroom conditions (Andersen & Andersen, 1982). Students are more motivated to remain on task and to learn when they have immediate instructors (Plax & Kearney, 1999). Also, higher teacher immediacy reduces the status between the student and teacher. This does not mean the teacher is on the same level as the student. It simply means the student will not be intimidated by the teacher's higher status. Therefore, the

student might be more willing to ask clarifying questions about the content without fear of the teacher (Richmond & McCroskey, 2000). Immediate teachers encourage students to ask questions in all areas, to ask the teacher and peers to explain reasons or to clarify comments, and to demonstrate respect during interactions (Book & Putnam, 1992). Therefore, a teaching assistant's immediate behaviors assist in building a classroom where each student's comments are valued and every person is regarded as important.

Cognitive learning refers to the extent to which students achieve factual, conceptual, and critical understanding of course material (Bloom, 1956). A number of studies (Richmond, Gorham, & McCroskey, 1987; Kelley & Gorham, 1988) have investigated a link between teacher immediacy and cognitive performance by the student. A recent meta-analytic study (Witt, Wheelless, & Allen, 2006) indicates that immediacy has a negligible relationship to cognitive learning. Research has not demonstrated a strong association with cognitive learning but has clearly demonstrated a number of other positive outcomes.

Immediacy research has as many as 200 studies reporting the positive associations and various classroom outcomes such as student motivation, student satisfaction, and student learning (Witt, Schrodt, & Turman, 2010). However, there are potential drawbacks of teacher immediacy. Immediate instructors may be perceived as not having control over the classrooms (Richmond & McCroskey, 2000). However, immediate instructors generating high student affect seldom have discipline or classroom control problems (Richmond & McCroskey, 2000). The entire class group is "in synch" and is coordinated with the instructor (Andersen, 1986).

Murray (1997) showed that enthusiastic teachers move around, make eye contact with students, and use more gestures and vocal variation, and teachers could learn these behaviors. Preparing beginning teaching assistants to increase immediacy requires that trainees understand immediate behavior. However, not everyone will incorporate the same immediate behaviors in the same way. Teaching assistants need to select and use those behaviors with which they are most comfortable. A teacher utilizing a behavior that seems uncomfortable appears awkward to students rather than immediate. False immediacy becomes evaluated as worse than low immediacy (Richmond & McCroskey, 2000).

The literature on teacher immediacy does not demonstrate a clear understanding of how the classroom environment influences students' perceptions of the instructor due to class settings (i.e., lecture/laboratory or self-contained). The examination of course formats has received minimal attention in the extant literature (e.g., Gray, Buerkel-Rothfuss, & Yerby, 1986; Todd, Tilson, Cox, & Malinauskas, 2000; Wildermuth, French, & Fredrick, 2013). Todd and colleagues investigation examined undergraduate students' perceptions of teacher immediacy in lecture/lab and self-contained sections of the introductory course. These authors reported no essential difference except that students in self-contained sections did identify instructors as more verbally immediate. Therefore, the purpose of this study was to further examine the relationship between student perceptions of immediacy behaviors, affective and cognitive learning, and student ratings of instruction. The following are research questions:

RQ₁: Does any difference exist between immediacy scales comparing lecture/laboratory and self-contained sections?

RQ₂: Does any difference exist in affective learning measures between lecture/laboratory and self-contained sections exist?

RQ₃: Does any difference exist in cognitive learning between lecture/laboratory and self-contained sections?

RQ₄: What correlation exists, if any, between student instructor rating (SIR II) comparing lecture/laboratory and self-contained sections?

Methods

Participants and Procedures

Two hundred and fifty-six students enrolled in introductory public speaking at a mid-western public university participated in this study. Essentially, the introductory public speaking course is where students create, perform, analyze, and develop public speaking skills (Morreale, Hugenberg, & Worley, 2006). Teacher immediacy, cognitive and affective learning and student rating data were collected during the last two weeks of the semester. The data was sealed and unopened until grades had been submitted to avoid influencing the results. A total of 321 surveys were returned, 256 (80%) were usable. The unusable surveys were incomplete. The distribution of respondents by class level was 36% freshmen, 28% sophomore, 20% juniors, and 13% seniors. Of the students in the communication course being analyzed 43% were fulfilling a major/minor requirement, 44% a college requirement, 11% an elective, and 2% other. A total of 117 students were enrolled in a single lecture with ten different laboratory sections; 139 students were enrolled in ten different self-contained sections. Class size in the laboratory was limited to 22 students and self-contained sections was limited to 24 students.

Three instruments for measuring (a) teacher immediacy, (b) affective learning, and (c) student rating of the instructor (SIR II) were utilized. The students' cognitive learning was measured following the teaching assistants' submission of grades at the completion of the semester.

Measurement of Immediacy

The students' score on the Nonverbal Immediacy Behavior Scale (Richmond, McCroskey, & Johnson, 2003) measured teacher's immediacy, refer to Appendix 1. The Immediacy Behavior Scale is a descriptive instrument comprising 26 items that require a frequency response of 1 (never) to 5 (very often). For a given instructor, this scale provides a lowest possible score of 0 and a highest possible score of 130. Instructors rated as highly immediate have a score greater than 109, those considered to have low immediacy have a score of less than 79. Alpha reliability for the scale was .85.

Measurement of Affective Learning

The Affective Learning Measure (McCroskey, 1994) assessed affect toward instructor, class' content, likelihood of taking future courses in this content area, and likelihood of taking future courses with this specific teacher. Sixteen questions with a seven point rating scale assessed affect toward communication and instruction. See questionnaire in Appendix 2. Scores should be between four and twenty-eight; higher scores indicate higher affective levels. The alpha reliability scale for teacher evaluation was .85. The alpha reliability scale for affective

learning scale was .81. The alpha reliability scale for future enrollment by student in content area was .91. The alpha reliability scale for enrollment in future course by instructor was .92.

Measurement for Cognitive Learning

Cognitive learning was assessed using the student letter grade achieved in the course. Letter grades are determined as follows: A = 4.00, A- = 3.67, B+ = 3.33, B = 3.00, B- = 2.67, C+ = 2.33, C = 2.00, C- = 1.67, D+ = 1.33, D = 1.00, D- = 0.67, and F = 0.00.

Measurement of Student Ratings of Instruction

The Student Instructional Report II (SIR II) developed by the Educational Testing Service was used to measure student ratings of instructors. According to Moore et al. (1996) over 150 colleges and universities nationwide have used this evaluative instrument in order to assess student experiences. The SIR II consists of 45 items that measure different aspects of student experiences and characteristics. The SIR II is comprised of ten sections, the following seven were used for this study: Course Organization and Planning ($SD = .46$), Communication ($SD = .44$), Faculty/Student Interaction ($SD = .48$), Assignments, Exams, and Grading ($SD = .44$), Course Outcomes ($SD = .48$), Student Effort and Involvement ($SD = .40$), and Overall Evaluation ($SD = .52$). Means were compared (t test) between teaching assistants for lecture/laboratory and self-contained for the seven SIR II sections.

Data Analysis

Analyses evaluated the relationship of immediacy to student ratings of instructors and measurement of affective and cognitive learning. Ratings between self-contained and lecture/laboratory teaching assistant sections were compared. The purpose of comparing these sections to each other is to determine if one type, either intact or lecture/laboratory teaching assistants, generates more immediacy, higher affective and cognitive understanding of course material, and how the instructor is perceived by his/her students.

Results

Research Question One

Teaching assistants in lecture/laboratory formats ($M = 97.74$, $SD = 9.99$, $N = 117$) were not significantly different ($t = .15$, $df = 254$, $p = .88$) from teaching assistants in self-contained sections ($M = 97.55$, $SD = 10.50$, $N = 139$) on the level of perceived immediacy.

Teaching assistants in lecture/laboratory formats ($M = 22.61$, $SD = 5.62$, $N = 117$) were not significantly different ($t = .28$, $df = 254$, $p = .78$) from teaching assistants in self-contained sections ($M = 22.42$, $SD = 5.06$, $N = 139$) on teacher evaluation.

Research Question Two

Teaching assistants in lecture/laboratory formats ($M = 22.17$, $SD = 4.70$, $N = 117$) were not significantly different ($t = 1.66$, $df = 254$, $p = .10$) from teaching assistants in self-contained sections ($M = 22.15$, $SD = 5.06$, $N = 139$) on the level of affective learning.

Students enrolled in lecture/laboratory formats ($M = 17.25$, $SD = 6.64$, $N = 117$) were more likely to enroll in a similar courses of the same content, demonstrating a significant difference ($t = 2.73$, $df = 254$, $p = .02$) from teaching assistants in self-contained sections ($M = 15.14$, $SD = 7.43$, $N = 139$).

Teaching assistants in lecture/laboratory formats ($M = 19.43$, $SD = 7.56$, $N = 117$) were not significantly different ($t = 1.59$, $df = 254$, $p = .11$) from teaching assistants in self-contained sections ($M = 17.89$, $SD = 7.70$, $N = 139$) on likelihood of a student enrolling in another course taught by the same instructor, but students from both groups are likely to enroll in a future courses taught by the same instructor.

Research Question Three

The study found teacher immediacy correlated positively with cognitive learning. When students experienced high teacher immediacy, it correlated to increased cognitive learning as evidenced by a higher grade in the course ($r = .21$, $p < .001$, $N = 256$). Other variables did not generate a significant correlation. See Table 1.

Table 1

Correlation Coefficients

	Teacher Evaluation	Affective Learning	Future Content	Future Teacher	Cognitive	Laboratory
Immediacy	.57 $p < .01$	.43 $p < .01$	.21 $p < .01$	.45 $p < .01$	.21 $p < .00$	-.01 $p = .88$
Teacher Evaluation		.69 $p < .01$	.25 $p < .01$	.63 $p < .01$	.24 $p = .00$	-.02 $p = .10$
Affective Learning			.37 $p < .01$	.49 $p < .01$	.23 $p < .01$	-.10 $p = .10$
Future Content				.51 $p < .01$	.10 $p = .10$	-.15 $p = .02$
Future Teacher					.16 $p < .01$	-.10 $p = .11$
Cognitive						.06 $p = .34$

Research Question Four

The SIR II found no significant difference in five of the seven topics: Course Organization and Planning (lecture/laboratory $M = 4.18$; self-contained $M = 4.19$), Communication (lecture/laboratory $M = 4.18$; self-contained $M = 4.19$), Assignments, Exams, and Grading (lecture/laboratory $M = 3.73$; self-contained $M = 3.73$), Course Outcomes (lecture/laboratory $M = 3.58$; self-contained $M = 3.49$), and Overall Evaluation (lecture/laboratory $M = 3.85$; self-contained $M = 3.91$). The comparison of Faculty Student Interaction (lecture/laboratory $M = 4.01$; self-contained $M = 4.13$) was found to be significantly higher ($p < .05$) for the self-contained sections. For the lecture/laboratory sections, Student Effort

and Involvement (lecture/laboratory $M = 3.60$; self-contained $M = 3.50$) was significantly higher ($p < .05$) than for the self-contained classes. See chart in Table 2.

Table 2

Student Instructor Rating II

Topics	<i>t</i> -tests		Mean(s)	
	<i>t</i>	<i>SD</i>	Lec/Lab	Self-con
Course Organization and Planning	0.17	.46	4.18	4.19
Communication	0.20	.44	4.18	4.19
Faculty/Student Interaction	2.00	.48	4.01	4.13
Assignments, Exams, and Grading	0.00	.44	3.73	3.73
Course Outcomes	1.50	.48	3.58	3.49
Student Effort and Involvement	2.00	.40	3.60	3.50
Overall Evaluation	1.00	.52	3.85	3.91

Discussion

This investigation identified no significant difference in immediacy between teaching assistants instructing lecture/laboratory or self-contained course sections. However, the impact of teacher immediacy influenced the teacher-student relationship in both settings. Students rated their teaching assistants more positively as immediacy behaviors increased. Moreover, student perceptions of immediate behaviors by their teaching assistants impacted both affective and cognitive learning. The data indicated no significant difference between lecture/laboratory and self-contained classes for affective learning. The results indicate a universal importance for instructor immediacy regardless of course format. This study reported that lecture/laboratory and self-contained sections do not differ in their influence on student cognitive learning; however, immediacy did influence cognitive learning among students. Students demonstrating higher levels of cognitive learning rated instructors as higher in immediacy.

Recognizing that immediate teachers influence positive perceptions of interpersonal closeness, sensory stimulation, liking, warmth, and friendliness is important for course directors or professors who are managing their teaching assistants. Taken together, what a teacher thinks he/she does may be of marginal interest, but what is of critical concern is what students think the teacher does and what impact those perceptions have on other meanings stimulated in the mind of the student (Richmond, 1990). Immediacy has a direct influence on what students perceive in the classroom. The SIR II results found that students of lecture/laboratory classes put forth more effort and involvement throughout the course.

Instructors generating high student affect not only improve self-esteem, feel liked by their students, and receive higher student evaluations; they also generate more affective learning for the subject matter and their academic discipline (Andersen, 1986). Therefore, the findings of this study affirm the importance of providing training to acquaint teaching assistants in the development of immediate skills. Allowing teaching assistants to learn about and practice immediate behaviors while they develop their own teaching style would aid in building teacher confidence and, most importantly, better serve students in their learning.

Teaching assistants of lecture/laboratory and self-contained courses did not demonstrate significant differences in immediacy ratings. Whether a teaching assistant is instructing a laboratory or self-contained section the ability to perform immediate behaviors becomes critical in how students view the instructors' roles, abilities, and qualifications. Therefore, teaching assistants prepared to implement immediate techniques possess a clear advantage for developing a learning community within the classroom.

The student ratings of instructor indicated significant differences among lecture/laboratory and self-contained sections in two areas: (a) Student Effort and Involvement and (b) Faculty/Student Interaction. Students in lecture/laboratory sections reported having put forth more effort and involvement throughout the course, than that of self-contained sections. Because the lecture/laboratory course structure consists of one lecture and two laboratory meetings per week, the students may have felt a greater effort and involvement was necessary compared to students who met once weekly in the three-hour self-contained course.

Students in the self-contained course sections reported a higher level of faculty-student interaction than did students in lecture/laboratory classes. Students may view self-contained teaching assistants as more available than teaching assistants in laboratory settings. Because laboratory teaching assistants have laboratories scheduled back-to-back, they have little time following a class to answer student questions or offer extra help. In contrast, teaching assistants in self-contained classes are available prior to and after classes to assist students. Further, the three-hour block of time allows ample student-teacher interaction opportunities.

Thus, whether for pragmatic reasons such as increased student enrollments and increased funding, or for philosophical goals such as a better-educated society, the mechanisms that generate high student affect should remain a central concern (Andersen, 1986). Should institutions need to make a financial decision to provide an introductory course offering in a lecture/laboratory format over the cost of employing part-time faculty for self-contained sections the primary concern appears to not be course format but teacher immediacy skill development.

This study examined 20 different sections of one course. The teaching assistants are not a random selection and, therefore, generalizations should be made with caution. The findings are limited to first and second year teaching assistants, not instructors with greater experience. The impact of immediacy and associated training may be greater with teaching assistants and may be less effective with more experienced instructors.

It would be interesting to follow the students in this study to determine if those who perceived higher levels of teacher immediacy showed greater institutional integration—continue to take courses in the department and university, complete a degree, and evolve into supportive alumni. An examination of a post-Tinto model of institutional integration could begin to assess why graduates contribute to their former colleges or universities.

Understanding the positive effects of immediacy for the college or university, administrators, professors, and teaching assistants ultimately benefits the students. Immediacy increases the likelihood of student affect for the subject, recall of material learned, enrollment in similar courses, institutional integration, and degree completion. In the short run, higher affective learning enhances the popularity of the subject matter and increases student enrollments. In the long run, higher affect is the avenue to lifelong learning, more general support of education, and a better society (Andersen, 1986). Teaching assistants equipped with immediate skills enhance the teacher-student relationship contributing to both short and long term benefits for students and the university.

Appendices

Appendix 1. Nonverbal Immediacy Scale – Self-Report

DIRECTIONS: The following statements describe the ways some instructors interact while talking with or to students. Please indicate in the space to the left of each item the degree to which you believe the statement applies to your instructor. Please use the following 5-point scale:

1 = Never; 2 = Rarely; 3 = Occasionally; 4 = Often; 5 = Very Often

- _____ 1. Uses hands and arms to gesture while talking to the class.
- _____ 2. Touches students on the shoulder or arm while talking to them.
- _____ 3. Uses monotone or dull voice while talking to the class.
- _____ 4. Looks at board or notes when talking to the class.
- _____ 5. Uses very few gestures when talking to the class.
- _____ 6. Has a relaxed body position when talking to the class.
- _____ 7. Smiles at individual students in the class.
- _____ 8. Avoids eye contact with the class while talking.
- _____ 9. Has a very tense body position when talking to the class.
- _____ 10. Sits on a desk or in a chair when teaching.
- _____ 11. Voice is monotonous or dull when talking to the class.
- _____ 12. Uses a variety of vocal expressions when talking to the class.
- _____ 13. Gestures when talking to the class.
- _____ 14. Animated when talking to the class.
- _____ 15. Bland facial expressions when talking to the class.
- _____ 16. Moves closer to students when talking to them.
- _____ 17. Looks directly at students when talking to them.
- _____ 18. Stands behind a podium or desk when teaching.
- _____ 19. Has a lot of vocal variety when talking to the class.
- _____ 20. Avoids gesturing while teaching.
- _____ 21. Moves around the room when teaching.
- _____ 22. Maintains eye contact with the class when teaching.
- _____ 23. Stands behind a podium or desk when teaching.
- _____ 24. Avoids eye contact with students in the class.
- _____ 25. Smiles at the class as a whole, not just individual students.
- _____ 26. Avoids touching students while talking with them.

Appendix 2. Affective Learning Measure

Please circle the number that best represents your feelings. The closer a number is to the item/adjective the more you feel that way.

Overall, the instructor I have in the class is:

1. Bad	1	2	3	4	5	6	7	Good
2. Valuable	1	2	3	4	5	6	7	Worthless
3. Unfair	1	2	3	4	5	6	7	Fair
4. Positive	1	2	3	4	5	6	7	Negative

I feel the class' content is:

5. Bad	1	2	3	4	5	6	7	Good
6. Valuable	1	2	3	4	5	6	7	Worthless
7. Unfair	1	2	3	4	5	6	7	Fair
8. Positive	1	2	3	4	5	6	7	Negative

My likelihood of taking future courses in this content area is:

9. Unlikely	1	2	3	4	5	6	7	Likely
10. Possible	1	2	3	4	5	6	7	Impossible
11. Improbable	1	2	3	4	5	6	7	Probable
12. Would	1	2	3	4	5	6	7	Would Not

My likelihood of taking future courses with this specific teacher is:

13. Unlikely	1	2	3	4	5	6	7	Likely
14. Possible	1	2	3	4	5	6	7	Impossible
15. Improbable	1	2	3	4	5	6	7	Probable
16. Would	1	2	3	4	5	6	7	Would Not

References

- Allen, M., Witt, P., & Wheelless, L. (2006). The Role of Teacher Immediacy as a Motivational Factor in Student Learning: Using Meta-analysis to Test a Causal Model. *Communication Education*, 55, 21-31. doi: 10.1080/03634520500343368
- Anderson, J. (1979). Teacher Immediacy as a Predictor of Teaching Effectiveness. In D. Nimmo (Ed.), *Communication Yearbook 3* (pp. 543-559). New Brunswick, NJ: Transaction Books.
- Andersen, J. (1986). Instructor Nonverbal Communication: Listening to Our Silent Messages. *New Directions for Teaching and Learning*, 26, 41-49. doi: 10.1002/tl.37219862607
- Andersen, P., & Andersen, J. (1982). Nonverbal Immediacy in Instruction. In L. Barker (Ed.), *Communication in the Classroom* (pp. 98-120). Englewood Cliffs, NJ: Prentice-Hall.
- Andersen, J., Nussbaum, J., Pecchioni, L., & Grant, J. (1999). Interaction Skills in Instructional Settings. In A. Vangelisti, J. Daly, & Friedrich (Eds.), *Teaching Communication: Theory, Research, and Methods* (pp. 359-374). Mahwah, NJ: Lawrence Erlbaum.
- Bloom, B. (1956). *A Taxonomy of Educational Objectives*. New York: Longmans, Green.
- Book, C., & Putnam, J. (1992). Organization and Management of a Classroom as a Learning Community Culture. In V. Richmond & J. McCroskey (Eds.), *Power in the Classroom: Communication, Control, and Concern* (pp. 101-119). Hillsdale, NJ: Erlbaum.
- Burgoon, J., Buller, D., Hale, J., & de Turck, M. (1984). Relational Messages Associated with Nonverbal Behaviors. *Human Communication Research*, 10, 351-378. doi: 10.1111/j.1468-2958.1984.tb00023.x
- Burgoon, J., & Saine, T. (1978). *The Unspoken Dialogue: An Introduction to Nonverbal Communication*. Boston: Houghton Mifflin.
- Christophel, D., & Gorham, J. (1995). A Test-retest Analysis of Student Motivation, Teacher Immediacy and Perceived Sources of Motivation and Demotivation in College Classes. *Communication Education*, 44, 292-305. doi: 10.1080/03634529509379020
- Collins, M. (1976). The Effects of Training for Enthusiasm on the Enthusiasm Displayed by Preservice Elementary Teachers. *Education*, 33, 130-337.
- Coppola, B. (2002). Laboratory Instruction: Ensuring an Active Learning Experience. In W. McKeachie (Eds.), *Teaching Tips: Strategies, Research, and Theory for College and University Teachers* (pp. 235-244). Boston: Houghton Mifflin.
- Gorham, J. (1988). The Relationship Between Verbal Teacher Immediacy and Student Learning. *Communication Education*, 37, 40-53. doi: 10.1080/03634528809378702

Gray, P. L., Buerkel-Rothfuss, N. L., & Yerby, J. (1986). PSI-based and Lecture-recitation Formats of Instruction in the Introductory Speech Communication Course. *Communication Education*, 35 (2), 111-125. doi: 10.1080/03634528609388329

Hackman, M., & Walker, K. (1990). Instructional Communication in the Televised Classroom: The Effects of System Design and Teacher Immediacy on Student Learning and Satisfaction. *Communication Education*, 39, 196-206. doi: 10.1080/03634529009378802

Jordan, F. (1989). *An Examination of the Relationship Between Perceived Verbal and Paralinguistic Immediacy and Accommodation to Perceived Cognitive Learning*. Unpublished doctoral dissertation, West Virginia University, Morgantown.

Kearney, P., Plax, T., & Wendt-Wasco, N. (1985). Teacher Immediacy for Affective Learning in Divergent Classes. *Communication Quarterly*, 33, 61-74. doi: 10.1080/01463378509369579

Kelly, D., & Gorham, J. (1988). Effects of Immediacy on Recall of Information. *Communication Education*, 37, 198-207. doi: 10.1080/03634528809378719

McCroskey, J. C. (1994). Assessment of Affect Toward Communication and Affect Toward Instruction in Communication. In S. Morreale & M. Brooks (Eds.), *1994 SCA Summer Conference Proceedings and Prepared Remarks: Assessing College Student Competence in Speech Communication*. Annandale, VA: Speech Communication Association.

McCroskey, J., & Richmond, V. (1992). Increasing Teacher Influence Through Immediacy. In V. Richmond & J. McCroskey (Eds.), *Power in the Classroom: Communication, Control, and Concern* (pp. 101-119). Hillsdale, NJ: Erlbaum.

McKeachie, W. (2002a). Facilitating Experiential Learning: Service Learning, Fieldwork, and Collaborative Research. In W. McKeachie (Eds.), *Teaching tips: Strategies, Research, and Theory for College and University Teachers* (pp. 245-249). Boston: Houghton Mifflin.

McKeachie, W. (2002b). How to Make Lectures More Effective. In W. McKeachie (Eds.), *Teaching tips: Strategies, Research, and Theory for College and University Teachers* (pp. 52-69). Boston: Houghton Mifflin.

Mehrabian, A. (1969). Some Referents and Measures of Nonverbal Behavior. *Behavioral Research Methods and Instruments*, 1, 213-217.

Mehrabian, A. (1971). Verbal and Nonverbal Interaction of Strangers in a Waiting Situation. *Journal of Experimental Research in Personality*, 5, 127-138.

Menzel, K., & Carrell, L. (1999). The Impact of Gender and Immediacy on Willingness to Talk and Perceived Learning. *Communication Education*, 48, 31-40. doi: 10.1080/03634529909379150

Moore, A., Masterson, J., Christophel, D., & Shea, K. (1996). College Teacher Immediacy and Student Ratings of Instruction. *Communication Education*, 45, 29-39. doi: 10.1080/03634529609379030

Morreale, S. P., Hugenberg, L., & Worley, D. (2006). The Basic Communication Course at U.S. Colleges and Universities in the 21st Century: Study VII. *Communication Education*, 55(4), 415-437. doi: 10.1080/03634520600879162

Murry, H. (1997). Effective Teaching Behaviors in the College Classroom. In R. Perry & J. Smart (Eds.), *Effective Teaching in Higher Education: Research and Practice* (pp. 171-204). New York: Agathon.

Norton, R. (1986). Communicator Style in Teaching: Giving Good Form to Content. *New Directions for Teaching and Learning*, 26, 33-40. doi: 10.1002/tl.37219862606

Pascarella, E., & Terenzini, P. (1980). Predicting Freshman Persistence and Voluntary Dropout Decisions From a Theoretical Model. *Journal of Higher Education*, 52, 197-210.

Plax, T., & Kearney, P. (1999). Classroom Management: Contending with College Student Discipline. In A. Vangelisti, J. Daly, & Friedrich (Ed.), *Teaching Communication: Theory, Research, and Methods* (pp. 269-286). Mahwah, NJ: Lawrence Erlbaum.

Plax, T., Kearney, P., McCroskey, J., & Richmond, V. (1986). Power in the Classroom VI: Verbal Control Strategies, Nonverbal Immediacy, and Affective Learning. *Communication Education*, 35, 43-55. doi: 10.1080/03634528609388318

Richmond, V. (1990). Communication in the Classroom: Power and Motivation. *Communication Education*, 39, 181-195. doi: 10.1080/03634529009378801

Richmond, V., Gorham, J., & McCroskey, V. (1987). The Relationship Between Selected Immediacy Behaviors and Cognitive Learning. In M. McLaughlin (Ed.), *Communication yearbook 10* (pp. 574-590). Newbury Park, CA: Sage.

Richmond, V., & McCroskey, J. (2000). *Nonverbal Behavior in Interpersonal Relations*. Boston: Allyn & Bacon.

Richmond, V. P., McCroskey, J. C., & Johnson, A. E. (2003). Development of the Nonverbal Immediacy Scale (NIS): Measures of Self- and Other-perceived Nonverbal Immediacy. *Communication Quarterly*, 51, 502-515. doi: 10.1080/01463370309370170

Sanders, J., & Wiseman, R. (1990). The Effects of Verbal and Nonverbal Teacher Immediacy on Perceived Cognitive, Affective, and Behavioral Learning in the Multicultural Classroom. *Communication Education*, 39, 341-353. doi: 10.1080/03634529009378814

Sweet, R. (1986). Student Dropout in Distance Education: An Application of Tinto's Model. *Distance Education*, 7, 201-213. doi: 10.1080/0158791860070204

Tinto, V. (1975). Dropout from Higher Education: A Theoretical Synthesis of Recent Research. *Review of Educational Research*, 45, 89-125. doi: 10.3102/00346543045001089

Titsworth, B. S. (2004). Students' Notetaking: The Effects of Teacher Immediacy and Clarity. *Communication Education*, 53 (4), 305-320. doi: 10.1080/0363452032000305922

Todd, T.S., Tilson, L. D., Cox, S. A., & Malinauskas, B. (2000). Assessing the Perceived Effectiveness of the Basic Communication Course: An Examination of Mass-lecture Format Versus the Self-contained Format. *Journal of the Association of Communication Administration*, 29, 185-195.

Wanzer, M. B., & McCroskey, J. C. (1998). Teacher Socio-communicative Style as a Correlate of Student Affect Toward Teacher and Course Material. *Communication Education*, 47 (1), 43-52. doi: 10.1080/03634529809379109

Wiener, M., & Mehrabian, A. (1968). *Language Within Language: Immediacy, a Channel in Verbal Communication*. New York: Appleton-Century-Crofts.

Wildermuth, S. M., French, T., & Fredrick, E. (2013). Finding the Right Fit: Assessing the Impact of Traditional v. Large Lecture/small Lab Course Formats on a General Education Course. *International Journal for the Scholarship of Teaching and Learning*, 7 (1). Retrieved from http://academics.georgiasouthern.edu/ijstol/v7n1/articles/PDFs/acc%20Art_Wildermuth%20et%20al.pdf

Witt, P., Schrodtt, P., & Turman, P. (2010). Instructor Immediacy: Creating Connections Conducive to Classroom Learning. In D. L. Fassett & J. T. Warren (Eds.), *The Sage Handbook of Communication and Instruction* (pp. 201-219). Thousand Oaks, CA: Sage.

Witt, P., & Wheelless, L. (2001). An Experimental Study of Teachers' Verbal and Nonverbal Immediacy and Students' Affective and Cognitive Learning. *Communication Education*, 50, 327-342. doi: 10.1080/03634520109379259

Witt, P., Wheelless, L., & Allen, M. (2004). A Meta-analytical Review of the Relationship Between Teacher Immediacy and Student Learning. *Communication Monographs*, 71(2), 184-207. doi: 10.1080/036452042000228054

Witt, P., Wheelless, L., & Allen, M. (2006). The Relationship Between Teacher Immediacy and Student Learning: A Meta-analysis. In B. M. Gayle, R. W. Preiss, N. Burrell, & M. Allen (Eds.), *Classroom Communication and Instructional Processes: Advances Through Meta-analysis* (pp. 149-168). Mahwah, NJ: Lawrence Erlbaum.

Popular psychological myths: A comparison of students' beliefs across the psychology major

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Abstract: The present study investigates the frequency and confidence with which college students endorse popular psychological myths, contrasting introductory psychology students (at the beginning and end of the course) with upper-level psychology majors and students who have never taken Introduction to Psychology. This study builds on the existing literature by comparing these groups of students and considering the role of confidence. While majors endorsed fewer myths than students with less psychology course experience, majors still endorsed half of the myths. Consistent with previous work, students reported a similar number of myths before and after completing Introductory Psychology, but students were less confident in their wrong answers at the end of the semester. While the present study focuses on myths in psychology, implications for teaching apply across disciplines.

Keywords: pedagogy, myths, misconceptions

Introduction

The topic of psychological myths and misconceptions has been studied by researchers in the field of the teaching of psychology for several decades (e.g. McKeachie, 1960). Although the specific items included on measures of psychological misconceptions have changed over time, and have sometimes been found to be discrepant across measures (see Griggs & Ransdell, 1987), the underlying topic remains of interest to teachers of psychology. There has been a recent renewed attention to the topic of misconceptions and recommendations for faculty to incorporate this information into psychology courses (e.g. Lilienfeld, 2010). Lilienfeld (2010) summarizes previous work on individual myths to highlight the significance of these topics for psychology courses. Kuhle and colleagues studied the potential impact of these myths on student performance and found a negative correlation between the number of myths endorsed at the beginning of the semester and students' performance in the Introduction to Psychology course (Kuhle, Barber, & Bristol, 2009). Psychology instructors are not only concerned with students' performance in Psychology courses, but also what knowledge students take from their courses to apply to life outside of the classroom. We want our students to appreciate the science of psychology and to be able to critically evaluate claims. While the topic of addressing misconceptions about the field is not unique to Psychology, with the nature of the topics covered within the field of Psychology, students may be more likely to base judgments on their own experiences or other non-empirical sources.

Data on the prevalence of psychological misconceptions suggests that many students entering Introductory Psychology courses endorse a majority of these myths (38.5% accuracy, Taylor & Kowalski, 2004; 30% Kowalski & Taylor, 2009). Some studies have compared

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students at the beginning and end of Introductory Psychology; McKeachie (1960) and Vaughan (1977) documented little change in performance between the beginning and end of Introductory Psychology. Kowalski and Taylor found an improvement to 64% accuracy using a myths-focused section of the course. While it is expected that our advanced majors would endorse fewer of these myths as their psychology experience has increased, few studies have investigated the prevalence of myths and misconceptions across the psychology major. One study that investigated the impact of college psychology courses on myths found that students' belief in myths (measured using a 20-item scale) decreased with the number of college courses (but not junior college courses) completed (Standing & Huber, 2003). Understanding how these myths are endorsed across the major helps to inform where and how discussions of myths and misconceptions in the field may be most beneficial to students.

One criticism of previous research on psychological misconceptions has addressed the true/false format of many of these measures (Brown, 1984; Ruble, 1986), with one set of researchers adding a "don't know" option (Gardner & Dalsing, 1986). Taylor and Kowalski (2004) reported confidence scores for their items (originally 1-10 but then collapsed to 3 categories for analysis), with high confidence in correct answers at post-test. While this confidence rating has not been widely used in studies of misconceptions, it addresses an important critique of the true/false format. In a true/false format it is impossible to distinguish between a belief that is strongly held (a true misconception) or a random guess. For this reason, the current study incorporates a confidence rating and specifically addresses items that are both incorrectly and confidently answered.

The goal of the present study is to develop a greater understanding of the myths students endorse with varying levels of psychology course experience. This extends findings from previous work by contrasting students with different levels of experience and examining how confidence in responses is affected by psychology course experience. The present study assesses the frequency and confidence with which college students endorse common psychological myths, contrasting; 1) Introductory Psychology students at the beginning of the course 2) Introductory Psychology students at the end of the course, 3) Advanced Psychology majors and 4) students who have never taken a Psychology course. It is expected that these different groups should exhibit different belief patterns. Specifically, it is expected that more psychology experience (more courses) should lead to lower myth endorsement. Furthermore, it is expected that these educational experiences will similarly affect the degree of confidence these students have in these myths.

Method

Participants

Students from a small Midwest college were invited to participate in the study in exchange for entry into a lottery for gift-cards. Thirty-three students enrolled in Introduction to Psychological Science (Intro Psych) chose to complete the questionnaire at the beginning of the semester, and 21 of those students (63.6%) returned to complete the questionnaire at the end of the semester. Twenty-nine advanced psychology majors (defined as having completed the research methods course) participated in the study. Students who had never taken a college psychology course were also recruited through flyers and announcements in classes across

campus (No Psych; n=14). As shown in Table 1, with the exception of the advanced student group, most participants were first year students.

Table 1

Demographics and total number of myths correctly recognized

Group	N	Year in school	% completed high school psychology	Average Number of Myths Correct (SD) Max = 45	Average Confidence (SD) Max = 3
Intro Psych (pre)	33	73% first year	39%	17.57 (4.93)	1.97 (0.28)
Intro Psych (post)	21	86% first year	29%	17.95 (4.72)	2.02 (0.27)
Advanced Majors	29	76% seniors	51%	22.41 (7.71)	2.19 (0.26)
No Psych	14	64% first year	50%	20.14 (6.00)	2.09 (0.22)

Materials

A modified version of Kowalski and Taylor's (2009) questionnaire was used. The 45 myth items from their questionnaire were combined with five true statements to create a 50-item questionnaire (see Appendix). Each item was presented in a true/false format, consistent with the original questionnaire. Students were also asked to rate their confidence for each item on a three-point scale. Additionally, the participants were asked to select one specific item and identify the source of the information they used to respond to that item. On the end of the semester questionnaire, Intro Psych students were asked whether or not each item was covered in their Intro Psych course.

Questionnaires were scored by counting the number of items answered correctly (appropriately identifying the statement as a myth or a fact). Only the 45 myth items are reported here to be consistent with previous studies. Additionally, responses that were both incorrect and rated as highly confident (rated as 3 out of 3) were identified.

Procedure

Students were recruited from nine different Introduction to Psychological Science classes during first two weeks of the semester to complete the pre-test. These Intro Psych students were then contacted at the end of the semester and invited to complete the survey during the last week of classes. Advanced Psychology students were recruited through upper level courses at the beginning of the semester. Students with no college level psychology experience were recruited through campus flyers, announcements in courses, and a table in the cafeteria. All questionnaires were administered in group sessions in paper and pencil format to prevent students from looking up the answers on a computer while completing the questionnaire.

Results

Total Number of Myths Endorsed

As shown in Table 1, students recruited at the beginning of Introduction to Psychological Science answered an average of 17.76 ($SD = 4.99$) items correctly out of 45 questions, or 39.5%. This is slightly higher than the 30% reported by Kowalski and Taylor (2009) using the same measure at the beginning of their introductory courses. By the end of the semester, students performed similarly, answering 17.95 ($SD = 4.72$) items correctly, or 39.9%. Students with no psychology courses answered an average of 20.14 ($SD = 6.0$) items correctly, or 45%. Advanced students answered an average of 22.41 ($SD = 7.71$) items correctly, 49.8%. A univariate analysis of variance indicated a significant difference in total items correct by group, $F(2, 73) = 4.54, p = .014, \eta^2 = .11$. Post-hoc analysis indicated a significant difference between the Introduction to Psychological Science students and advanced psychology majors ($p = .01$), with Advanced majors answering more items correctly. Interestingly, there was no significant difference in performance between students (Intro and No Psych) who completed high school psychology and those who had no prior psychology experience ($t(45) = 1.52, p = .13$).

Confidence in Responses

Analyses were also conducted to assess the degree of confidence in responses. An average confidence score was created for each student. A univariate analysis of variance indicated a significant difference among the groups in their average confidence $F(2, 73) = 5.40, p = .007, \eta^2 = .13$, with post-hoc analysis indicating advanced students were significantly more confident in their responses than beginning introductory students ($p = .007$), but interestingly no difference was found in confidence between advanced students and students with no psychology courses.

Items that students answered incorrectly but confidently (score of 3) were of interest, as these exemplify endorsement of a myth, not just a random guess. First, myths that received no incorrect/confident responses were identified. For beginning introductory psychology students, five myths received no incorrect and confident responses (See Table 2) and these myths were confidently endorsed by very few students across groups. Some of these myths were still answered incorrectly by students, but no students were confident in these wrong answers.

In contrast, five myths were identified as being answered incorrectly and confidently by a majority (51% or more) of the group (see Table 3). These same five items were answered incorrectly by more than 90% of the class. At the end of the semester, a majority of Intro Psych students only answered two myths incorrectly and confidently. These same two myths were the only two endorsed by a majority of advanced majors as wrong and confident.

Sources of Misconceptions

Students were asked to select one item for which they knew the source of their information. Overall, only 56% of students answered the question they selected correctly, with advanced students more likely to answer the item they selected correctly than beginning Intro Psych students, $t(45) = -2.53, p = .015, d = .72$. More advanced students were also more likely to than Intro Psych students to cite a previous class as the source of their information (83% and

61% respectively) and less likely to cite personal experience than Intro Psych students (10% and 30% respectively).

Table 2

Myths with no incorrect and confident responses by beginning intro psych students

Myth	% Wrong and Confident			
	Intro Pre (n =33)	Intro Post (n = 21)	Advanced (n=29)	No Psych (n = 14)
We experience stress even when good things happen to us (reverse score)	0	0	7%	7%
Human memory works like a tape recorder or video camera, and accurately records the events we have experienced.	0	0	0	0
During sleep, your brain rests.	0	0	3%	0
Many adults were abused as children but do not remember the abuse	0	5%	10%	14%
If you live long enough, you will eventually develop dementia.	0	5%	7%	0

Table 3

Myths answered incorrectly and confidently by majority of beginning intro psych students

Myth	% Wrong and Confident			
	Intro Pre (n =33)	Intro Post (n = 21)	Advanced (n=29)	No Psych (n = 14)
If you're unsure of your answer while taking a test, it's best to stick with your initial hunch.	52%	33%	45%	64%
Subliminal messages can be used to persuade others to purchase products.	55%	43%	41%	57%
Most people who use heroin become addicted to it.	55%	52%	59%	43%
Immediate contact between a mother and infant after birth is critical for bonding	61%	57%	59%	29%
Most women experience a marked worsening of their moods during the premenstrual period.	52%	38%	45%	36%

Intro Psych Students at the Beginning and End of the Semester

Within-subject analyses were possible with 21 Intro Psych students who returned to complete the same measure during the last week of classes. As noted above, their mean score on the 45 myths was similar to their performance at the beginning of the semester. One possible explanation for a lack of change in performance may be that many of these myths are not covered in traditional Introduction to Psychology classes. In order to assess this, students were asked to report whether or not each item was covered in their class. Interestingly, only 17 of the myths were reported by a majority (51%) of students as covered in their Introduction to Psychological Science, and only 10 myths were reported as being covered by 75% or more of the students.

Of particular interest in this subset of students were items in which there was substantial change (either positive or negative) at the end of the semester. Five myths for which the majority of changes in responses were from incorrect to correct (“positive change”) are identified in Table 4. The percent of students who reported discussing each myth in their class is also reported in this table. For example, 81% of students reported discussing the reliability of eyewitness testimony in their course, while only 29% reported discussing whether opposites attract.

Five myths were also identified as “negative change” items (see Table 5). Although 95% of the students reported discussing information related to attachment, five of the seven students who changed their responses from the beginning of the semester, made an incorrect change, endorsing the myth that attachment is based on the mother filling the physiological need for food, at the end of the semester.

Advanced Psychology Students

While advanced students performed better than Intro Psych students and No Psych students, several myths were endorsed by a substantial percentage of the advanced students. Overall, 12 of the 45 items were answered correctly by less than 1/3 of the group. For example, 76% of advanced students endorsed the myth that hypnosis is useful for retrieving forgotten memories, 45% percent of the advanced students endorsed the myth that we only use 10% of our brain, and 34% believe memory works like a tape-recorder or video camera.

Discussion

The results of this study contribute to our understanding of undergraduate students’ endorsements of popular misconceptions. While this study specifically addresses psychology myths, several of the findings have implications for the identification of myths across disciplines. With a better understanding of the misconceptions with which students enter the classroom, more effective pedagogy can be developed.

Psychology majors who had completed more coursework did correctly identify more items as myths than students with less psychology course experience, but these students still scored relatively low (only around 50% correct). Consistent with previous work, a college level introductory psychology class did little to convince the students to reject commonly held psychological myths. In fact, students who completed an introductory psychology class were indistinguishable from non-psychology students who never took the class. One area in which

students did improve (both at the end of Introduction to Psychological Science and as advanced majors) was the certainty with which they answered items incorrectly. While the number of myths they endorsed did not change significantly, they were less confident in their misconceptions after being exposed to psychology courses. This confidence rating adds an important dimension to the true/false format, which otherwise could simply reflect random guessing. While students across the groups endorsed many misconceptions, only five misconceptions were rated as incorrect and confident by a majority of students. Given that the majority of studies that address myths have focused on the true/false format, this is an important consideration for the identification of myths across disciplines.

Table 4

Positive Change Items for Intro Psych Students

Myth	Number of answers changed to correct after Intro	% who reported covering the topic in Intro	% Answered Correctly			
			Intro Pre (n = 21)	Intro Post (n = 21)	Advanced (n = 29)	No Psych (n = 14)
Playing classical music (e.g., Mozart) to infants and children increases their intelligence.	5 of 7 changes	43%	29%	43%	69%	21%
Eyewitness testimony is usually reliable (5 of 7 changes correct)	5 of 7 changes	81%	52%	67%	79%	71%
All effective psychotherapies force individuals to confront the “root” causes of their problems in childhood (5 of 8 changes correct)	5 of 8 changes	76%	43%	52%	48%	36%
Most people only use 10% of their brains (6 changes, all correct)	6 of 6 changes	52%	29%	57%	55%	50%
Opposites attract (9 of 12 changes correct)	9 of 12 changes	29%	33%	62%	59%	50%

Table 5

Negative Change Items for Intro Psych Students

Myth	Number of answers changed to wrong after Intro	% who reported covering the topic in Intro	% Answered Correctly			
			Intro Pre (n = 21)	Intro Post (n = 21)	Advanced (n = 29)	No Psych (n = 14)
ESP has been empirically documented	6 of 8	33%	76%	57%	59%	64%
Human memory works like a tape recorder or video camera, and accurately records the events we have experienced	4 of 5	86%	95%	81%	66%	71%
Clinical judgment and intuition are the best means of combining information to reach a diagnosis for a patient	8 of 10	29%	62%	33%	55%	36%
People's responses to inkblots tell us a great deal about their personalities and propensities toward mental disorders.	6 of 8	95%	29%	10%	34%	36%
A baby's attachment for its mother is based on mom's filling the physiological need for food.	6 of 7	95%	38%	14%	41%	57%

For the teaching of psychology, it is helpful to examine the specific myths endorsed. Most students (Intro and No Psych) correctly answered items related to memory. However, myths about clinical judgment and developmental issues were frequently endorsed, even among psychology majors. These myths are particularly concerning due to their potential impact on people's behavior. For example, one of the most strongly endorsed myths was related to immediate contact between a mother and infant. Well-meaning individuals may share this with expectant parents. In cases where immediate contact between mother and child is not possible due to medical complications, parents may already be looking for evidence that their child is not attached to them and consequently change their own behavior toward the child. In contrast, some other myths are less harmful. One of the most strongly endorsed myths was that related to the addictiveness of heroin. Individuals who believe this myth will be less likely to try heroin

and may discourage others from trying also so that in this case endorsement of the myth may result in less dangerous behavior.

One strength of the current study is that the students were sampled across Introductory Psychology sections and do not reflect a single instructor's coverage of the material. One finding that may inform previous reports of a lack of change in students after completion of an Introductory course is that only 10 of 45 myths used in the present study were reported by students as being addressed in their Introductory course. While individual instructors may choose to emphasize some material over other in the interest of time, it is critical for instructors to be aware of the biases and misinformation with which their students are entering the course, and for instructors of advanced courses cannot take for granted that information was covered previously. In the current study, this information is based only on student report. In future research it would be beneficial to also have instructors provide a rating of the topics they believe they covered in the course.

The data from this study add to our understanding of the prevalence of these myths across the major. The myths endorsed by the advanced majors and Intro students who reported discussing the topic in their course but still answered incorrectly point to the ineffectiveness of traditional courses in challenging students pre-existing beliefs. One set of assumptions that underlies many introductory courses and majors, is that students will internalize critical thinking tools and be motivated to re-examine their existing beliefs without explicit cues to do so. This data suggests that those assumptions are not being met, and as such, students may need more explicit training in re-examining existing beliefs to develop this skill. Kowalski and Taylor (2009) compared sections of an introductory psychology course in which refutational lectures and readings were assigned with sections in which only refutational lecture was presented or only readings were assigned. Students who experienced the refutational lecture (with or without the accompanying reading) were more likely to correctly identify the item as a myth than students who had refutational reading alone. Preliminary findings from a first year seminar on the topic of Popular Psychological Myths ($n = 7$) found that one year later students correctly answered 63% of the items using the same questionnaire as the current study and only one item was incorrectly and confidently endorsed by a majority of the course (heroin is addictive). Although these are very preliminary findings, they are consistent with Kowalski and Taylor's findings of improved performance in an introductory psychology course taught with a specific focus on debunking myths (Kowalski & Taylor, 2009). Given the prevalence of myths endorsed across the major, it is important for departments to consider where and when in the curriculum discipline-related myths are addressed.

While this study incorporated confidence ratings, it is still based on items presented in a True/False format. Several researchers, most recently Taylor and Kowalski (2012), have noted limitations of a true-false format. They contrasted student accuracy in the identification of myths when presented as true/false statements or in a forced-choice format. While they found that performance differed by myth, overall students were more accurate with a forced-choice format, perhaps because the multiple responses made them more carefully evaluate their belief. Future research in this area would benefit development of a more open-ended response format in which students could explain their answer and provide the evidence they are using to support it, although such a measure would be more difficult to score.

The findings of the present study highlight the importance of faculty teaching across disciplines to consider the misinformation with which their students are entering the course and to provide tools to help students challenge their beliefs. Since myths evolve over time, students

will benefit from learning the skills to identify possible myths and research the evidence. While the present study focused on myths in psychology, these recommendations apply across disciplines.

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Appendix

PSYCHOLOGY INFORMATION QUESTIONNAIRE

For each item circle whether it is **TRUE** or **FALSE**.

Then note how **CONFIDENT** you are in that answer:

1 = Not Sure

2 = Moderately Confident

3 = Very Confident

1. Psychology is defined as the study of mental disorders.

T F Confident =

2. If you're unsure of your answer while taking a test, it's best to stick with your initial hunch.

T F Confident =

3. It can be easier to remember information if you are in the same emotional state as when you originally encoded that information.

T F Confident =

4. Most "crack babies" end up with serious neurological deficits.

T F Confident =

5. Subliminal messages can be used to persuade others to purchase products.

T F Confident =

6. Taste areas for sweet, sour, salty and bitter are well defined on the tongue.

T F Confident =

7. ESP (extrasensory perception) has been empirically documented.

T F Confident =

8. During "out of body" experiences, individuals can observe themselves from above.

T F Confident =

9. Drug education programs (i.e., DARE) are effective in deterring drug use among teenagers.

T F Confident =

10. Individuals can learn information (e.g., new languages) while asleep.

T F Confident =

11. There is a genetic basis to schizophrenia.

T F Confident =

12. Most people who use heroin become addicted to it.

T F Confident =

13. Human memory works like a tape recorder or video camera, and accurately records the events we have experienced.

T F Confident =

14. We experience stress even when good things happen to us.

T F Confident =

15. Many adults were abused as children but do not remember the abuse

T F Confident =

16. Hypnosis is useful for retrieving memories of forgotten events.

T F Confident =

17. In criminal eyewitnesses, confidence is closely related to accuracy.

T F Confident =

18. Playing classical music (e.g., Mozart) to infants and children increases their intelligence.

T F Confident =

19. Too much sugar causes hyperactivity in children.

T F Confident =

20. Babies who learned sign language as infants have a higher overall IQ.

T F Confident =

21. Immediate contact between a mother and infant after birth is critical for bonding.

T F Confident =

22. You can “spoil” a baby if you respond to its demands too quickly.

T F Confident =

23. A baby’s attachment for its mother is based on mom’s filling the physiological need for food.

T F Confident =

24. If you live long enough, you will eventually develop dementia.

T F Confident =

25. The defining feature of dyslexia is seeing words backwards (e.g., “pal” instead of “lap”).

T F Confident =

26. The polygraph (“lie detector”) test is a highly accurate means of detecting dishonesty.

T F Confident =

27. According to a classic research study, many people obeyed when given an order to administer powerful and potentially lethal shocks to someone.

T F Confident =

28. Most women experience a marked worsening of their moods during the premenstrual period.

T F Confident =

29. Raising children similarly leads to similarities in their adult personalities.

T F Confident =

30. Psychiatrists attend medical school and are responsible for administering psychiatric meds and may also provide therapy.

T F Confident =

31. Astrologers can predict your personality from the arrangement of stars and planets at your birth.

T F Confident =

32. People’s responses to inkblots tell us a great deal about their personalities and propensities toward mental disorders.

T F Confident =

33. People diagnosed with schizophrenia have a split personality.

T F Confident =

34. People who attempt to commit suicide do not talk about it.

T F Confident =

35. Eyewitness testimony is usually reliable.

T F Confident =

36. “Psychological profiling” has been shown to be an effective means of identifying criminals.

T F Confident =

37. The suicide rate is higher among the elderly than among adolescents.
T F Confident =
38. A large proportion of criminals are acquitted on the basis of the insanity defense.
T F Confident =
39. Clinical judgment and intuition are the best means of combining information to reach a diagnosis for a patient.
T F Confident =
40. A well-trained psychotherapist can establish a person's true thoughts and problems by analyzing dreams.
T F Confident =
41. All effective psychotherapies force individuals to confront the "root" causes of their problems in childhood.
T F Confident =
42. Electroconvulsive ("shock") therapy is a physically dangerous treatment.
T F Confident =
43. Opposites attract: People tend to have relationships with individuals who differ from them in their personality, interests, and attitudes.
T F Confident =
44. There's safety in numbers: The more people present at an emergency, the greater the chance that someone will intervene.
T F Confident =
45. Women talk more than men ("Men are from Mars, women are from Venus").
T F Confident =
46. Most people use only 10% of their brains.
T F Confident =
47. During sleep, your brain rests.
T F Confident =
48. There are striking stylistic differences between the two hemispheres of the brain, with the left being "analytic" and the right "holistic."
T F Confident =
49. It is generally better to express anger openly than to hold it in.
T F Confident =
50. High self-esteem is necessary for high achievement.
T F Confident =

For ONE of the questions above, please tell us where you learned this information using this code:

M = media—TV (news, talk show, Dateline, 20/20), radio, movie, newspaper, magazine, book, etc.

P = personal experience

C = classroom knowledge

O = other--add your own source for this knowledge.

Please be as explicit as possible about how you know about each of these. For example if you think media is the source of your knowledge note if it was in a magazine article, which magazine, or which type of magazine, i.e., Newsweek, Discover, People, etc. So your answer might M (Oprah) or P (observing my younger siblings) or O (my aunt, who is a nurse, told me). **YOU MAY LIST MULTIPLE SOURCES in the order of their importance** in learning about the information.

Question # _____

Source(s): _____

(detail _____)

References

Brown, L.T. (1984). Misconceptions About Psychology Aren't Always What They Seem. *Teaching of Psychology, 11*, 75-78. doi: 10.1207/s15328023top1102_3_3

Gardner, R. M., & Dalsing, S. (1986). Misconceptions About Psychology Among College Students. *Teaching Of Psychology, 13*, 32-34. doi: 10.1207/s15328023top1301_9

Griggs, R.A., & Ransdell, S. E. (1987). Misconceptions Tests or Misconceived Tests. *Teaching Of Psychology, 14*, 210-213. doi: 10.1207/s15328023top1404_4

Kowalski, P., & Taylor, A. (2009). The Effect of Refuting Misconceptions in the Introductory Psychology Class. *Teaching of Psychology, 36* (3), 153-159. doi: 10.1080/00986280902959986

Kuhle, B. X., Barber, J. M., & Bristol, A. S. (2009). Predicting Students' Performance in Introductory Psychology from Their Psychology Misconceptions. *Journal of Instructional Psychology, 36* (2), 119-124.

Lilienfeld, S. O. (2010). Confronting Psychological Misconceptions in the Classroom: Challenges and Rewards. *APS Observer, 23* (7), 17; 36-39.

McKeachie, W. J. (1960). Changes in Scores on the Northwestern Misconceptions Test in Six Elementary Psychology Courses. *Journal of Educational Psychology, 51*, 240-244. doi: 10.1037/h0048569

Ruble, R. (1986). Ambiguous Psychological Misconceptions. *Teaching of Psychology, 75*, 34-36. doi: 10.1207/s15328023top1301_10

Standing, L. G., & Huber, H. (2003). Do Psychology Courses Reduce Belief in Psychological Myths? *Social Behavior and Personality*, 57, 585-592. doi: 10.2224/sbp.2003.31.6.585

Taylor, A. K., & Kowalski, P. (2004). Naive Psychological Science: The Prevalence, Strength, and Sources of Misconceptions. *Psychological Record*, 54, 15–25.

Taylor, A.K., & Kowalski, P. (2012). Students' Misconceptions in Psychology: How You Ask Matters...Sometimes. *Journal of the Scholarship of Teaching and Learning*, 12, 62-77.

Vaughan, E. D. (1977). Misconceptions About Psychology Among Introductory Psychology Students. *Teaching of Psychology*, 4, 138-141. doi: 10.1207/s15328023top0403_9

Group simulation for “authentic” assessment in a maternal-child lecture course

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Abstract: The purpose of this pilot study was to explore student perceptions and outcomes surrounding the use of a labor and delivery simulation as a midterm exam in a maternal-newborn lecture course. An exploratory case study design was used to gain a holistic view of the simulation experience. Data from focus groups, written debriefings, simulation scoring rubrics, student course evaluations, and other course exams were analyzed using Stake’s case study method. Qualitative analysis revealed four themes: confidence, fairness, reliability, and team effort. Students were able to accurately grade the performance of their group as a whole and complete a group self-debriefing, but quantitative analysis showed that the group scores were significantly higher than other individual course grades. The findings suggested that the group simulation was an authentic assessment of teamwork, but not individual performance. Future research is needed to determine what role simulation and collaborative testing should play in pre-licensure education.

Keywords: authentic assessment; case study; competency-based education; evaluation research; high-fidelity simulation; higher education; maternal-child nursing; nursing education; patient simulation; QSEN; quality and safety education; student performance appraisal; testing

Background

To practice in today’s health care environment, experts believe that registered nurses (RNs) must possess specific knowledge, skills, and attitudes related to quality and safety, collectively known as the Quality and Safety for Nurses (QSEN) competencies (Cronenwett et al., 2007). These competencies include teamwork, patient-centered care, informatics, evidence-based practice, quality, and safety. The question of how best to assess students’ mastery of these competencies is currently of great interest to nurse educators.

Educational Assessment Design

Assessment design can foster either deep or superficial learning (Tiwari et al., 2005). Frequent testing with traditional questions (e.g. multiple choice, true/false, etc.) has been shown to improve long-term retention (Roediger & Butler, 2011), but multiple choice questions in test banks and standardized exams are often flawed (Masters et al., 2001; Tarrant, Knierim, Hayes, & Ware, 2006). These flaws tend to penalize high-achieving students (Tarrant & Ware, 2008). Roediger and Butler also warn misinterpretation of multiple choice distractors may cause

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students to learn information incorrectly. Others argue that written examinations with conventional test questions are only indirect measures of student abilities used as proxies for real performance, and they do not necessarily predict workplace behaviors (Rodgers, Bhanji, & McKee, 2010; Wiggins, 1998).

“Authentic” assessments, on the other hand, are measures of student performance that require the same knowledge, skills, and attitudes that would be used when faced with the same situation in professional practice (Gulikers, Bastiaens, & Kirschner, 2004). While a traditional test requires only a response, an authentic assessment requires learners to perform or produce and to explain or justify their actions. When assessments are based on authentic tasks and use performer-friendly feedback, Wiggins (1998) asserts that assessments do more than test -- they serve an educative function.

Gulikers et al. (2004) provide a framework for understanding the validity of authentic assessments. Construct validity arises from the five elements of authenticity: (a) *task* or how the problem resembles a real practice situation, (b) *physical context* involving the resources and information available, (c) *social context* including performing collaboratively if that is the norm in practice, (d) *assessment form* or requiring that students observably demonstrate competencies, and (e) *criteria* or the professional standards used to judge the output. These elements are subject to student perceptions of their realism. The assessment’s validity depends on the effects of the assessment on student motivation and learning. Gulikers et al. suggest that authentic assessment, along with authentic instruction, set the foundation for authentic learning that can be translated to practice.

Simulation

Simulation may serve as an optimal method to create authentic assessments for nursing education because they are grounded in an authentic task and can be used to both teach and assess learning (Jeffries, 2007). Competency testing using simulations is increasingly being used in clinical education with one study finding that 45% of undergraduate clinical courses in the United States used simulation to some degree to assess learning (Oermann, Yarbrough, Saewert, Ard, & Charasika, 2009). Students believe that assessments constructed using simulated scenarios can improve learning (Leung, Mok, & Wong, 2008). Simulation has also been shown to increase self-efficacy when used as a teaching strategy in lecture classes (Sinclair & Ferguson, 2009), but less is known about the use of simulation for competency testing in lieu of traditional examinations in such courses. The purpose of this pilot project was to create an authentic assessment midterm examination in a maternal-child lecture course using simulation and to evaluate the outcomes in terms of students’ performance outcomes and perceptions. Our research question was how does a group simulation serve as an authentic assessment of competency for students enrolled in a maternal- child nursing lecture course?

Method

Setting and Participants

The pilot study took place at a large public university in the Midwestern United States. All students enrolled in a junior-level, baccalaureate, maternal-child nursing course participated in a group simulation involving the care of a patient in labor in place of a written midterm

examination ($N=28$ females & 2 males). The students participated in 6 groups of 5 students each in the pilot project.

Procedures

Students were given a study guide in advance to review the possible types of patients that they might encounter and were encouraged to study as a team. Groups were assigned in 30-minute blocks on the testing day. After orienting to the room and equipment, roles were randomly assigned for the brief simulation as nurses ($N=2$), evaluators ($N=2$), or video-recorder ($N=1$). The scenario used a high-fidelity birthing simulator and involved caring for a patient in labor immediately after spontaneous rupture of membranes. The simulation design was consistent with the National League for Nursing (NLN)-Jeffries Simulation Framework (Jeffries, 2007). Students in the nurse role were expected to check the fluid, which was stained with meconium, and intervene for the abnormal patterns displayed on the electronic fetal heart rate monitor by at least repositioning the patient and notifying the physician. The simulation averaged approximately five minutes in length and ended when the students notified the physician.

The evaluators and instructor scored the simulation using a rubric with five categories: safety, communication, teamwork, assessment, and interventions. Each category spelled out performance criteria for 0, 1, or 2 points. After the simulation, students watched the video, and the evaluators shared their ratings. The groups were then asked to complete a written debriefing based on common debriefing questions and the QSEN competencies and to submit it to the instructor by the following day (see Figure 1).

1. Please summarize the simulation.
2. What went well in the simulation?
3. What would you have liked to have done better or differently?
4. The next set of questions addresses the QSEN competencies.
 - a. Patient-centered care: Describe your communication with your patient. Was it therapeutic and respectful? How did it (or not) reflect caring?
 - b. Teamwork & collaboration: How did (or not) the nurses work within their scope of practice?
 - c. Evidence-based practice: Given the situation, describe the evidence-based-protocol that should be implemented to care for the baby at birth.
 - d. Quality improvement: How would you describe the quality of this patient's care and why?
 - e. Safety: Use the SBAR (Situation-Background-Assessment-Recommendation) format now to write out a report that should have been phoned to the physician. Did your group follow that format? If not, what were you missing?
 - f. Informatics: How did technology play a role in your decision making and the provision of safe care?
5. What did you take away from this experience? Please include individual and group thoughts.

Figure 1. Group Debriefing Guide. Questions adapted from Cronenwett et al. (2007) and NLN Debriefing/Guided Reflection QSEN overview for Laerdal Simulations Volume II

Group scores were determined by the course instructor based on observed performance as scored by the student evaluators and instructor with the rubric (20%) and the group's collectively written self-debriefing (80%). All members in each group received the same final grade. Following the simulation, all students were invited to share their perceptions in one of two audio-taped focus groups led by a senior honors student ($N=18$).

Data Analysis

An exploratory case study design was used to evaluate student perceptions and performance outcomes. Approval was obtained from the university Institutional Review Board to retain and study all materials generated as part of normal course work and to conduct focus groups. Stake's (1978; 1995) case study analysis method was used to identify patterns. Student perceptions were identified using the focus group transcripts, debriefing guides, and course evaluations. Patterns found in the qualitative data were discussed between authors to arrive at predominant themes. The identified themes were then coded, placed in a matrix, and tabulated. Group performance was measured using the debriefing guide and simulation rubrics. The group simulation scores were compared to individual average course exam scores, scores on a nationally normed content proficiency exam (www.ATItesting.com), and course grades. Scores were analyzed using descriptive statistics and independent t tests. The objective and subjective data were cross-compared to draw conclusions.

Results

Student Perceptions

Four themes emerged: team effort, fairness, reliability, and confidence. All themes except confidence, about which all comments were positive, revealed both positive and negative perceptions (See Table 1).

Throughout the data, the participants expressed the recurring theme of *team effort* as a positive experience and as a way to feel less nervous than when taking an exam as an individual. "Nothing we do in the field is going to be an individual effort." "You would have at least one person there to help you out." Another student stated "You can stop each other if you're doing something wrong." However, some students also perceived some aspects of working in a group as detrimental, mostly in regard to dependence on others for one's grade. One student commented, "Your grade relies on what two people do, so...kind of scary." Furthermore, some students perceived that this type of group division may have hindered what they could have gained from the simulation. One student commented that "only two students got to benefit from participating."

Students had mixed perceptions as to the *fairness* of the group simulation. Some students believed that the materials and resources provided beforehand were adequate and the amount of information the simulation focused on was fair. One student commented: "There were only three scenarios, and I feel like you could really focus on those three things and the things you needed to know how to do." There was a general consensus that the selection process was fair. "We were all prepared to be the nurse." On the other hand, many students viewed some aspects of the different roles as unfair. For example, one commented that "not everyone gets to be the nurse." Another said, "I feel like I wasn't contributing." Many comments were made about inadequate

preparation with the equipment beforehand, which made evaluation in this simulation unfair. Some students had not had the chance to be on a labor and delivery unit before participation in the simulation. One student said, “We had never seen any of the equipment, none of the machines, nothing.” Many students believed that more exposure to the equipment would have greatly increased the fairness of the examination

Table 1

Frequency of Student Perception Themes

Theme		Debriefing Forms	Focus Groups	Course Evaluations	Total
Team Effort	<i>Beneficial</i>	14	3	2	19
	<i>Detrimental</i>	0	4	1	5
Fairness	<i>Fair</i>	2	13	1	16
	<i>Not fair</i>	0	14	3	17
Reliability	<i>Reliable</i>	6	3	2	11
	<i>Not reliable</i>	2	3	0	5
Confidence	<i>Gained</i>	6	5	0	11

Most students thought that simulation provided a way for poor test-takers to demonstrate their knowledge. One said, “[Simulation] is a better indicator to the instructor...to show them that you actually did prepare.” Other students questioned the *reliability* of the assessment of their knowledge on the topic because the simulation only addressed one situation. One student noted, “We only did one simulation, so I feel like there may be other areas or other things we aren’t as well versed in as we could have been.”

The idea of gaining *confidence* was frequently mentioned as something gained from the experience. In the debriefing paperwork, one group wrote, “The biggest thing we took away from this experience is a gain in confidence that we are more prepared to work as a nurse than we previously believed.” Students also addressed the confidence they gained when they were able to support each other as a group during the critiquing process. One student commented, “When your group watches it together I feel like they can kind of give you confidence.” Being able to critique each other as a group after watching their video allowed students to hear supportive comments about their skills, giving them confidence.

Student Performance

Students were able to reliably grade their group’s performance using the rubric, with student ratings matching the instructor’s score 100% of the time. The most common performance deductions were for wearing dirty gloves when using the telephone and mistaking late for variable decelerations in fetal heart rate patterns. Groups were also able to complete a thoughtful self-briefing using the provided guide. All groups identified electronic fetal monitoring as a way that technology supported patient safety. All but one group were able to predict how the finding of meconium-stained amniotic fluid fit with national guidelines for neonatal resuscitation.

Still, the group scores on the simulation exam were significantly higher than those on any other individual course measure, averaging 94.7% ($SD = 2.17$). Specifically, the group simulation scores were higher than individual performance measures on the national content proficiency exam ($M=71.1\%$, $SD=8.41$; $p=.001$), other course exams ($M=85.7\%$, $SD=4.53$, $p=.001$), and the final OB course grade ($M=91.7\%$, $SD=2.74$, $p=.001$).

Discussion

Evidence of Authenticity

The outcomes suggest that the group simulation fulfilled the criterion of a valid, authentic assessment as identified by Gulikers et al. (2004). The students perceived the task as being real nurse work. The social context involved collaboration as it would in the workplace. The performance was observable, and the students were evaluated against several professional quality and safety standards. Feedback suggested that physical context was perceived as the least authentic aspect of the simulation, mostly because some students believed they did not have enough prior experience using the labor and delivery equipment. Fetal heart patterns had been covered extensively in class, but viewing them on PowerPoint slides apparently felt very different to the students than reading them on a monitor.

Working in a team is an expectation of the RN (American Association of Colleges of Nursing, 2008; Cronenwett et al., 2007; Institute of Medicine [IOM], 2011), and one of the project's strongest themes revealed that students highly valued the teamwork aspect of the simulation. Since performing collaboratively is the norm in practice, the social context was perhaps the most compelling evidence that this simulation met Gulikers et al.'s (2004) standards for an authentic assessment. Students were encouraged to study together to begin to form a group identity before the actual simulation, and they volunteered that the group support provided a sense of comfort. This reinforced the findings by Elfrink, Nininger, Rohig, and Lee (2009) that the group setting and the group planning skills that are required may be some of the most beneficial aspects of the simulation experience.

In this pilot study, the students reported gaining confidence from the simulation. Through the debriefing process the student groups were able to begin the work of quality improvement, defined as observing care outcomes and implementing new methods to improve care (Cronenwett et al., 2007). Student learning gives an authentic assessment its consequential validity (Gulikers et al., 2004), and the written group self-debriefings showed evidence of student learning. For instance, students had an opportunity to say what they would have liked to have done differently and what they took away from the experience. SBAR (Situation, Background, Assessment, and Recommendation) format is recommended to improve collaborative communication (Beckett & Kipnis, 2009). During this simulation, no student used the SBAR communication format, but all groups were able to provide a corrected version with the debriefing.

Authentic assessments arise from and inform authentic instruction (Gulikers et al., 2004). In this case, we expected that the most challenging part of the task might be to interpret the electronic fetal monitor data, but we did not expect to see so many violations of standard infection control precautions. Specifically, soiled gloves are to be removed after patient contact (World Health Organization, 2009), but students routinely touched personal items and made

telephone calls while wearing soiled gloves. These repetitive errors led us to conclude that the methods we were using to teach the use of personal protective equipment were not effective.

Issues with Group Testing

It is not unusual for nursing students to be focused on grades (Oermann & Gaberson, 2009), and by far the most negative comments about the simulation were related to the issue of grades. Elfrink et al. (2009) found negative attitudes arose from being “singled out” to be the nurse in group simulations, but we found students were disappointed when they did not get to be the nurse. This was partially due to feeling like they were not contributing and disliking the fact that their grade was linked to the performance of others, even though the grading process was heavily skewed to favor the group-think debriefing and yielded higher average grades than other course assessments.

Although the students agreed that the simulation provided a real-world assessment of group skills, students did not perceive the simulation as being a reliable and accurate measure of individual abilities. Analysis of all quantitative measures supported the students’ perceptions. Group performance scores were significantly higher than other individual course performance measures. Others also have found that when group testing is utilized, scores tend to be higher than individual scores (Michaelsen & Sweet, 2011; Sandahl, 2009).

The increasing complexity of the healthcare environment calls for a greater emphasis on the nurse’s ability to work collaboratively (Cronenwett et al., 2007; IOM, 2011). This includes working collaboratively during patient care and in the quality improvement process. If teamwork is a practice competency, the question for nursing educators becomes what role should collaborative testing should play in pre-licensure education? Nurse educators may fear group testing because they want to prepare students to take national licensure examinations, which are individual efforts. Still, leaders in nursing education assert that multiple methods of assessment give a clearer picture of student abilities (NLN, 2010). Sadahl (2009) argues that students learn from the group-think process in collaborative testing and retain the information longer than from traditional individual testing.

Feasibility

Availability of resources has to ultimately factor into testing format decisions. While Roedinger and Butler (2011) suggested that frequent testing promotes learning, we feel resource availability would challenge the ability to use frequent testing with simulation for large groups often seen in lecture courses. In this study, 30 minutes was allotted per group for an orientation, to complete the scenario, and to watch the video-tape within the lab. Thus testing six groups took three hours to administer. Previous traditional midterm examinations in this course took only one hour to administer.

Conclusions

We concluded that this group simulation was an authentic assessment of teamwork that increased student confidence and promoted learning. Thus it was an appropriate method to test attainment of course objectives related to collaboration. However, it was not a measure of individual performance. Limitations of this pilot project included the narrow demographics;

participants did not reflect the entire population of nursing students demographically and therefore may not have provided widely applicable results. Another limitation was that the testing scenario itself was focused on a very particular situation and only the performance of the two students in the nurse direct patient care role could actually be assessed. Finally, the nature of case study design provides room for researcher bias due to the nature of the analysis, although cross-comparisons using of multiple types of measures added credibility to the findings and helped to minimize bias in this study.

Despite the pilot study limitations, the findings provide direction for future studies. More research is needed to understand the feasibility and outcomes of simulation testing compared to traditional testing in larger groups and different nursing content applications. Since simulations and traditional assessment methods seem to have different but complementary strengths and weaknesses, future research is also needed to identify the best mix of testing methods to predict and improve practice performance.

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References

- American Association of Colleges of Nursing. (2008). *The Essentials for Baccalaureate Education for the Professional Practice of Education*. Retrieved from <http://www.aacn.nche.edu/education/pdf/baccessentials08.pdf>
- Beckett, C. D. Y. & Kipnis, G. (2009). Integrating SBAR to Improve Quality/Patient Safety Outcomes. *Journal for Healthcare Quality*, 31 (5), 19-28. doi: 10.1111/j.1945-1474.2009.00043.x
- Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., ... Warren, J., (2007). Quality and Safety Education for Nurses. *Nursing Outlook*, 55 (3), 122-131. doi: 10.1016/j.outlook.2007.02.006
- Elfrink, V.L., Nininger, J., Rohig, L., Lee, J. (2009). The Case for Group Planning in Human Patient Simulation. *Nursing Education Perspectives*, 30(2), 83-86.
- Gulikers, J. T. M., Bastiaens, T. J., & Kirschner, P. A. (2004). A Five-Dimensional Framework for Authentic Assessment. *Etr&D-Educational Technology Research and Development*, 52(3), 67-86. doi: 10.1007/bf02504676
- Institute of Medicine. (2011). *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: National Academies Press.
- Jeffries, P. R. (2007). *Simulation in Nursing Education: From Conceptualization to Evaluation*. New York: National League for Nurses.

Leung, S. F., Mok, E., Wong, D. (2008). The impact of assessment methods on the learning of nursing students. *Nurse Education Today*, 28 (6), 711-719. doi: 10.1016/j.nedt.2007.11.004

Masters, J.C., Hulsmeyer, B.S., Pike, M.E., Leichty, K., Miller, M.T., & Verst, A.L. (2001). Assessment of multiple-choice questions in selected test banks accompanying text books used in nursing education. *Journal of Nursing Education*, 40(1), 25-31.

Michaelsen, L.K. & Sweet, M. (2011). Team-based learning. *New Directions for Teaching and Learning*, 2011(128), 41. doi: 10.1002/tl.467

National League for Nursing. (2010). National League for Nursing task force tackles high stakes testing. Retrieved from http://www.nln.org/newsreleases/highstakes_testing_061110.htm

Oermann, M.H. & Gaberson, K.B. (2009). *Evaluation and testing in nursing education*, 3rd ed. New York: Springer.

Oermann, M.H., Yarbrough, S.S., Saewert, K. J., Ard, N., & Charasika, M. (2009). Clinical evaluation and grading practices in schools of nursing: National survey findings Part II. *Nursing Education Perspectives*, 30 (6), 352–35. doi: 10.1043/1536-5026-30.6.352

Roediger, H.L. & Butler, A.C. (2011). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Sciences*, 15(1), 20-27. doi: org/10.1016/j.tics.2010.09.003

Rodgers, D. L., Bhanji, F., & McKee, B. R. (2010). Written evaluation is not a predictor for skills performance in an Advanced Cardiovascular Life Support course. *Resuscitation*, 81(4), 453-456. doi: 10.1016/j.resuscitation.2009.12.018

Sandahl, S.S. (2009). Collaborative testing as a learning strategy in nursing education: A review of the literature. *Nursing Education Perspectives*, 10 (1), 171-175

Sinclair, B. & Ferguson, K. (2009). Integrating simulated teaching/learning strategies in undergraduate nursing education. *International Journal of Nursing Education Scholarship*, 6 (1), Article7. doi: 10.2202/1548-923X.1676

Stake, R.E. (1978). The case study method in social inquiry. *Educational Researcher*, 7 (2), 5-8. doi: 10.2307/1174340

Stake, R.E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications, Inc.

Tarrant, M., Knierim, A., Hayes, S. K., & Ware, J. (2006). The Frequency of Item Writing Flaws in Multiple-Choice Questions Used in High Stakes Nursing Assessments. *Nurse Education Today*, 26(8), 662-671. doi: 10.1016/j.nedt.2006.07.006

Tarrant, M. & Ware, J. (2008). Impact of Item-Writing Flaws in Multiple-Choice Questions on Student Achievement in High-Stakes Nursing Assessments. *Medical Education*, 42(2), 198-206. doi: 10.1111/j.1365-2923.2007.02957.

Hensel, D., & Stanley, L.

Tiwari, A., Lam, D., Yuen, K. H., Chan, R., Fung, T., & Chan, S. (2005). Student Learning in Clinical Nursing Education: Perceptions of the Relationship Between Assessment and Learning. *Nurse Education Today*, 25(4), 299-308. doi: 10.1016/j.nedt.2005.01.013

Wiggins, G. (1998). *Educative Assessment*. San Francisco, CA: Jossey-Bass Inc.

World Health Organization (2009). Glove Use Information Leaflet. Retrieved from http://www.who.int/gpsc/5may/Glove_Use_Information_Leaflet.pdf

Models of pre-service teachers' academic achievement: The influence of cognitive motivational variables

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Abstract: Theoretical models were tested using structural equation modeling to evaluate the interrelations among cognitive motivational variables and academic achievement using a sample of 128 predominately Hispanic pre-service teachers enrolled in two undergraduate educational psychology classes. Data were gathered using: (a) a quantitative questionnaire to assess personal control, internal causality, self-efficacy, mastery goal orientation, and final course grade and (b) a problem-solving activity to identify engagement style: action- or process-oriented. The proposed theoretical model produced a poor model fit and thus a modified model was forwarded that directly linked self-efficacy with final course grade rather than mediated by mastery goal orientation. Results supported the modified model and suggested that the cognitive motivational variables under investigation played important roles in predicting students' grades, with self-efficacy acting as the mediator between both internal causality and personal control and students' final course grade. This study also demonstrated that the modified model was relatively invariant across gender, ethnicity, and engagement style. Implications for both teacher educators and pre-service teachers for understanding the complex links between cognitive motivational variables and academic achievement with a predominately Hispanic sample are discussed.

For educators, determining how to maximize student learning is a continuous and never-ending process. A rich literature base in cognitive motivational processes demonstrates that student academic achievement extends beyond quality of instruction, curricular content, and student ability to include student attributions, beliefs, engagement, and goal setting (Corno & Mandinach, 2004; Schunk, 2008; Wolters, Yu, & Pintrich, 1996). While relations between various cognitive motivational processes and academic achievement have been documented with non-minority populations, the U.S. student body has grown increasingly diverse (Pressley & Harris, 2006) therefore introducing the need for theoretical models to not only predict student academic achievement but also to generalize across diverse populations. As an example, one study conducted with a specific and homogeneous minority sample showed different pathways for predicting GPA and stronger magnitudes among predictor variables than for non-minority groups (Garriott & Flores, 2013).

Several cognitive motivational variables have emerged as strong predictors of academic achievement including self-efficacy, locus of causality, achievement goal orientation, controllability, and academic engagement. Self-efficacy has repeatedly shown to significantly predict academic achievement while beliefs, attributions, achievement goal orientation, and

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engagement have also acted as predictor, mediator, and criterion variables in theoretical models (Castro-Villarreal, Sullivan, Sass, & Guerra, 2012; Locke & Latham, 2002). However, the predictive ability of these variables amidst increasing educational requirements and expectations with a predominately Hispanic pre-service teacher sample has yet to be examined. Considering the rich literature on complex cognitive processes (Wolters et al., 1996), the contribution of the present study is not in the inclusion of the variables but in the examination of relative contribution and placement in the model as recent findings suggest psychological variables contribute in different ways for different populations (Castro-Villarreal et al., 2012; Locke & Latham, 2002). For example, previous research has shown important relations between self-efficacy and academic performance for Mexican-American females (Flores & O'Brien, 2002). From this viewpoint, the purpose of this study was to establish and test a theoretical framework examining how predominately Hispanic pre-service teachers' beliefs, attributions, achievement goal orientation, and engagement relate to their academic achievement.

Cultural and linguistic diversity combined with increased accountability and expectations for both educators and their students has effectively altered the United States (U.S.) education system (U.S. Department of Education, 2010). At the same time, minorities, namely Hispanics are still underrepresented in the teaching profession (U.S. Department of Education, 2010). Ostensibly, understanding how predominately Hispanic pre-service teachers' cognitive motivational variables interact to predict academic achievement could be one piece toward understanding teacher recruitment, retention, burn out, and persistence (U.S. Department of Education, 2010). Although determining whether ethnicity moderates models of teacher's academic success appears critical due to changing U.S. demographics and U.S. education system status, this study was also interested in whether teacher's engagement preference and gender moderated the theorized model.

Specifically, the research questions guiding this inquiry were: (1) What model including personal control, internal causality, self-efficacy, and achievement goal orientation best predicts academic achievement and (2) Does engagement style, gender, and ethnicity moderate the model's parameter estimates? Findings from this study can potentially aid teacher educators in recognizing and managing predominately Hispanic pre-service teachers', beliefs, attributions, self-efficacy, goal orientation, and level of engagement to support undergraduate academic achievement. The predicted relations among the included variables are detailed in theorized order next.

Theoretical Model

Attribution

Weiner (1986) defined attribution as the explanations people ascribe to their successes and failures. Within this theory, attributions fall along three dimensions, *locus*, *control*, and *stability*. The *stability* dimension refers to the stability of attributed causes of events and is most closely related to expectancies for success, unsuccessful events attributed to this factor can lead to learned helplessness (Weiner, 2004). The *control* dimension refers to the perceived source of control over events and is related to future effort and expectancies, it is also related to responsibility-taking, level of engagement, and academic success (Andrews & Debus, 1978; Perry, Hladkyj, Pekrun, & Pelletier, 2001; Shell & Husman, 2008; Tollefson, 2000; Weiner, 1994, 2004). Unlike the *stability* dimension, attributing both successes and failures to personal

controllable factors gives individuals a sense of responsibility, ownership, and control, which in turn influences engagement and efficacy. Given the importance of developing responsible self-regulated learners, teaching students to attribute outcome of performances to strategy use and effort (some examples of personal control attribution) has been the focus of attribution retraining as these factors are controllable by the individual and are considered healthy attributions (Castro-Villarreal & Schallert, 2008; Castro-Villarreal, Sullivan, & Guerra, 2007). The *locus* dimension refers to the location of the cause of events and is either internal or external. Personal control and internal causality have been shown to predict self-efficacy, which relates with academic success. Therefore, internal causality and personal control were examined as predictor variables and stability was omitted from our model.

Self-efficacy

Self-efficacy, people's beliefs about their ability to successfully complete a task (Bandura, 1977; 1997), is found to influence effort, persistence, and goal setting (Pajares, 2003; Pintrich, 2003; Wigfield & Eccles, 2000). To that end, research has shown self-efficacy to be a powerful predictor of grade point average and final course grade (Devonport & Lane, 2006; Graham & Weiner, 1996; Liem, Lau, & Nie, 2008; Multon, Brown, & Lent, 1991; Pajares, 2003; Ryan & Pintrich, 1997; Zajacova, Lynch, & Espenshade, 2005), and to relate with other behaviors, actions, affect, and goals (Patrick, Ryan, & Kaplan, 2007; Shell & Husman, 2008).

Because the belief individuals have about the amount of control they have over performance can influence their sense of being able to effectively deal with a task, it is appropriate to examine the relation between self-efficacy and the control dimension of Weiner's attributional model (Bandura, 1977; Poulou & Norwich, 2002). Researchers suggest that the more students believe that success is due to personal control factors, the higher their self-efficacy (Bond, Biddle, & Ntoumanis, 2001) and when students attribute failure to factors outside of their volitional control, their self-efficacy suffers (Castro-Villarreal & Schallert, 2008; Castro-Villarreal et al., 2007; Castro-Villarreal et al., 2012). Further, Rudisill (1989) found that students who perceived their performance as due to an internal, unstable, but personally controllable cause reported having higher self-efficacy and had better performance than students who attributed their performance to internal, stable, and uncontrollable causes. For this study, it was theorized that feeling in control over the learning situation and outcome (i.e., having personal control) gives students a higher sense of self-efficacy and therefore self-efficacy was tested for mediator effects.

Achievement Goal Orientation

Achievement goal orientation can be defined as the purpose for students' engagement in academic tasks (Elliott & Church, 1997). Traditionally, students who are motivated to learn and acquire knowledge have *mastery* goals, while those who exert effort in academic tasks in order to receive favorable judgments are said to have *performance* goals (Pintrich, 2003). Three types of goal orientations have been identified: *mastery*, in which students' main goal is to master new skills, *performance-approach*, where students' main concern is receiving favorable judgments from others, and *performance-avoidance*, where students worry about failure and focus primarily on how not to look bad (Elliott & Church, 1997). Although a revised 2 x 2 achievement goal framework has been proposed where mastery orientation is also subdivided into approach and

avoidance, with avoidance being more negative than approach but more positive than the traditional performance-avoidance goals, the traditional one-dimensional mastery orientation was the only variable utilized in the present study (Elliot & McGregor, 2001).

Students' achievement goal orientation has been found to relate to motivation, self-efficacy, use of "deep processing" strategies, engagement, and persistence in the face of challenge (Elliot & Church, 1997; Friedel, Cortina, Turner, & Midgley, 2007; Kaplan & Middleton, 2002; Liem, Lau, & Nie, 2008; Pajares, Britner, & Valiante, 2000; Patrick, Ryan, & Kaplan, 2007; Pintrich, 2003). Students with mastery goal-orientations tend to perform better academically than those with performance goals (Button, Mathieu, Zajac, 1996; Harackiewicz & Elliot, 1993; Phillips & Gully, 1997; Castro-Villarreal et al., 2007). In addition, students with higher self-efficacy adopt significantly more mastery goals than those who have lower self-efficacy (Greene, Miller, Crowson, Duke, & Akey, 2004; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Castro-Villarreal et al., 2007). Similarly, students with mastery goals had higher self-efficacy while the opposite was true for students with performance goals (Phillips and Gully, 1997). Results indicate precedence for mastery goals over performance goals yet also points to the complexity of the relations among the variables, and provides justification for the inclusion of mastery goal orientation to follow high self-efficacy in the proposed theoretical model.

Moderator variables

Engagement

Engagement is the degree to which students' perceive, attend, and persist with a task and is largely influenced by values, beliefs, self-efficacy, and goal orientation (Corno & Mandinach, 2004; Castro-Villarreal et al., 2012). Although engagement has been divided into behavioral, cognitive, and motivational components, the present study focused on the cognitive aspects of engagement that are observed in goal-setting, planning, and task management (Carver & Scheier, 1991; Hickey & Granade, 2004; Linnenbrink & Pintrich, 2003).

Findings indicate engaged students attend more closely to tasks, set goals that challenge and encourage learning, and exhibit greater persistence than their less engaged counterparts (Dolezal, Welsh, Pressley, & Vincent, 2003; Linnenbrink & Pintrich, 2003; Talyor, Pearson, Peterson, & Rodriguez, 2003). Student engagement is also associated with persistence, attentiveness, self-regulation, and active participation, while non-engagement is associated with minimal to no task investment (Steinberg, 1996). Carver and Scheier (1991) maintain that there are levels of consciousness in engagement and self-regulation. Because self-regulated students defined as students who set goals and actively monitor their progress toward task completion must also be engaged, the two constructs are often used interchangeably (Castro-Villarreal et al., 2012; Zimmerman & Schunk, 2001). They assert that at an initial level, (a) one finds automaticity, (b) second, one is likely to observe a conscious set of processes involved in decision making, this level will include goal-setting and self-monitoring, and (c) a third level includes the meta-cognitive processes of self-awareness and self-reflection about one's decisions.

In accordance with this research, engagement style can be examined from students' problem solving (Guerra, 2005, 2009). Considering reliance on planning, managing, and outcome expectations, researchers maintain that individual's investment and automaticity can be

observed in their problem solving (Carver & Scheier, 1991; Zimmerman, 2000). The LIBRE Model Problem Solving Activity (LMPSA) incorporates the three essential skills agreed to represent engagement and self-regulation: planning, monitoring, and evaluation. As such, the LMPSA is a tool designed to record one's progress through the levels of self-regulation put forth by Carver and Scheier (1991) and to identify engagement style (Guerra, 2004; 2006; 2007; 2009a; 2009b; Guerra, Flores, & Claeys, 2009; Guerra, & Bollinger, 2011).

In this study, engagement styles are defined as dichotomous categories of 1) Action-Oriented engagement, which involves taking an active role in creating a plan towards reaching a goal, or 2) Process-Oriented engagement, which involves a passive role in contemplation with no identifiable goal related plans. Participants respond to the LIBRE Model prompts and the LMPSA protocol functions as a visual guide to organize interaction between participants and researchers and to record the students' responses. LMPSA respondents have been observed to offer similar expressions based on the extended underlying goal information of "how" (motivated direction) and "why" (motivated impetus) included with the selected goal. Because engagement is the cornerstone to learning, engagement style and its association with academic achievement is examined (Guerra et al., 2009). Therefore, our study tested whether one's engagement style moderated our theorized model and resulted in significant mean differences on those model variables.

Gender

Some research cites gender differences in cognitive motivational variables and how it relates with academic achievement. For example, research has shown females to be more likely to ascribe failure to internal attributes and successes to external factors (Seegers & Boekarets, 1993; Skaalvik & Skaalvik, 2004). Similarly, gender differences were seen with self-efficacy with males reporting higher levels than females (Seegers & Boekarets, 1993). To test whether the effects in our theoretical model are different for male versus female students, we examined gender as a moderator. Gender differences will be examined in an exploratory manner.

Ethnicity. Ethnicity and academic achievement have long been examined together and although the relationship is complex, some have reported differences (Flores & O'Brien, 2002; Garriott & Flores, 2013; Warikoo & Carter, 2009). Unfortunately, much of the research is conceptual and theoretical in nature and fails to examine the complex interactions among race, culture, ethnicity, and academic achievement. Although some have found stronger associations between self-efficacy and academic achievement for minority versus Caucasian participants (Garriott & Flores, 2013; Flores & O'Brien, 2002), Warikoo and Carter (2009) suggested future research on culture and academic achievement focus on uncovering the *when* and *how* ethnicity and culture matter for academic achievement. Thus, empirical study through the deployment of structural equation modeling that examines *when* and *how* to elucidate the interplay and interaction of ethnicity on academic achievement is long overdue (Warikoo & Carter, 2009). Therefore, our study tested whether ethnicity moderated our model or resulted in significant mean differences on those model variables.

The Present Study

Although the research on the relation between cognitive motivational variables and academic achievement is rich, study of the unique and independent contributions of each variable

to academic achievement is less available. Despite the considerable amount of literature on teacher education and academic achievement, very few studies have tested for moderation effects (especially, engagement style and ethnicity) within a theoretical modeling framework. Given well known association between self-efficacy and academic achievement and the especially important role self-efficacy plays in teacher performance, we examined pre-service teachers' academic achievement by investigating the predictive relations among attributions, self-efficacy, engagement, and goal orientation and theorized that attribution variables would come before self-efficacy and be followed by learning orientation with engagement, gender, and ethnicity acting as moderators.

Method

Participants

Participants were 128 pre-service teachers from a large southwest U.S. metropolitan Hispanic-serving institution (the current student body is 44% Hispanic), a federal designation given to non-profit institutions with Hispanic student body populations of at least 25% (U. S. Dept. of Education, 2010). This sample of convenience was comprised of individuals drawn from two undergraduate educational psychology courses. This course is an early entry course into the pre-service teacher program and is also part of their core curriculum. Thus, most students reported to be earning degrees from the College of Education and Human Development (42%), followed by 29% from the College of Liberal and Fine Arts, and 20% in the College of Sciences. Additionally, most participants reported being juniors (49%) or seniors (42%). The sample was 72% female; 54% Hispanic, 35% White, 7% African American, 3% Asian, and 1% Native American. The gender representation is comparable to other education programs and the ethnic breakdown mirrors the larger Hispanic-serving university population breakdown of 44% Hispanic and 33% Caucasian. Participation was voluntary and participants were not compensated.

Methodology

Interviewer training to administer the LIBRE Model Problem Solving Activity occurred two weeks before the beginning of the semester for ten graduate students enrolled in a Counselor Education program at the university. During the week of the first course exam, questionnaires and individual problem solving interviews were completed with informed consent. All participant responses were recorded and assessed according to the established protocol. Questionnaires and interviews were completed consecutively within an hour timeframe.

Instrumentation

Causal Dimension Scale II

This self-report instrument was designed to measure causal attributions for academic performance (McAuley, Duncan, & Russell, 1992). This instrument consisted of 12 items that measured four subscales using a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The four subscales were as follows: (a) *locus of causality* (is due to a factor

inside the individual), (b) *stability* (whether the cause is stable over time), (c) *personal control* (whether the cause is controllable by the individual), and (d) *external control* (whether the cause resides outside the individual). The justification of variable inclusion into the model was provided in the introduction. Our internal consistency reliability coefficients (see Table 1) were acceptable and comparable with previous findings (McAuley et al., 1992).

Table 1.

Provides the inter-factor correlations that were adjusted for measurement error using the internal consistency reliability coefficients.

	1.	2.	3.	4.	5.
1. Final course grades	0.90	0.27	0.21	0.60	-0.06
2. Internal causality	<i>0.37</i>	0.61	0.41	0.29	0.14
3. Personal control	<i>0.26</i>	<i>0.59</i>	0.78	0.17	0.49
4. Self-efficacy	<i>0.68</i>	<i>0.40</i>	<i>0.20</i>	0.90	0.18
5. Mastery goal orientation	<i>-0.07</i>	<i>0.19</i>	<i>0.60</i>	<i>0.20</i>	0.86

Note. The diagonal represents the internal consistency reliability coefficients (bolded), the bottom-left off-diagonal represents the correlations between factors (italicized), and the upper-right off-diagonal are not corrected for measurement error (neither bolded or italicized). Correlation coefficients of .18 or greater were statistically significant at .05.

Academic Self-Efficacy Scale

The six-item self-report academic self-efficacy scale from the Patterns of Adaptive Learning Scales (PALS; Midgley et al., 2000) was modified to measure students' beliefs about their ability to complete the course successfully. This 5-point scale, ranging from 1 (*not at all true of me*) through 5 (*very true of me*), included questions like "I am certain I can figure out how to do the most difficult work in this class". This measure had an internal consistency coefficient of .96.

Achievement Goal Orientation

The 18-item questionnaire (Elliot & Church, 1997) measured learners orientations and was comprised of three subscales: *mastery goal orientation* (e.g., I want to learn as much as possible while in this class), *performance-approach* (e.g., I want to do well in this class to show my ability to my family, friends, or others), and *performance-avoidance* goals (e.g., I just want to avoid doing poorly in this class) (Pintrich, 2000). For each question, students were asked to rate whether they agree or disagree with the statements using a 5-point Likert scale, with scores ranging from 1 (strongly disagree) to 5 (strongly agree). Our analyses indicated acceptable internal consistency reliability coefficients (see Table 1). As justified in the introduction, only mastery goal orientation was incorporated into this model. To ensure this was a valid assertion, the correlations between performance-approach, performance-avoidance, and final course grades was tested and found to be statistically and practically insignificant.

Final course grade

Final course grades, which were based on students' homework assignments, projects, quizzes, midterm exam, and final exam, served as the academic achievement measure and was obtained from official University records and entered into the data file.

Engagement style

The LIBRE Model protocol and LMPSA tool were used to assess engagement style of action versus process orientation, which were determined from participant responses (Guerra, 2004; 2005; 2006). Test-retest analysis suggests that individuals are very consistent in their manner of response and engagement as determined by their LIBRE qualitative responses. Students' specificity and the number of solutions generated were indicators used to determine engagement style (see Guerra, 2004; 2006).

The assessment and categorization of the LMPSA was conducted in three steps to determine *Action* versus *Process* orientation. First, a trained interviewer administered the LMPSA. Each protocol was then individually scored. Second, a trained research associate, not involved with the interviews, also independently scored the Stick Figure Protocols. Third, one of the researchers who conducted the LIBRE Model training, provided oversight of the assessed protocols, scoring, and rubric completion to determine scoring accuracy. An ex post facto examination of independent categorization found an inter-rater reliability of .90. This means that of the 128 completed LMPSA interviews, 115 were scored exactly the same by the first and second clinicians. The remaining 13 protocols were examined and categorization was determined by consensus among the three reviewers.

Each LMPSA was then categorized as: Action- or Process-Oriented depending on the (1) specificity, quality, and quantity (expanse, breadth, elaboration, relevance) of the responses provided to each prompt and (2) the articulation and inclusion of a feasible problem-solving plan (see Guerra, 2009a; 2009b for more theory detail and LMPSA categorization).

Statistical Analyses

Model identification and estimation

Given the relatively small sample size to model both the items and the structural coefficients, a more complex model that incorporated each measured item was not selected. Instead, the measurement error was integrated into the model by using each measure's internal consistency reliability coefficient (i.e., Cronbach's coefficient α) to disattenuate (i.e., correct the structural coefficients for measurement error) the structural coefficients (i.e., the relationships between latent variables). Note, whether the measure's internal consistency reliability or the individual measured items are modeled should not influence the magnitude of the structural coefficients if the scales are unidimensional (see Sass & Smith, 2006). Stated differently, the structural coefficient magnitudes (see γ 's and β 's in Figure 1 & 2) should be nearly identical regardless of whether the individually measured items or internal consistency reliability was modeled. This modeling procedure is justifiable given that the psychometric properties of the measures used in this model have been evaluated elsewhere and therefore were not of primary interest. However, it is worth noting that when the confirmatory factor analysis model was

estimated it provided a good model fit when using the WLSMV estimator with our data, χ^2 (129) = 211.05, $p < .0001$, CFI = .969, TLI = .964, RMSEA = .071, WRMR = .868.

Using the internal consistency reliability coefficients as the model's measurement component, the degree of structural coefficient disattenuation was represented by λ_x and λ_y . The amount of measurement error in the latent variable was computed using the following equation: $\sigma_\eta^2 - (\sigma_\eta^2 \alpha)$, where σ_η^2 represents the total variance in the scale score variable (η) and α corresponds to the internal consistency reliability coefficient (i.e., Cronbach's α coefficient) for each scale. Note that all latent variables were corrected for measurement error using the reliability coefficients computed from the data in this study. The exception was final course grades (measured using a percent of points awarded), which was assumed to have a reliability of .90. This coefficient was selected to adjust for minor measurement imperfections without assuming too much measurement error and making large adjustments to the structural coefficients.

Data analyses were conducted using Mplus 7 (Muthén & Muthén, 1998-2012) on a covariance matrix using a maximum likelihood robust estimation (MLR, Yuan & Bentler, 2000). This estimation method was employed given that the scale scores were significantly skewed based on the Shapiro-Wilk test of normality (using $\alpha = .01$) and the Q-Q plots for all variables/scales used in the model. Therefore, when testing the differences between two nested models the strictly positive Satorra-Bentler χ^2 difference test (see Satorra & Bentler, 2010) was used (Mplus website for more details), rather than simply subtracting the two χ^2 statistics. No missing data were present on any of the model variables.

Model fit

The statistics employed to evaluate model fit for each sample were the robust χ^2 , Comparative Fit Index (CFI), Tucker Lewis index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). A detailed description of these model fit statistics is provided by Hu and Bentler (1999), and Marsh, Hau, and Wen (2004). Based on their research, SRMR values below .08, RMSEA below .06, and CFI and TLI greater than .95 are deemed appropriate.

Results

Proposed model

The *proposed model* (see Figure 1) produced an inadequate model fit, χ^2 (5) = 84.265, $p < .0001$, CFI = .270, TLI = -.460, RMSEA = .353, SRMR = .188, which suggested that this model was incorrectly specified and should be revised. The modification indices, along with the parameter estimates (see $\beta_{3,2}$ in Figure 1), suggested that mastery goal orientation is unrelated to final course grades, but instead self-efficacy is the primary predictor of final course grades. For this reason, we removed mastery goal orientation from the model (thus implying that it does not mediate the relationship between self-efficacy and final course grade) and proposed that self-efficacy directly related to final course grades (see Figure 2). As past literature suggests there is also considerable evidence for this direct link between self-efficacy and final course grades.

Modified model

The *modified model* (see Figure 2) produced an excellent model fit, $\chi^2 (2) = 2.773$, $p < 0.2500$, CFI = 0.989, TLI = 0.967, RMSEA = .055, SRMR = .031, and suggests this model accurately represents the data. Moreover, with the exception of internal causality regressed on self-efficacy, the other structural coefficients are statistically and practically significant. These analyses imply that the relationship between personal control and final course grades is mediated by self-efficacy, which was further supported by the direct relationship between personal control and final course grades ($r = .26$, $p = .011$). Conversely, internal causality did not predict self-efficacy after controlling for personal control, thus indicating that self-efficacy does not mediate the relationship between internal causality and final course grades. This occurred despite the larger bivariate correlations (see Table 1) between internal causality and self-efficacy ($r = .40$, $p < .001$) and internal causality and final course grades ($r = .37$, $p = .001$). The reason for these results was the rather large correlation between personal control and internal causality, thus resulting in personal control having a larger unique contribution after adjusting for internal causality.

To better portray this finding, models (see Figure 3) were tested using a single exogenous variable. As expected, these analyses provided a good model fit for the personal control (Model 3A), $\chi^2 (1) = 2.124$, $p < .1450$, CFI = 0.974, TLI = 0.923, RMSEA = 0.094, SRMR = 0.032, and internal causality (Model 3B), $\chi^2 (1) = 1.552$, $p < .7479$, CFI = 0.989, TLI = 0.966, RMSEA = 0.066, SRMR = 0.023, models and both exogenous variables significantly predicted self-efficacy when not adjusting for the other. In fact, these analyses contradict the Model 2 results (see Figure 2) that suggest personal control is the better predictor, but instead provide more evidence in favor of internal causality being the stronger predictor variable. The one partial limitation associated with this conclusion is that internal causality has a lower reliability coefficient, thus a larger correction for measurement error was made. However, even the unadjusted correlation coefficients (see Table 1) and unadjusted path coefficients (see Models 3A & 3B) were larger for internal control than personal control.

Collectively, the results from Figure 2 and 3 imply that self-efficacy is a mediator for the relationships between the exogenous variables (i.e., personal control and internal causality) and final course grades, with the perceived benefit of these variables based on how they are defined (i.e., partial or full relationship with self-efficacy). That is, personal control explains more unique variance in the prediction of self-efficacy, whereas internal causality has a larger total contribution to self-efficacy. This distinction is noteworthy because researchers who model these variables simultaneous will draw conflicting conclusions than when modeling these variables in isolation. In fact, these results imply that internal causality is likely a better variable to include in future models than personal control.

The previous statement is further supported based on the R^2 statistics (see Figure 2 & 3), as the change in R^2 (or ΔR^2) did not change greatly when adding personal control to the model (i.e., $\Delta R^2 = .166 - .165 = .001$, rounded to three rather than two decimals). In any case, self-efficacy continued to be a strong predictor of final course grades, as 57% of the variance in final course grades can be explained by self-efficacy. In general, all the R^2 statistics in Figure 2 and 3 possessed medium to large effect size based on the tentative standards proposed by Cohen (1988): small $R^2 = .01$, medium $R^2 = .09$, and large $R^2 = .25$. The only exception was for Model 3A when examining the relationship between personal control and self-efficacy ($R^2 = .02$ or $.04$ for unadjusted and adjusted statistics, respectively).

Figure 1. Provides the *proposed model's* (Model 1) standardize factor loadings, structural coefficients, and R^2 statistics.

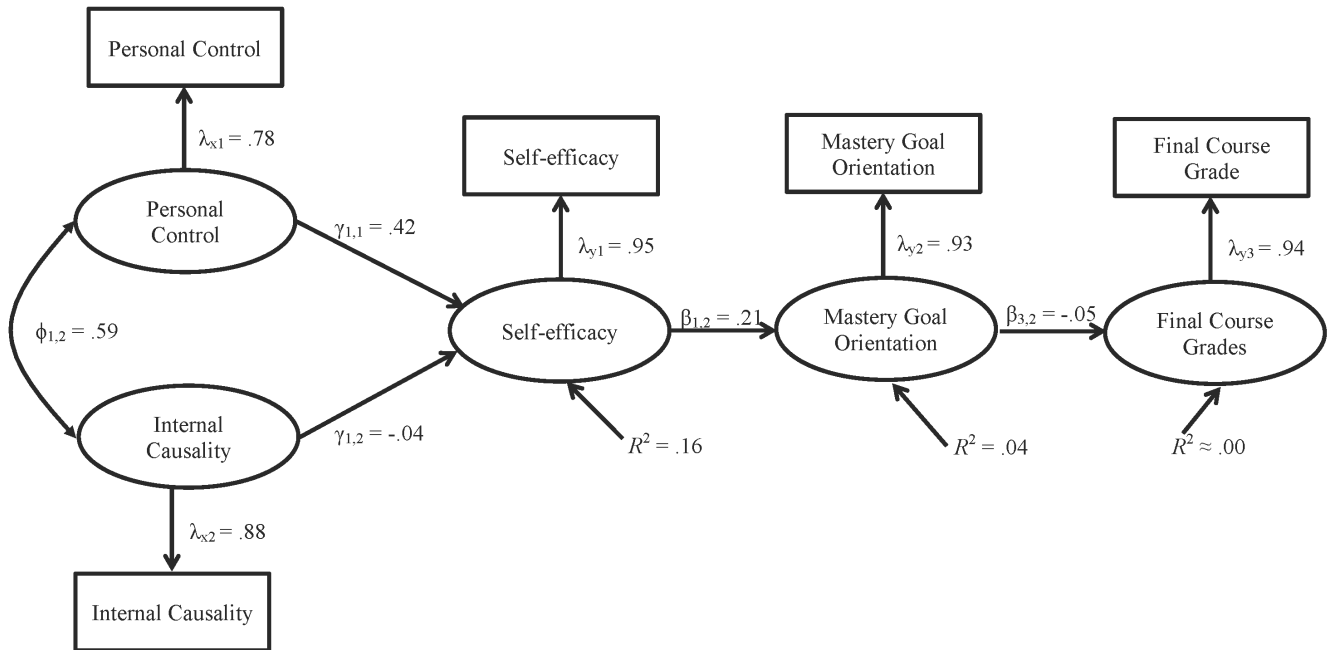


Figure 2. Provides the *modified model's* (Model 2) standardized factor loadings, structural coefficients, and R^2 statistics. Path coefficients not corrected for measurement error, along with the R^2 statistics, are also provided in parentheses for comparison purposes.

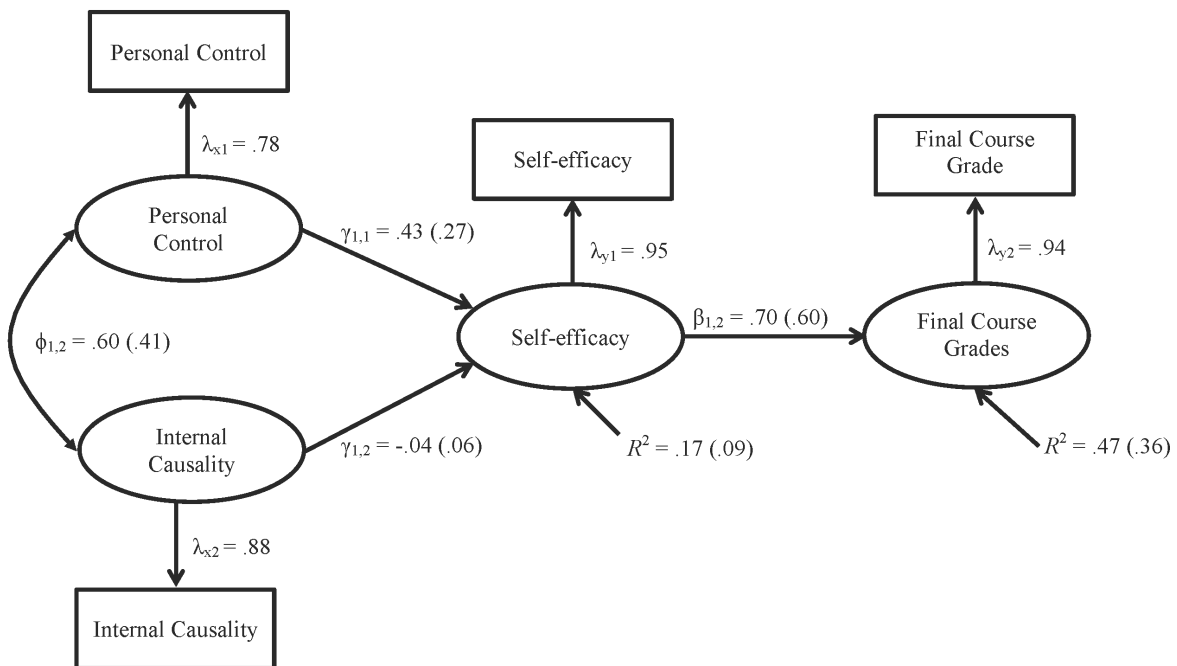
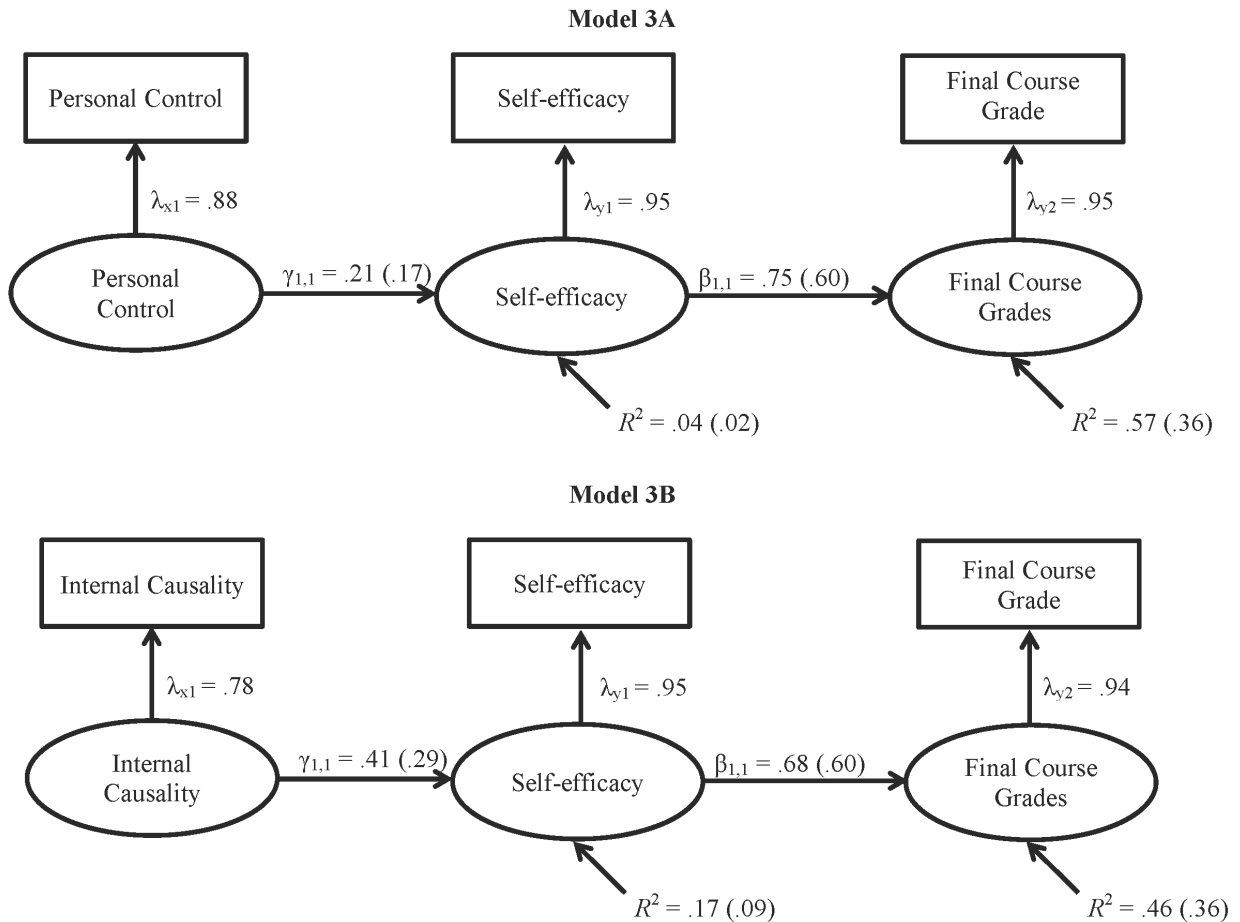


Figure 3. Model results for analyses using a single exogenous variable rather than having them in a single model. Parameter estimates in parenthesis represent the estimates unadjusted for measurement error.



Moderation/invariance and mean difference results

Ideally when testing for moderation effects (or invariance across groups), the scales should be tested for measurement invariance before proceeding to test for structural invariance. However, due to the small sample sizes per group these analyses were not appropriate. Instead, we assumed these scales were invariant and tested whether engagement preference, gender, and ethnic group moderated the path coefficients (uncorrected for measurement error) using the $\Delta\chi^2$ ($\Delta\chi^2 = \chi^2_{PI} - \chi^2_{CI}$), where the configural invariance (CI) model allowed the path coefficients to differ across groups and the path invariant (PI) model fixed the path coefficients to be equal across group membership. Recall, MLR estimation uses the Satorra-Bentler $\Delta\chi^2$ test, so a simple subtraction of χ^2 statistics is not appropriate, and it tests the difference between unstandardized (not standardized) path coefficients. To ensure the covariance between personal control and internal control and adjustments for measurement error did not inadvertently influence the moderation/invariance conclusions, Models A and B (see Figure 3) were evaluated using the variables unadjusted for measurement error and in isolation.

Gender

Invariance/moderation analyses revealed no statistically significant difference between males ($n = 36$) and females ($n = 91$) for Model 3A, $\Delta\chi^2$ ($df = 2$) = 1.154, $p = .5616$, or Model 3B, $\Delta\chi^2$ ($df = 2$) = 1.243, $p = .5371$. As seen in Table 2, some coefficient differences started to appear (e.g., personal control to self-efficacy); however, it is unknown whether these tests were simply unpowered due to the small sample size or these differences simply emerged due to chance.

When examining mean and variance differences, no statistically significant differences existed between gender based on the Levene's test for equality of variances and t -tests for equality of mean differences. Using Cohen's d (Cohen, 1988) tentative effect size standards of small ($d = |0.2|$ to $|0.3|$), medium (d around $|0.5|$), and large ($d > |0.8|$), the largest effect size ($d = -0.32$, $p = .091$) was on internal control, with males having a lower mean than females (see Table 3). The second largest effect size was for self-efficacy, with the average male score being 0.29 estimated standard deviations above the mean for females.

Ethnicity

Analyses revealed no statistically significant differences between Caucasian ($n = 44$) and Hispanic ($n = 68$) students for Model 3A, $\Delta\chi^2$ ($df = 2$) = 3.832, $p = .1472$, or Model 3B, $\Delta\chi^2$ ($df = 2$) = 3.084, $p = .214$. However, as seen in Table 2, several notable differences are starting to emerge. For example, the relationship between personal control and self-efficacy was much larger for Caucasian than Hispanic students, as was the relationship between internal causality and self-efficacy. This same trend appeared when testing the relationship between self-efficacy and final course grades. Collectively, these results imply the relationships between these variables are much stronger for Caucasian than Hispanic students; however, the relatively small sample sizes prohibit adequate power to definitively make adequate inferences.

No statistically significant mean or variance differences emerged between Caucasian and Hispanic subjects, as seen in Table 3. The largest mean difference was on the personal control scale ($d = 0.38$, $p = .071$) with Caucasian students scoring on average 0.38 estimated standard deviations above Hispanic students. A smaller effect size also emerged for mastery orientation, with males scoring higher than females. These results suggest relatively small differences between these groups on these variables when focusing on the mean differences.

Engagement style

Results suggested there was no statistically significant difference between Action Oriented Engagement preference ($n = 39$) and Process Oriented Engagement preference ($n = 42$) students for Model 3A, $\Delta\chi^2$ ($df = 2$) = 2.220, $p = .3296$, or Model 3B, $\Delta\chi^2$ ($df = 2$) = 0.535, $p = .7653$. From a practical standpoint, these differences were rather small (see Table 2). The largest difference existed between Action and Process groups for the personal control to self-efficacy link; however, both path coefficients were relatively small and in the opposite direction (i.e., positive relationship for Process and negative relationship for Action).

When examining mean (see Table 3) and variances differences, the only statistically significant difference emerged on the self-efficacy scale for the mean differences ($d = 0.48$, $p = .035$). These analyses suggested that Action-Oriented students reported noticeably higher self-

efficacy scores than Process-Oriented students, with a similar trend also emerging for final course grades ($d = 0.29, p = .173$).

Table 2.

Standardized and unstandardized path coefficients associated with moderation effects.

	Path		Gender			Ethnicity			Engagement style	
			US	S		US	S		US	S
Model 3A	PC to SE	Male	0.07	0.08	Caucasian	0.23	0.31	Action	-0.15	-0.15
	PC to SE	Female	0.18	0.20	Hispanic	0.02	0.03	Process	0.21	0.22
	SE to FG	Male	10.33	0.55	Caucasian	14.38	0.73	Action	12.61	0.64
	SE to FG	Female	14.81	0.64	Hispanic	9.16	0.45	Process	12.36	0.53
Model 3B	IC to SE	Male	0.36	0.32	Caucasian	0.50	0.56	Action	0.11	0.11
	IC to SE	Female	0.33	0.32	Hispanic	0.18	0.16	Process	0.21	0.21
	SE to FG	Male	10.33	0.55	Caucasian	14.38	0.73	Action	12.61	0.64
	SE to FG	Female	14.81	0.70	Hispanic	9.16	0.45	Process	12.36	0.53

Note. PC = Personal Control, IC = Internal Causality, SE = Self-Efficacy, FG = Final course Grade, US = Unstandardized coefficients, and S = Standardized coefficients.

Table 3.

Displays the mean differences on the outcome variables of interest for each of the quasi-independent variables.

	Gender	Ethnicity	Engagement style
Final course grades	-0.16	0.06	0.29
Mastery goal orientation	-0.10	0.26	-0.02
self-efficacy	0.29	0.13	0.48
Internal causality	-0.32	0.18	0.04
Personal control	-0.05	0.38	-0.04

Note. Mean differences were computed as follows: Males – females, Caucasians – Hispanics, and Action – Process orientation.

Discussion

With push to increase student academic success and graduation rates, models that predict academic achievement and ultimately student graduation appear timely. Therefore, structural equation modeling was employed to address the former component by answering the following research questions: (a) What model including personal control, internal causality, self-efficacy, and mastery goal orientation best predicts academic achievement and (b) Are the variables moderated by engagement style, gender, and ethnicity?

Theoretical model conclusions

The proposed model (see Figure 1) yielded a poor fit and indicated that mastery goal orientation is unrelated to final course grades. As such, mastery goal orientation was removed from the model and self-efficacy was examined for its direct relationship with academic achievement. This modified model (see Figure 2) suggested that self-efficacy mediated the relationship between personal control and final course grades. Because personal and internal causality were so strongly related, a third and fourth model (see Figure 3) with a single exogenous variable was tested and found internal causality to be the stronger predictor variable. Collectively, these results suggest that personal control is the better predictor variable when modeled with internal causality (i.e., larger unique contribution), whereas internal causality is the better bivariate predictor of self-efficacy. This finding is important as researchers could falsely conclude from modeling both variables simultaneously that only personal control predicts self-efficacy, when in fact internal causality is really the best predictor. This is supported by the fact that the R^2 (or percent of variance explained in self-efficacy) did not change when including both variables ($R^2 = .017$) or only internal causality ($R^2 = .017$). Regardless of the model, self-efficacy appears to be a good mediator in predicting final course grades.

Collectively, the results of this study provide support for previous research linking self-efficacy and academic achievement. In addition, our findings underscore the role attributions play in learning and achievement. This is one of few studies to utilize structural equation modeling to investigate the unique and combined contribution of variables known to predict academic achievement. Models of this statistical sophistication are needed if teacher educators are to accurately identify cognitive motivational factors critical to learning and subsequently support these factors in students through explicit instruction in complex cognitive processes and innovative instructional techniques.

Moderation/invariance conclusions

Although no moderation effects were found to be statistically significant based on the change in χ^2 , some emerging trends are worth noting. Foremost, ethnicity appeared to play a noticeable role in model prediction, with the relationships always being considerably higher for Caucasian (C) than Hispanic (H) pre-service teachers. This is most evident when evaluating the standardized parameter estimates, as the relationship from personal control to self-efficacy ($\beta_C = .31$ vs. $\beta_H = .03$) and internal causality to self-efficacy ($\beta_C = .73$ vs. $\beta_H = .45$) were always much larger for Caucasian students, as was the relationship from self-efficacy to final course grades ($\beta_C = .73$ vs. $\beta_H = .45$). The implications of this finding are that the path to academic success for Hispanic students may be very different from Caucasians, thus implying that additional research is needed to determine those variables likely to predict academic success for Hispanic students. Moreover, it would be interesting to determine why these paths differ to such a degree based on ethnicity and what other cultural variables contribute to these differences.

Regardless, the emerging ethnic differences suggest that this model may be a better fit for Caucasians, as the relationships among these variables was much stronger for Caucasians than for Hispanics. The larger model coefficients may indicate that Caucasians are more likely to believe events and conclusions to be well within their control and this belief perhaps also explains their enhanced sense of self-efficacy. However, this study also demonstrates that these

differences in structural coefficients are not translating to higher final course grades for Caucasian students.

Mean difference conclusions

Generally speaking, no large mean differences (based on Cohen's effect size standards) emerged between gender, ethnic, and engagement style groups on any of the model variables (see Table 3). In fact, the only statistically significant difference existed between the Active and Process engagement preference groups when evaluating self-efficacy. These results imply that students who are more actively engaged have almost a half standard deviation ($d = 0.48$) higher self-efficacy than those who utilize a process type engagement style. Perhaps worthy of note is these same students have a higher final course grade ($d = 0.29$). Other notable mean differences were on mastery goal orientation and personal control, with mean scores always higher for Caucasian students. Different relationships for different ethnic groups are consistent with previous findings that demonstrated a greater relationship between self-efficacy and academic performance for minority populations (Garriot & Flores, 2013). In addition, although self-efficacy was higher for males, they also tended to have a lower internal locus of causality.

Model Implications for Teacher Educators and Pre-Service Teachers

The theoretical models proposed suggest that cognitive motivational variables interact to play key roles in predicting pre-service teachers' final course grade as the proxy for academic achievement. In general, results indicated that students who believe they have personal control over events and attribute successes and failures to internal causes over the learning situation tend to have higher self-efficacy, which leads to higher final course grade. This model demonstrates that self-efficacy, perceived control, and academic achievement are linked in important ways, as students with high self-efficacy are more likely to engage in the learning process likely due to their perception of control and causality. However, our findings suggest that this model may not generalize to Hispanic students, as the relations between these variables was much smaller for this subsample.

Although literature suggests a link between mastery goal orientation and academic achievement, the present findings suggest this relationship to be much more complex and involving more beliefs and attributions. Our findings suggest precedence for explicit instruction in metacognitive strategy use, development, and monitoring, strategies seldom explicitly taught (Pressley & Harris, 2006). Explicit instruction on "thinking about the thinking" and recognizing and monitoring good problem solving, learning, and logic strategies to cultivate personal control and internal causality is recommended to augment and enhance curricular content and material.

Instructional Techniques to Enhance Learning

The modified model revealed that self-efficacy was a strong predictor of final grades and served as a mediator for the relation between personal control and internal causality and academic achievement consistent with recent findings that showed a strong link between self-efficacy and academic achievement (Al-Harthi & Was, 2011). Because these findings support the linkage between self-efficacy and academic success (Devonport & Lane, 2006), what can teacher educators do to utilize such findings? As teacher educators strive to graduate students,

improve teacher retention, decrease burnout, and produce highly qualified teachers, the modified model points to some potential targets for intervention. For example in this study, self-efficacy and perceived control are imperative to the prediction of academic outcomes. With the understanding of the significant roles these variables play, educators should implement strategies to increase students' self-efficacy and make students aware of their role in the learning process and outcomes (developing self-regulation skills and attributing outcomes to "internal causes and within personal control"). One method of doing this is through attribution re-training where students are explicitly taught the importance of these variables and then asked to identify their own personal attributions and learning strategies, attend to task requirements and demands, engage in goal setting, and evaluate their learning (Andrews & Debus, 1978; Castro-Villarreal et al., 2007). The LIBRE stick figure tool is one way to teach students how to identify and manage their engagement, attention, effort, and persistence (Pressley & Harris, 2006).

The models also suggest a need for teachers and teacher educators to support attributions and beliefs through task manipulation. To illustrate, several novel instructional techniques have been shown to positively impact self-efficacy, such as altering and increasing the response set, diversifying instruction for increased opportunity for success, problem interspersal, and attribution retraining. Altering the response set by increasing the opportunities to practice and respond during the acquisition phase of learning is critical to success with a task and dealing effectively with a task is essential for increasing self-efficacy. By the same token, decreasing the number of items and/or assignments can also serve to enhance self-efficacy by making the task more manageable and feasible. To enhance self-efficacy, educators may consider providing instructions, materials, goals, and expectations with some flexibility offered to the student to self-regulate and manage task requirements, order, and sequence. That is, students should be offered various assignments to choose from and perhaps even select the assessment technique drawing upon individual student strength and diversity.

Success is also known to enhance self-efficacy. As such, a logical suggestion would be to allow for opportunities for success, which often entails offering various and diverse assignment and assessment methodologies. Increased opportunities for success can unfold in a variety of ways. As an illustration, success with instructionally appropriate materials could potentially impact feelings of competency and efficacy and additionally build on engagement and self-regulation through appropriately leveled tasks. Another method would be to allow students the flexibility to choose assignments, purposefully assign assignments and activities ranging from easy to difficult, opt for some activities clearly below instructional levels, or adopt problem interspersal techniques where each problem or assignment is followed by an easier one. Item interspersal has been found to contribute to feelings of control and competence shown to enhance self-efficacy and locus of causality. In addition to providing multiple and diverse opportunities for success, students should be provided with corrective and performance feedback to maximize engagement, persistence, and goal setting thereby creating a feedback loop essential for learning from successes and failures. Findings suggest that teachers and teacher educators should incorporate ways to support self-efficacy, personal control, and internal causality into their lesson planning just as they prepare for the provision of curricular content.

Limitations of the Study

The results of our study should be interpreted in light of several limitations. Foremost, the rather small sample size limits our ability to adequately test whether our models are invariant

across gender, ethnicity, and engagement style. Therefore, our interesting ethnic group differences should be tested not only with a larger sample size, but also across different college majors and other ethnic groups. Along a similar vein, the statistical power to detect mean differences is also a limitation, thus the mean differences should be interpreted more tentatively. Secondly, data were based on self-report and may have reflected social desirability, interviewer-participant level of rapport, rather than actual perspectives. This limitation is most concerning for the LIBRE Model, which assess problem-solving and self-reflection activity to identifying engagement preference. A third limitation is that other variables (e.g., academic and additional psychological variables) were not included in the model. If in fact these variables truly are poor predictors of academic success for Hispanic students, it is unknown what variables are good predictors for this population.

Conclusions

One purpose of this study was to provide empirical support for the belief that teaching is not only about curricular content, but also about complex cognitive motivational processes. As predicted, findings highlighted the importance of personal control and internal causality, which appear mediated by self-efficacy, in the prediction of pre-service teacher academic success. Considering the contribution of personal control, internal causality, and self-efficacy in our model, instructional emphasis on complex cognitive processing is in order and can be accomplished through the use of instructional techniques to promote academic efficacy and explicit instruction in problem solving to foster deep processing and reflection as a means to cultivate control (Pressley & Harris, 2006). However, our results provide some evidence that although the model may be invariant across gender and engagement style, this may not be the case for ethnicity. Therefore, the exploration of alternative theoretical models that are perhaps more generalizable across ethnicity appear imperative, while at the same time including variables in the model that predict academic success for non-Caucasian students. Overall, our findings demonstrate the complex relations among cognitive psychological variables and academic achievement and also showcased that relations do differ between groups and continued research into variable functioning, predictive ability, and placement will continue to be a need.

References

- Al-Harthy, I. S., & Was, C. A. (2011). Goals, Efficacy and Metacognitive Self-Regulation: A Path Analysis. *International Journal of Education*, 2, 1-20.
- Andrews, G. R., & Debus, R. L. (1978). Persistence and the Causal Perception of Failure: Modifying Cognitive Attributions. *Journal of Educational Psychology*, 70(2), 154-166. doi: 10.1037/0022-0663.70.2.154
- Appleton, J., Christenson, S. L., & Furlong, M. J. (2008). Student Engagement with School: Critical Conceptual and Methodological Issues of the Construct. *Psychology in the Schools*, 45(5), 369-386. doi: 10.1002/pits.20303
- Bandura, A. (1977). Self-Efficacy: Toward a Unified Theory of Behavioral Change. *Psychology Review*, 84, 191-215. doi: 10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: W. H. Freeman.

Bandura, A., & Cervone, D. (1986). Differential Engagement of Self-Reactive Influences in Cognitive Motivation. *Organizational Behavior and Human Decision Processes*, 38, 92-113. doi: 10.1016/0749-5978(86)90028-2

Bond, K. A., Biddle, S. J. H., & Ntoumanis, N. (2001). Self-Efficacy and Casual Attribution in Female Golfers. *Sport Psychology*, 31, 234-256.

Bråten, I., Samuelstuen, M. S., & Strømsø, H. I. (2004). Do Students' Self-Efficacy Beliefs Moderate the Effects of Performance Goals on Self-Regulatory Strategy Use? *Educational Psychology*, 24, 231-247. doi: 10.1080/0144341032000160164

Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal Orientation in Organizational Research: a Conceptual and Empirical Foundation. *Organizational Behavior and Human Decision Processes*, 67, 26-48. doi: 10.1006/obhd.1996.0063

Cafri, G., Kromrey, J.D., & Brannick, M.T. (2010). A Meta-Meta-Analysis: Empirical Review of Statistical Power, Type I Error Rates, Effect Sizes, and Model Selection of Meta-Analyses Published in Psychology. *Multivariate Behavioral Research*, 45(2), 239-270. doi: 10.1080/00273171003680187.

Carver, C. S., & Scheier, M. F. (1991). Self-Regulation and the Self. In J. Strauss, & D. R. Goethals (Eds.), *The Self: Interdisciplinary Approaches* (pp. 168-207). New York: Springer-Verlag. doi: 10.1007/978-1-4684-8264-5_10

Castro-Villarreal, P. H., & Schallert, D. L. (2008). Implications from Self-Efficacy and Attribution Theories for an Understanding of Undergraduates' Motivation in a Foreign Language Course. *Contemporary Educational Psychology*, 33(4), 513-532. doi: 10.1016/j.cedpsych.2008.01.003

Castro-Villarreal, P. H., Sullivan, J. R., & Guerra, N. S. (2007). Closer look at college students: Self-efficacy and goal orientation. *Journal of Advanced Academics*, 18, 454-476.

Castro-Villarreal, P. H., Sullivan, J. R., Sass, D. A., & Guerra, N. S. (2012). Undergraduate Engineering Students' Beliefs, Coping Strategies, and Academic Performance: An Evaluation of Theoretical Models. *The Journal of Experimental Education*, 80, 196-218. doi: 10.1080/00220973.2011.596853

Cohen J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum.

Connell, J. P., & Wellborn, J. G. (1991). Competence, Autonomy, and Relatedness: A Motivational Analysis of Self-System Processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self-Processes in Development: Minnesota Symposium on Child Psychology*, 23, (pp. 167-216). Chicago: University of Chicago Press.

Corno, L., & Mandinach, E. B. (2004). What we have learned about student engagement in the past twenty years. In D. M. McInerney & S. Van Etten (Eds.), *Big theories revisited* (pp. 299-328). Greenwich, CT: Information Age Publishing.

Creswell, J. W. (2003). *Research Design* (2nd ed.). Thousand Oaks, CA: Sage. Devonport, T. J., & Lane, A. M. (2006). Relationships between self-efficacy, coping and student retention. *Social Behavior and Personality*, 34(2), 127-138. Retrieved from <http://search.proquest.com/docview/209898913?accountid=7122>

Dolezal, S., Welsh, L., Pressley, M., & Vincent, M. (2003). How Nine Third-Grade Teachers Motivate Student Academic Engagement. *Elementary School Journal* 103(3), 239-268. doi: 10.1086/499725

Elliot, A. J., & Church, M. A. (1997). A Hierarchical Model Of Approach and Avoidance Achievement Motivation. *Journal of Personality and Social Psychology*, 72, 218-232. doi: 10.1037/0022-3514.72.1.218

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and Avoidance Achievement Goals and Intrinsic Motivation: A Mediation Analysis. *Journal of Personality and Social Psychology*, 70, 461-475. doi: 10.1037/0022-3514.70.3.461

Elliot, A. J. & McGregor, H. A. (2001). A 2 X 2 Achievement Goal Framework. *Journal of Personality and Social Psychology*, 80, 501-518. doi: 10.1037/0022-3514.80.3.501

Emmons, R. A. (1996). Striving and feeling: Personal Goals and Subjective Well-Being. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The Psychology of Action: Linking Motivation and Cognition to Behavior*. New York: Guilford.

Flores, L. Y. & O'Brien, K. M. (2002). The Career Development of Mexican American Adolescent Women : A Test of Social Cognitive Career Theory. *Journal of Counseling Psychology*, 49, 14-27. doi: 10.1037/0022-0167.49.1.14

Friedel, J. M., Cortina, K. S., Turner, J. C., & Midgley, C. (2007). Achievement Goals, Efficacy Beliefs and Coping Strategies in Mathematics: The Roles of Perceived Parent and Teacher Goal Emphases. *Contemporary Educational Psychology*, 32, 434-458. doi: 10.1016/j.cedpsych.2006.10.009

Garriott, P. O. & Flores, L. Y. (2013). The Role of Social Cognitive Factors in Mexican-American Students' Educational Goals and Performance: A Longitudinal Analysis. *Journal of Latina/o Psychology*, 1, 85-94. doi: 10.1037/a0032378

Graham, S., & Weiner, B. (1996). Theories and Principles of Motivation. In D. Berliner & R. C. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 63-84). New York : Macmillan.

Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting High School Students' Cognitive Engagement and Achievement: Contributions of Classroom Perceptions and Motivation. *Contemporary Educational Psychology*, 29, 462-482. doi: 10.1016/j.cedpsych.2004.01.006

Guerra, N. S. (2004). The LIBRE Model: A Cognitive One-on-One Loci Approach to Facilitating Change Presentation. *Consortium of State Organizations for Texas Teacher Education*, Galveston, Texas: Waves of Change.

Guerra, N. S. (2005). Revised LIBRE Model Stick Figure. Unpublished instrument.

Guerra, N. S. (2006). The LIBRE Problem-Solving Model: A Practical Approach to Problem-Solving and Decision-Making for Teachers and Teacher Educators. *Texas Teacher Educator's Forum*, 29, 9-14.

Guerra, N. S. (2007). LIBRE Model: Engagement Styles in Counseling. *Journal of Employment Counseling*, 44, 2-10. doi: 10.1002/j.2161-1920.2007.tb00019.x

Guerra, N. S. (2009a). LIBRE Stick Figure Tool: Graphic Organizer. *Interventions in Schools and Clinics*, 44(4), 229-233.

Guerra, N. S. (2009b). Illustrations of Engagement Styles: Four Teacher Candidates. *Teacher Education & Practice*, 22(1), 95-117.

Guerra, N. S. & Bollinger, E. A. (2011). Engagement Styles in Consultation: LIBRE Model Problem-Solving Tool. *The Dialog*, 40(1), 4-8.

Guerra, N. S., Flores, B. B., & Claeys, L. (2009). A Case Study of an Induction Year Teacher's Problem-Solving Using the LIBRE Model. *New Horizons in Education, Journal of Education*, 57(1), 43-57.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking Achievement Goals: When are they Adaptive for College Students and Why? *Educational Psychologist*, 33, 1-21. doi: 10.1207/s15326985ep3301_1

Harackiewicz, J. M., Durik, A. M., Barron, K. E., Linnenbrink-Garcia, L., & Tauer, J. M. (2008). The Role of Achievement Goals in the Development of Interest: Reciprocal Relations Between Achievement Goals, Interest, and Performance. *Journal of Educational Psychology*, 100, 105-122. doi: 10.1037/0022-0663.100.1.105

Hickey, D. T., & Granade, J. B. (2004). The Influence of Sociocultural Theory on our Theories of Engagement and Motivation. In D. M. McInerney & S. Van Etten (Eds.), *Big Theories Revisited* (pp. 223-247). Greenwich, CT: Information Age

Hu, L., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structure Equation Modeling*, 6, 1-55. doi: 10.1080/10705519909540118

Kaplan, A., & Middleton, M. J. (2002). Should Childhood be a Journey or a Race? A Response to Harackiewicz et al. (2002). *Journal of Educational Psychology*, 94, 646-648. doi: 10.1037/0022-0663.94.3.646

Kanfer, R., & Kanfer, F. H. (1991). Goals and Self-Regulation: Applications of Theory to Work Settings. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (pp. 287-326). Greenwich, CT: JAI Press.

Liem, A. D., Lau, S., & Nie, Y. (2008). The Role of Self-Efficacy, Task Value, and Achievement Goals in Predicting Learning Strategies, Task Disengagement, Peer Relationship, and Achievement Outcome. *Contemporary Educational Psychology*, 33, 486-512. doi: 10.1016/j.cedpsych.2007.08.001

Linnenbrink, E. A., & Pintrich, P. R. (2003). The Role of Self-Efficacy Beliefs in Student Engagement and Learning in the Classroom. *Reading and Writing Quarterly*, 19, 119-137. doi: 10.1080/10573560308223

Locke, E. A., & Latham, G. P. (2002). Building a Practically Useful Theory of Goal Setting and Task Motivation: A 35-Year Odyssey. *American Psychologist*, 57, 705-717. doi: 10.1037/0003-066X.57.9.705

Marsh, H. W., & Hocevar, D. (1985). Application of Confirmatory Factor Analysis to the Study of Self-Concept: First- And Higher Order Factor Models and their Invariance Across Groups. *Psychological Bulletin*, 97(3), 562-582. doi: 10.1037/0033-2909.97.3.562

McAuley, E., Duncan, T. E., & Russell, D. (1992). Measuring Causal Attributions: The Revised Causal Dimension Scale (CDSII). *Personality and Social Psychology Bulletin*, 18, 566-573. doi: 10.1177/0146167292185006

Marsh, H.W., Hau, K.T. & Wen, Z., (2004). In Search of Golden Rules: Comment on Hypothesis Testing Approaches to Setting Cutoff Values for Fit Indexes and Dangers in Over-Generalizing Hu & Bentler's (1999) Findings. *Structural Equation Modeling*, 11, 320-341. doi: 10.1207/s15328007sem1103_2

Middleton, M. J., & Midgley, C. (1997). Avoiding the Demonstration of Lack of Ability: An Underexplored Aspect of Goal Theory. *Journal of Educational Psychology*, 89, 710-718. doi: 10.1037/0022-0663.89.4.710

Multon, K., D., Brown, S. D., & Lent, R. W. (1991). Relation of Self-Efficacy Beliefs to Academic Outcomes: A Meta-Analytic Investigation. *Journal of Counseling Psychology*, 38(1), 30-30. doi: 10.1037/0022-0167.38.1.30

Muthén, L.K., & Muthén, B.O. (1998-2012). Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

Pajares, F. (2003). Self-Efficacy Beliefs, Motivation, and Achievement in Writing: A Review of the Literature. *Reading and Writing Quarterly*, 19, 139-158. doi: 10.1080/10573560308222

Pajares, F., Britner, S., & Valiante, G. (2000). Relation Between Achievement Goals and Self-Beliefs of Middle School Students in Writing and Science. *Contemporary Educational Psychology*, 25, 406-422. doi: 10.1006/ceps.1999.1027

Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early Adolescents' Perceptions of the Classroom Social Environment, Motivational Beliefs, and Engagement. *Journal of Educational Psychology*, 99, 83-98. doi: 10.1037/0022-0663.99.1.83

Perry, R. P., Hladkyj, S., Pekrun, R. H., & Pelletier, S. T. (2001). Academic Control and Action Control in the Achievement of College Students: A Longitudinal Field Study. *Journal of Educational Psychology*, 93(4), 776-789. doi: 10.1037/0022-0663.93.4.776

Phillips, J. M., & Gully, S. M. (1997). Role of Goal Orientation, Ability, Need for Achievement, and Locus of Control in the Self-Efficacy and Goal-Setting Process. *Journal of Applied Psychology*, 82, 792-802. doi: 10.1037/0021-9010.82.5.792

Pintrich, P. R. (2000). Multiple Goals, Multiple Pathways: The Role of Goal Orientation in Learning and Achievement. *Journal of Educational Psychology*, 92(3), 544-555. doi: 10.1037/0022-0663.92.3.544

Pintrich, P. R. (2003). A Motivational Science Perspective on the Role of Student Motivation in Learning and Teaching Contexts. *Journal of Educational Psychology*, 95(4), 667-686. doi: 10.1037/0022-0663.95.4.667

Poulou, M., & Norwich, B., (2002). Cognitive, Emotional and Behavioural Responses to Students with Emotional and Behavioral Difficulties: A Model of Decision-Making. *British Educational Research Journal*, 28, 111-138. doi: 10.1080/01411920120109784

Pressley, M. & Harris, K. A. (2006). Cognitive Strategies Instruction: From Basic Research to Classroom Instruction. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of Educational Psychology* (2nd Ed., pp. 256-286). Mahwah, NJ: Erlbaum.

Rudisill, M. E. (1989). Influence of Perceived Competence and Causal Dimension Orientation on Expectation, Persistence, and Performance During Perceived Failure. *Research Quarterly for Exercise and Sport*, 60, 166-175. doi: 10.1080/02701367.1989.10607432

Ryan, A. M., & Pintrich, P. R. (1997). "Should I Ask For Help?": Adolescent Perceptions of Costs and Benefits of Help-Seeking in Math Class. *Journal of Educational Psychology*, 89, 329-341. doi: 10.1037/0022-0663.89.2.329

Schunk, D. H. (2008). *Learning Theories: An Educational Perspective*. Upper Saddle River, NJ: Pearson Education, Inc.

Seegers, G., & Boekarts, M. (1993). Task Motivation and Mathematics Achievement in Actually Task Situations. *Learning and Instruction*, 3, 133-150.

Shell, D. F., & Husman, J. (2008). Control, Motivation, Affect and Strategic Self-Regulation in the College Classroom: A Multidimensional Phenomenon. *Journal of Educational Psychology*, 100, 443-459. doi: 10.1016/0959-4752(93)90012-O

Skaalvik, E.M., & Skaavlik, S. (2004). Self-Concept and Self-Efficacy: A Test of the Internal/External Frame Reference Model and Predictions of Subsequent Motivation and Achievement. *Psychological Reports*, 95, 1187-1202.

Steinberg, L. (1996). *Beyond The Classroom: Why School Reform Has Failed and What Parents Need To Do*. New York: Touchstone.

Sullivan, J. R., Author, P. H., Guerra, N. S., Lumadue, C., & Lebrón-Striker, M. (2007). Getting Everybody Involved: A Collaborative Training Approach for Counselors and Educators. *Journal of Creativity in Mental Health*, 2(3), 29-49. doi: 10.1300/J456v02n03_04

Talyor, B., Pearson, P. D., Peterson, D., & Rodriguez, M. (2003). Reading Growth in High-Poverty Classrooms: The Influence of Teacher Practices That Encourage Cognitive Engagement in Literacy Learning. *Elementary School Journal*, 104(1), 3-28. doi: 10.1086/499740

Tollefson, N., (2000). Classroom Applications of Cognitive Theories of Motivation. *Educational Psychology Review*, 12, 63-83. doi: 10.1023/A:1009085017100

U. S. Department of Education. Developing Hispanic-Serving Institutions. Retrieved 1/11/10, <http://www.ed.gov/programs/dueshsi/definition.html>

Warikoo, N., & Carter, P. (2009). Cultural Explanations for Racial Stratification in Academic Achievement: A Call for a New and Improved Theory. *Review of Educational Research*, 79(1), 336-394. doi: 10.3102/0034654308326162

Weiner, B. (1986). *An Attribution Theory of Motivation and Emotion*. New York: Springer-Verlag. doi: 10.1007/978-1-4612-4948-1

Weiner, B. (1994). Integrating Social and Personal Theories of Achievement Striving. *Review of Educational Research*, 64, 557-573. doi: 10.3102/00346543064004557

Weiner, B., (2004). Attribution Theory Revisited: Transforming Cultural Plurality into Theoretical Unity. In D. M. McInerney & S. Van Etten (Eds.), *Big Theories Revisited: Research on Sociocultural Influences on Motivation and Learning*. (pp. 13-30). Greenwich, CT: Information Age Publishing.

Wigfield, A., & Eccles, J. (2000). Expectancy-Value Theory of Achievement Motivation. *Contemporary Educational Psychology*, 25, 68-81. doi: 10.1006/ceps.1999.1015

Wolters, C. A., Yu, S. L., & Pintrich, P. R. (1996). The Relation Between Goal Orientation and Students' Motivational Beliefs and Self-Regulated Learning. *Learning and Individual Differences*, 8, 211-238. doi: 10.1016/S1041-6080(96)90015-1

Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-Efficacy, Stress, and Academic Success in College. *Research in Higher Education*, 46, 677-706. doi: 10.1007/s11162-004-4139-z

Zimmerman, B. J., (2000). Attaining Self-Regulation: A Social Cognitive Perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of Self-regulation* (pp. 13-39). San Diego, CA: Academic Press. doi: 10.1016/B978-012109890-2/50031-7

Professional development of graduate teaching assistants in faculty-like positions: Fostering reflective practices through reflective teaching journals

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Abstract: This study explores the outcomes of reflective journaling among novice Graduate Teaching Assistants during the initial stages of their professional development. It seeks to establish whether there were common concerns addressed in their journals and if different levels of reflection were achieved. By means of content analysis of 177 entries, nine common themes were identified. Among these, “methodology” and “classroom management” were the most prevalent. Three degrees of reflection were used to categorize the entries. Slightly over half of the entries achieved high levels of reflection, whereas 49% of the entries did not. Recommendations for teacher educators and facilitators of the professional development of graduate students are provided.

Keywords: Reflective journals, teaching journal, graduate teaching assistants, teacher training, professional development

Introduction

Despite efforts to implement training opportunities at American universities, Graduate Teaching Assistants (GTAs) still carry out their teaching appointments with an evident lack of preparation (Boyd & Boyd, 2005; Hardré, 2005). Since the pre-service instruction GTAs receive is often brief and insufficient, their first encounter with pedagogical and theoretical training usually occurs simultaneously with their first teaching experience at the college level (VanValkenburg & Arnett, 2000).

Even when frequently appointed to faculty-like positions, mainly due to their content knowledge, GTAs are often times not provided with the necessary tools to offer high-quality education to undergraduate students. It has been noted that the experience GTAs gain while teaching is nearly the only opportunity to advance their development as future professors (Austin, 2002; Luo, Grady, & Bellows, 2001; Wise, 2011). The operationalization of reflective activities and exploratory endeavors that could instill in GTAs the desire to become reflective practitioners are typically circumscribed to the few occasions in which GTAs are required to engage in pedagogical training. Moreover, extensive professional development is rather insufficient and GTAs are faced with the challenge of trial and error, as well as independent exploration of instructional methods, which means that much of their preparation tends to happen incidentally (Boyd & Boyd, 2005; Wise, 2011).

Since teaching is inherently a profession that requires ongoing reflection; students' needs analysis; and evaluation of outcomes, students and oneself; it is essential that GTA trainers facilitate various types of reflective activities that help novice and in-training teachers evaluate the results of instructional practice and acquire self awareness (Lee, 2005).

Journal writing, one means of fostering reflection, has been shown to be beneficial to the

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development of those in the teaching field (Boyd & Boyd, 2005; Genc, 2010; Hatton & Smith 1995; Kaur & Kaur, 2010; H. Lee, 2005, I. Lee, 2008; Maarof, 2010; Zeki, 2010, *inter alia*). Journaling is considered a useful tool for self-exploration and to evaluate the meaning one gives to teaching (Pratt, 2002). Teacher candidates, novice teachers and experienced professionals can, through reflection, create or adjust their teaching persona so that abstract theoretical knowledge interacts with the application of that knowledge. Reflective journaling can then enhance a teacher's practice by permitting the exploration of factors that could positively or negatively impact their instructional methods, raise awareness concerning their own biases and beliefs, allow more sensitive responses to students' needs and establish the necessary connections between theory and practice (Genc, 2010; Maarof, 2010).

This study explores reflective journaling among novice GTAs as a mean to enhance reflective teaching practices and seeks to establish whether there were common concerns addressed in their journals and if different levels of reflectivity (Lee, 2005) were achieved.

Background

A reflective journal is a potential avenue for raising awareness and enhancing the practice of experienced teachers as well as advancing the professional development of novice teachers. Implementing techniques that promote reflective teaching plays an important role in the development of novice teachers. It can have a positive impact in the professional growth of graduate students in faculty-like positions, which consequently has a twofold effect. It contributes to enhancing the quality of education received by undergraduate students and better prepares the future professoriate.

Reflective journals can be implemented in different contexts and the outcomes could therefore be diverse. While teacher-training programs often require journaling during the student-teaching period, it is also commonly assigned during classes taken before embarking on the teaching appointment (Numrich, 1996; Kaur & Kaur, 2010). "In-service journals" can include self-studies and journaling of a volunteer nature, as opposed to journaling as a requirement for a class or a program (Genc, 2010; Jeffrey, 2007; Porto, 2008).

Pre-service teachers experience a disadvantage regarding the benefits of journaling. Given the nature of their position, they lack the ability to establish correlations between their incipient knowledge of theory and the application of theories in the classroom. Therefore, when required to write teaching journals, pre-service teachers are pushed to make predictions without yet having experience in their own classrooms. (Lai & Calandra, 2000; Pedro, 2005; Yost, Sentner, & Forlenza-Bailey, 2000).

Mainly because of lack of experience, much of the reflection that takes place in both "pre-service journal writing" and "in-service journal writing" tends to be merely descriptive and superficial in its level of analysis and it tends to lack the expected essence of reflection (Lai & Calandra, 2007; Hatton & Smith, 1995; Maarof, 2007; Pultorak, 1996). Reflective journaling and the quality of critical reflection can be fostered, improved, or even developed by providing: 1) trigger questions, 2) supervised scaffolding, 3) opportunities to share experiences, and 4) opportunities to connect theory to practice (Hatton & Smith 1995; I. Lee, 2008; Pultorak, 1996, Zeki, 2010).

Concerned with the absence of true reflection in teaching journals, previous studies have investigated the various degrees of "reflectivity." For instance, Hatton and Smith (1995), describe four types of reflection. The first one is called "descriptive writing", and entails a

description of a given situation or literature review. The second level is the “descriptive reflection” which adds some degree of true reflection. At this level, situations are described or analyzed from a personal perspective without any other interconnection. The third level incorporates a more elaborate type of reflective writing and it consists of “dialogic reflection” in which the analysis is still at the individual level. This level is considered dialogic due to the conversations one can have with oneself in order to explore possible reasons for a given situation. The highest level is “critical reflection” which incorporates contemplation of various causes a given situation, as well as its possible links to social, historical or political factors.

Contrary to the four levels proposed by Hatton and Smith (1995), Lee (2005) suggests a three-tiered categorization of critical reflection. All of Lee’s levels imply some sort of reflection. Starting in the first level, even without resorting to alternative explanations, the writer interprets experiences. The recall level (R1) is considered a recollection in which the writer is able to interpret a situation based on the exploration of his/her own experiences. The Rationalization level (R2) occurs in the middle of the continuum, in which the writer begins to make connections between experiences and reasons for those experiences. This level implies a more elaborate reflection due to the fact that the writer is not only able to interpret a given situation but also to discover guiding principles. The highest level of reflection is constituted by the Reflectivity level (R3), in which an agenda can be clearly established, and the analysis of previous experiences serves now as a way to elaborate the necessary changes to improve future endeavors.

In the studies conducted by Lee (2005) and Hatton and Smith (1995), a gradual progression from lower to higher levels of reflection was seen as teachers were gaining experience and familiarity with the reflective process. However, Lee (2005) points out that even when reflecting on technical or practical issues, high levels of reflection can also be achieved, if the interpretation of such issues involves deep analysis and suggestions for improvement.

Implementing reflective journaling as an assignment for novice teachers is a useful way of fostering self-awareness and the evaluation of teaching techniques. It additionally provides the opportunity for developing the foundation for an ongoing reflective practice as the teacher advances in his/her career. While studies haven shown the benefits of reflective journaling among teachers in training, research that documents reflective journaling by GTAs is rather scarce. Therefore, the current study investigates the outcomes of reflective journaling among foreign language GTAs during their first semester of teaching at the university level. For that, the following research questions guided this investigation:

1. Are there common concerns shared by GTAs as indicated in their journals?
2. What level of reflectivity do their journal entries display?

The study

The journal entries analyzed were provided over the course of three years by graduate students enrolled in their first year of a Masters in Spanish in a public, American university. These students were also serving as graduate teaching assistants in faculty-like positions, as part of a multi-section lower-division Spanish course. There were both males and females, some were foreign-born (n=10) native speakers of Spanish, and some (n=16) were U.S.-born native speakers of English. Of the foreign-born GTAs, six were male and four were females, while nine male and seven females were U.S.-born. None of the participants had had previous experience teaching at the college level in the U.S., and very few had had limited experience teaching at the high school level in the U.S. (n=4) and/or in other countries (n=2) prior to beginning their

teaching appointment as GTAs.

All of the GTAs had participated in a week-long orientation before meeting their classes on the first day of the semester. During their first year as graduate students, the GTAs enrolled in a semester-long Foreign Language Methodology class (in which the journals were produced) as well as a two-semester discussion workshop.

Reflective journaling constituted one of the assignments in the Methodology class, for which students were required to write two journal entries per week. It has been found that having guiding questions or trigger topics can yield more effective results, in terms of the quality of the reflection and the writer's commitment to the activity (Mariko, 2011; Maarof, 2007, Yost et al. 2000; Zeki, 2012). Given that the participants of this study were graduate students, it was expected that they had, to some extent, already developed the ability to critically reflect and to make connections between theory and practice. Additionally, it was considered that guiding questions could impose topics that might not be a true concern for every GTA. Therefore, there were no thematic constraints, guiding questions, or prompts. They were instructed to write about the development of their teaching persona, successful or challenging moments in and out the classroom, as well as difficulties or accomplishments concerning classroom management and teaching approaches. They were also encouraged (but not required) to incorporate reflections based on the class readings regarding theories of second language acquisition, second language teaching methodology and pedagogical practices. Lastly, they were allowed to write in English or Spanish.

In this case, scaffolding was conducted in the form of oral interaction with the professor/mentor and peers. After 4 days of regular class a "journal day" was scheduled. During "journal days" each student read aloud an entry while the professor identified common themes and guided the discussion based on those themes. Often times, the common themes were evident and students themselves were able to relate to fellow GTAs and the anecdotes described in the entries, whereas less frequently the professor established connections and guiding principles. The most challenging aspect of the "journal days" for the professor was helping students stay on task and facilitating a fruitful discussion instead having the class become a mere venting session. The scaffolding mainly consisted of supporting GTAs and offering solutions to their concerns as well as new ideas and alternative strategies to implement in the classroom.

Data coding and analysis

In order to ensure the validity of the data by triangulation and to eliminate the variable "group" as a confounding one, journal entries were collected from three different cohorts. Similarly, to avoid data contamination, participants were not informed of this research project until long after the course was completed. Permission for using journal entries was requested at least one year after the course was completed. Of the 26 GTAs who wrote reflective journals during those three academic years, fifteen of them volunteered their journals to be analyzed as data for this study. Further measures were taken to avoid any gender, age, previous experience or language bias: a research assistant (RA) copied the journals into anonymous electronic files and categorized them into three different groups, according to the semester in which they were produced. Then, the RA randomly selected five journals from each group and passed them to the researcher.

The data were evaluated by means of content analysis, a qualitative method that involves three stages: 1) identification, 2) coding, and 3) categorizing themes or patterns (Patton, 2002).

The fifteen journals contained a total of 177 entries and 37,852 words. The average length of an entry was 21 lines, ranging from as short as three lines to as long as two pages. After primary analysis, recurrent themes were identified. If a theme was mentioned by two thirds of the writers, it was considered relevant, and was subsequently included in the analysis. The RA was also asked to identify recurrent themes, which were compared and contrasted with the ones identified by the researcher. Then, the tabulation of frequency was conducted for the identified recurrent themes. After establishing the common themes, the levels of reflectivity were analyzed, for which Lee's (2005) categorization was used. The procedure was to place each entry into one of the categories (Recall level R1, Rationalization level R2, or Reflectivity level R3) and to determine whether there were any entries that could correspond to more than one category. Categorization produced by the RA and the researcher were compared and contrasted until achieving consensus. After that, simple frequency calculations were conducted to establish which level of reflection was more prevalent.

Results and discussion

The content analysis approach allowed for the identification of nine common concerns and recognition of reflectivity dimensions.

"Methodology" was the broadest category since it encompassed entries related to: 1) material read in the methodology class; 2) discussions that happened in the methodology class and that the GTAs reflected upon or connected to their teaching; 3) methods that the GTAs tried to implement in their own classroom; 4) activities implemented in class; 5) reflections about outcomes of activities implemented in class.

"Classroom management" included remarks regarding GTAs' ability (or lack thereof) to navigate classrooms duties such as: 1) creating student-centered vs. teacher-centered class; 2) maintaining discipline and respect towards instructor and peers; 3) motivating students.

"Satisfaction" comprised notes related to different degrees of satisfaction with various aspects of the writers' life as a graduate student or as a graduate teaching assistant, including: 1) feelings of joy, happiness, etc. concerning student performance and progress; 2) support offered by peers or supervisors; 3) own progress in the teaching profession.

"Frustrations with students" was mainly populated by general expressions of frustration, disappointment, and discontent or complaints related to students' behavior in or out of the classroom.

"Owning the class and instructor persona" refers to comments related to the development of the teacher persona, and included concerns related to: 1) graduate student-graduate teaching assistant dichotomy; 2) having or lacking authority; 3) having or lacking preparedness; 4) having or lacking self-confidence.

"Observation" included instances in which the writer commented on either observing a peer or being observed by a peer or a supervisor, as well as reactions specifically derived from observations.

"Grading" included comments concerning aspects such as: 1) difficulties with calculating grades; 2) frustrations with the length of the grading process; 3) student complaints about grading fairness or effectiveness.

"Time management" was related to the ability or lack thereof to manage time within the busy and demanding schedule of a graduate student who also has a teaching appointment. Time management in the classroom is included in the theme "classroom management".

“Notes to self” covered remarks that included statements such as: 1) I ought to try [...]; 2) I should implement [...] in the near future/next class/next week/soon; 3) brief self advice of the type: a) don’t panic!, b) I need to rest/study/catch up/be patient/etc.

Results indicate that GTAs were most concerned about methodological issues (N=78, 25%), followed by matters of classroom management (N=52; 17%). Satisfaction (N=43, 14%) and frustrations with students (N=41, 13%) were very close, followed by affirmation or lack thereof of classroom ownership and teaching persona. Frequency of the nine themes is presented in Table 1.

Table 1

Frequency of Common Themes

	<i>N</i>	<i>%</i>
Methodology	78	25
Classroom Management	52	17
Satisfaction	43	14
Frustrations with students	41	13
Owning the class	33	10
Notes to self	22	7
Observation	21	7
Grading	18	6
Time management	7	2
<i>Total</i>	315	100

As shown in the entries analyzed, through the completion of reflective journals, first year GTAs were able to reflect of their own learning processes, shortcomings, and experiences both as instructors and graduate students. Most were able to develop plan of actions, whether with long-term goals or day-to-day strategies.

As shown in the entries analyzed, through the completion of reflective journals, first-year GTAs were able to reflect on their own learning process, professional responsibilities, shortcomings, and experiences both as instructors and graduate students. Moreover, as in Genc (2012), participants showed signs of improvement and change.

The first research question aimed to investigate whether there were common concerns among GTAs. What follows is a more detailed discussion of the two most frequent themes: Methodology and Classroom management.

As expected, methodological issues took priority over other themes. Given that writing reflective journals was assigned in a foreign language methodology class, it was predictable that GTAs would make remarks about techniques and activities implemented in their classrooms. Moreover, as novice language instructors, it was foreseeable that one important goal was for them to find out where they stood with regards to theories of second language acquisition and current methods and approaches.

Within the theme “Methodology”, many subthemes were identified, for example, self-criticism and self-awareness concerning the effectiveness of activities and techniques²:

What to do when an activity does not turn out well? I feel I put forth a lot of effort and I didn't accomplish much. Why is it that certain activities work out well and some fail? Is there a problem in the activity or is it something else? How can I avoid this to happen in other activities? But this day, as many other bad days, shall pass; and there is always a new day full of possibilities and opportunities for improvement.

I think I have gotten better. I keep learning how to do cooler and more interesting PowerPoints. I have also created a few good activities. Moreover, every day I try to see the PowerPoints of the other GTAs to look for ideas and to offer my advice.

In addition to comments about activities and teaching styles, these observations were often times connected to recalling certain discussions that had taken place in the Methodology class. GTAs were frequently able to make connections between these discussions and designing resources to implement new strategies in their own classes. The instructional decisions made by GTAs generated reactions in the students, which consequently triggered more reflection.

Yesterday in 540 [reference to Methodology class], we talked about the importance of varying activities, and the order in which the material is presented. My fellow GTAs and I concluded that we have to change the order in our lesson plans. [the professor] talked about the need for not being predictable to capture students' attention. I kept thinking about it, maybe my students are not motivated because I always do the same thing and follow the same steps. Maybe just changing the typical lesson plan organization will change the pace. I am going to try.

The last change I introduced was to remove vocabulary lists. For this, both the methodology class and our weekly workshop have contributed a great deal. They have helped me identify the classroom as the place to practice my new skills. My students immediately complained because what they want is vocabulary lists and to memorize everything. I often get upset if they complain, but I am now beginning to see that complaints are unavoidable and that everything is going in the right direction.

When thinking about methodological issues, some GTAs made connections between a specific reading and decisions made while planning lessons. Even when the entries included misconceptions or the GTAs' understanding of a given theory was not quite accurate, they represented, nonetheless, an attempt towards reflection.

I realize my teaching today was to a large extent informed by Lee & VanPatten's Making communicative language teaching happen. After reading the chapter I

² No substantial modifications have been made to the excerpts. Names have been eliminated, as well as specific references to classes and professors. If an entry was written originally in Spanish, it was translated by the researcher and proofread by the RA.

realized that, as a language instructor, I've been a culprit in my effort to implement the so-called communicative approach in my classroom. I therefore decided to try something new today. Students in pairs and in groups of 4 or 5 will do most of the activities in the form of a contest while I give guidelines. The outcome? 100% participation. I then realize, teaching a foreign language can really be fun not only for the students but also for the instructor.

I now think more about theories and methods, I reflect more on my use of input. How can I make it more "direct"? Is it comprehensible? A student told me that sometimes she does not understand what I say. If she does not understand, how will she develop her "interlanguage"? If a student does not understand, how many more feel the same way and don't say anything?

The second most frequent theme was that of Classroom Management. Many of the remarks made were related to discipline, motivation, and student engagement. The GTAs were faced with the reality of students' disinterest and lack of motivation, or even disrespect, and had difficulties understanding the reasons why students behaved that way. This led them to question their own teaching styles, themselves as people, their ability to manage a group, etc.

I notice how most of my students get involved in collaborative activities and appear very enthusiastic, but there is always a small group that does not want to work with classmates. Whenever they are required to interact those students try to hide and start doing something to avoid getting involved. If I tell them to interact, they do it, but I have to be constantly pushing and their attitude concerns me.

Last week I was worried about discipline, this week I am worried about motivation. I feel that I am not a fun person, and I have a hard time talking to others. I'd like to think that when I am teaching I behave differently but my demons still chase after me. Time will tell! At least I can already make eye contact and call them by their names. My new goal is having them feeling something other than boredom.

On the one hand, the attitude displayed by the students was useful in that it triggered these thoughts and encouraged the GTAs to evaluate, re-evaluate and push for change. On the other hand, it caused a great deal of frustration (another of the recurrent themes) and could have had a "backfire" effect. It appears that the GTAs may have been questioning or second-guessing themselves too extremely. While self-evaluation is positive as it can foster change and improvement, too much self-questioning and self-criticism can be detrimental since it can hinder the professional development process by instilling a sense of failure or lowering self-confidence. The development of skills such as using "teacher talk", time and space management, maintaining self-confidence, and creating of a positive learning atmosphere was noted by many:

Last week in class [in reference to the Methodology class] we talked about "teacher talk" and I am certainly concerned about this. I think I speak very slowly, that I use cognates and I form syntactically simple sentences, even if they do not sound 100% accurate, because I know they will understand it better that

way. However, there are still many faces showing confusion and at this point I don't think that many students should be confused. I don't know if the problem is mine, maybe I think I am simplifying my input but in actuality I am not doing it. In any case, this is one of the things I have to improve.

As usual, classroom time management has been a bit of a problem. I finished 10 minutes before the hour. Luckily (as almost always) I had an extra activity. The issue is that the last 10 minutes of class seem to be torture, but today they were truly awake and they did not complain about the activity and worked very productively.

I am getting to know my students a little better and I feel this is helping the classroom atmosphere. Some days, especially at the beginning of class they are very quiet (like it's almost awkwardly quiet). So I am employing a few different strategies.

The GTAs revisited the concept of teacher-centered versus student-centered classes in their journals. Many of the challenges and concerns they faced were related to designing a student-centered class.

The review day was too boring and teacher-centered and I had to include so much information that time flew. The best day of the week was Wednesday, I had good activities and the students participated a lot. I can already see who are the students that don't want to get involved or the ones that do just because they have to, apart from those who truly want to learn (the latter group is, of course, very small). I think everything is getting better, but there is still much more room for improvement.

I feel a lot more comfortable in class now that we have spent a few days together and I brought new batteries for the clicker, so I can walk around the classroom, something that I really like. I can't stand being in the same place.

With regards to the second research question, findings show that many of the GTAs were able to produce entries with different degrees of reflection. Even though 46% of the entries were categorized as Recall level (R1), the remaining 29% were Rationalization level (R2) and 10% Reflectivity level (R3). In addition, although not so frequent, some entries were also found to fall under more than one category. Frequency of reflectivity levels is presented in Table 2 below.

Showing an incipient level of reflectivity has been interpreted as a sign of lacking the necessary preparation for critical reflection (Kaur & Kaur, 2010; Mariko, 2011; Maarof, 2007); therefore, guiding questions or scaffolding of some sort has been recommended (Mariko, 2011; Maarof, 2007, Yost et al. 2000; Zeki, 2012). Yost et al. (2000) maintain that reflective writing, especially amongst novice or pre-service teachers, can only be developed if we guarantee “supervised practical experiences” and writers prove to have “a personally meaningful knowledge based in pedagogy, theories of learning, as well as social, political, and historical foundation to which they can connect their experiences” (47).

Results show that GTAs were able to engage in reflection and that guiding questions are not essential to achieve deeper levels of reflectivity since almost half of the entries were categorized as R2 (Rationalization level) or R3 (Reflectivity level) or a combination of two levels of reflection: R1+R2 (8%) and R2+R3 (7%).

Table 2

Frequency of Reflectivity Levels

	<i>N</i>	%
First level of Reflectivity (R1)	85	46
Second level of Reflectivity (R2)	53	29
Third Level of Reflectivity (R3)	19	10
First and Second Level Combined (R1+R2)	14	8
Second and Third Level Combined (R2+R3)	12	7
Total	179	100

R2 level entries (29%) display the writer's ability to interpret situations and to connect experiences that could seem fragmented at first. This allows the writer to establish generalizations and, consequently, guiding principles for improving their instructional techniques. For example:

I realized that I am becoming too structured when it comes to lesson planning. I noticed I don't like the days in which the structure of the class HAS to be different, like review days. I find it hard to plan in a flexible way, without hindering the quality and usefulness of the class. I like teaching. It is hard to manage time and to find out how many minutes to devote to each part. There are days in which nothing works out and I just want to sleep, rest, and forget about everything. Sometimes I wonder whether I am doing a good job. Whether I am fulfilling my responsibilities and what is expected of me. I try to determine whom I work for: do I need to feel accepted? Do I work for myself? Do I work for improvement? Everything I study, I learn, I know, benefits myself first. I can share it afterwards. Maybe what I need to do is: 1) do things without expecting a reward or an approval from others; 2) Focus, be disciplined.

Moreover, 10% of the entries were classified as Reflectivity level (R3), considered the highest degree of reflection a journal writer can achieve. These entries include comments about a particular goal and provide an in-depth analysis of a given experience from various standpoints.

The arguments and controversies about finding the "perfect approach" to second language acquisition is not surprising. Human language, as we all know, is as complex as human nature itself. In teaching a second language therefore, one needs to be well-informed about the various methodologies, be it skill or process-oriented. Thanks to 540 [in reference to the Methodology class] and writing these journal entries I have been able to realize the importance of a solid theoretical

background. It has become obvious that a good base of grammatical input is as vital as the communicative and the encouraging environment that is provided in the classroom. There should be a constant stream of “pushed output” activities, which serves as catalysts for high intake thereby facilitating proficiency. Teaching, I will say, is an art hence every individual instructor should be encouraged to adhere to their unique set of principles within prescribed guidelines. I am finding my way. The support from [The professor] and my fellow TAs has a great impact, I feel they are a big part of my improvement. I challenge myself with the creation of tasks and try to give the students ample opportunities for interaction. I see a great difference between the ideas I am given now through our class discussions and readings, and the ideas I was given while I was teaching high school. I was very used to drills and memorization, today I understand why interaction is fundamental.

The R1 level entries (49%) also imply a degree of reflection. Although the most salient aspect of this level is the description of experiences and the interpretation is only based on these experiences, this type of entry still constitutes the first step towards deeper levels of reflection.

Today I started my fifth week. I explained the crisis in Spain, to raise awareness. I also explained possessives and I don't think I did a good job. Until now, I never realized how hard it is to explain my own language. I think I am overall doing fine. Last week I gave 26 oral exams. They did fairly well.

Many entries that appeared to be mere anecdotal descriptions, also referred to readings, teaching moments, or incidents with students, which shows that even when merely narrating or recalling, GTAs are still able to establish incipient connections and interpretations. One can speculate that the act of recalling and interpreting given situations, even when the interpretation can only be accomplished through one's own experiences and not through alternative explanations (Lee, 2005) is a valid method for self-exploration. If an answer cannot be found, proposing a question and the fact that a given situation triggered that particular question, holds a reflective value. According to Lee (2005), high levels of reflection can be achieved also when referring to practical issues, if the interpretation of such issues involves deep analysis and suggestions for improvement. This was frequently the case in the entries categorized as R1 in which practical issues were discussed. GTAs were able to provide interpretations or answers to their questions based on their own experiences and to self-provide ideas for new directions and self-improvement.

Further research could compare the effects of variables such as peer scaffolding, supervisor scaffolding, and professional background in order to determine a more precise impact of journaling on the development of reflectivity. Moreover, most studies of the effects of reflective journals have been conducted with a group of teachers or GTAs being trained for the same field; future research could compare GTAs in different fields to determine whether the recurrent concerns are shared, not only within but also among various academic disciplines. Lastly, the advantage of implementing reflective journaling with GTAs extends beyond a mere class assignment. The GTAs themselves considered journaling an effective tool as it helped GTAs enhance their practice. Many participants, without being prompted to do so, commented on the journal assignment:

I believe that everything that I wrote here is part of a process that goes beyond specific reflection concerning material read. I believe the main goal of the journal is to help us see our training process and development: our doubts, our frustration, our small victories.

I can't believe I am writing my last entry. Reading back I realize how much confidence I have gained and I enjoyed remembering some of my opinions and realizing how much my perspective has changed. My entries evolved from just commenting about what we did in 540 [in reference to the Methodology class] towards issues that concerned me or made me happy about my class, and "my kids". I have learned a lot about theories, methods and I have found the class and this assignment [journal writing] super productive. I am overall satisfied with my work and about becoming an instructor.

GTAs identified reflective journaling as a practice that can promote their integral growth through instilling in them the importance of being reflective practitioners.

I think this has been a learning process for everybody. I hope my students learned, and I know I have learned a lot from them. I also learned a lot about theories of second language acquisition and that helped me think what I do, what I do right, and what I need to do better. I also think that all of us have learned from our fellow GTAs and we have worked collaboratively. The "journal days" were a good way to know everybody shared the same concerns. All of them have been to me a great support system, if not a second family. Writing this journal helped me put all of these pieces together and realize how important all of this was.

I taught high school for 5 years before starting this program, I thought my training was sufficient, and my high school students always thanked me for my teaching skills. Writing this journal opened my eyes. I now realize how important it is to constantly evaluate myself. This has been a great way to "look at myself in the mirror". I feel I am now an improved version. I must confess I was a bit skeptical about the usefulness of this assignment, but after completing it, I decided that I will always keep a journal, this has helped me tremendously!

Conclusion and implications

This study investigated the effects of implementing reflective journaling as a way to enhance the opportunities for training and professional development of GTAs. It particularly focused on discerning common concerns discussed in reflective journals originally written as an assignment for a foreign language methodology class by first-year Master's students teaching elementary Spanish. In addition, it determined different levels of reflectivity achieved in the journal entries.

Through content analysis of the data, it was possible to establish recurrent themes. The findings indicate that even though GTAs commented on a fairly wide variety of topics, mostly related to teaching and professional development, the most persistent concerns were those of

Methodology and Classroom Management.

One aspect of this study's results was particularly significant and differed from previous research (Mariko, 2011; Maarof, 2007, Yost et al. 2000; Zeki, 2012) GTAs displayed the ability to achieve high levels of reflection without having guiding questions or trigger topics, proven by the fact that a little over half of the entries were constituted by level R2, R3 or a combination of those. Findings also indicate that reflective journaling along with oral scaffolding was valued by the GTAs and contributed to interiorizing different methodologies and circumnavigating the difficulties of implementing these methodologies. It additionally provided an avenue to self-exploration, not only concerning the development of their teaching style but also, on occasion, related to issues of identity and personality.

The findings of this study and previous research have demonstrated that reflective journaling has an overall positive impact in the development of aspiring or novice teachers; however, less has been said concerning the advantages it presents to teacher educators. Along with Numrich (1996) and I. Lee (2008) this study suggest that the emphasis be placed not only on the benefits for pre-service or novice in-service teachers or GTAs but also on the possibility of considering journal entries as a tool for either needs analysis or evaluation of GTAs. It is then recommended that teacher educators (and the numerous titles this position can encompass in the case of GTAs trainers), value the virtues of critical reflection. Further research could explore whether GTA trainers can obtain information to better inform their decisions concerning the creation of new and more effective opportunities for GTA mentoring through the analysis of journal entries provided by their trainees.

This investigation contributed to advancing knowledge concerning the implementation of reflective journals during the initial stages of GTAs professional development. Results showed that by engaging in reflective journaling, first year GTAs were able to raise self-awareness concerning learning processes, shortcomings, and experiences both as instructors and graduate students.

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References

- Austin, A. (2002). Preparing the Next Generation of Faculty: Graduate School as Socialization. *The Journal of Higher Education*, 73(1), 94-122. doi: 10.1353/jhe.2002.0001
- Boyd, J., & Boyd, S. (2005). Reflect and Improve. Instructional Development Through Teaching Journal. *College Teaching*, 53(3), 110-114. doi: 10.3200/CTCH.53.3.110-114
- Genc, Z. (2010). Teacher Autonomy Through Reflective Journals Among Teachers of English as a Foreign Language in Turkey. *Teacher Development*, 14(3), 397-409. doi: 10.1080/13664530.2010.504028

Kaur, Sidhu, G. & Kaur, S. (2010). Pathways to Reflective Learning and Teacher Development: Insights from Teacher Trainees' Diaries. *Malaysian Journal of Education*, 35(1), 47-57.

Hardré, P. (2005). Instructional Design as a Professional Development Tool-of-Choice For Graduate Teaching Assistants. *Innovative Higher Education*, 30(3), 163-169. doi: 10.1007/s10755-005-6301-8

Hatton, N., & Smith, D. (1995). Reflection in Teacher Education: Towards Definition and Implementation. *Teaching and Teacher Education*, 11(1), 33-49.

Lai, G., & Calandra, B. (2007). Using Online Scaffolds to Enhance Preservice Teachers' Reflective Journal Writing: A Qualitative Analysis. *International Journal of Technology in Teaching and Learning*, 3(3), 66-81.

Lee, H. (2005). Understanding and Assessing Preservice Teachers' Reflective Thinking. *Teaching and Teacher Education*, 21(6), 699-715. doi: 10.1016/j.tate.2005.05.007

Luo, J, Grady, M., & Bellows, L. (2001). Instructional Issues for Teaching Assistants. *Innovative Higher Education*, 25(3), 209-230. doi: 10.1023/A:1007603816555

Mariko, S. (2011). Student Teachers' Reflective Journals on Teaching Practice Experiences. *Contemporary PNG Studies*, 14, 67-83.

Maarof, N. (2007). Telling His or Her Story Through Reflective Journals. *International Education Journal*, 8(1), 205-220.

Numrich, C. (1996). On Becoming a Language teacher: Insights from Diary Studies. *TESOL Quarterly*, 30(1), 131-153. doi: 10.2307/3587610

Pedro, J. Y. (2005). Reflection in Teacher Education: Exploring Pre-Service Teachers' Meaning of Reflective Practice. *Reflective Practice*, 6(1), 49-66. doi: 10.1080/1462394042000326860

Pultorak, E. G. (1996). Following the Developmental Process of Reflection in Novice Teachers: Three Years of Investigation. *Journal of Teacher Education*, 47(4), 283-291. doi: 10.1177/0022487196474006

Yost, D. S., Sentner, S. M., & Forlenza-Bailey, A. (2000). An Examination of the Construct of Critical Reflection: Implications for Teacher Education Programming in the 21st Century. *Journal of Teacher Education*, 51(1), 39-49. doi: 10.1177/002248710005100105

VanValkenburg, J. & Arnett. C. (2000). The Professionalization of Teaching Assistants: Can it be Accomplished?. *Die Unterrichtspraxis*, 33, 7-13. doi: 10.2307/3531057

Wise, A. (2011). Supporting Future Faculty in Developing Their Teaching Practices: an Exploration of Communication Networks Among Graduate Teaching Assistants. *International Journal of Teaching and Learning in Higher Education*, 23(2), 135-149.

Zeki, C. (2012). The Importance of Guiding Questions in Reflective Journaling. *Hacettepe University Journal of Higher Education*, 2, 282-292.

Assessing interdisciplinary learning and student activism in a Water issues course

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Abstract: In response to a request from a campus student organization, faculty from three fields came together to develop and teach an integrated interdisciplinary course on water issues and social activism. This course, “Water as Life, Death, and Power,” brought together issues from the fields of anthropology, biology and chemistry to explore water rights, access to clean water, and water treatment methods. Students enrolled in the course developed interdisciplinary projects related to a variety of local and global water issues to present real-world solutions at a university-wide student research showcase. This article reports the assessment outcomes of the course, measuring changes in both interdisciplinary learning and levels of student activism.

Keywords: Course design, interdisciplinary assessment, water issues, student activism.

Background

Universities Allied for Essential Medicines (UAEM) is a coalition of undergraduate, graduate and professional students at academic institutions worldwide dedicated to providing global access to affordable medicines. The student group at Central Michigan University (CMU) indicated that they are interested in undergraduate courses that combined interdisciplinary teaching with solving real world problems, combining theory with activism. Three CMU UAEM faculty advisors took up the challenge to develop such a course: Stephen Juris (Biology); Anja Mueller (Chemistry); and Cathy Willermet (Anthropology). We decided to develop a course that would bridge all three disciplines around a complex problem and encourage both interdisciplinary thinking and activism in our students.

Interdisciplinary Teaching and Learning

The students requested an interdisciplinary course as a result of their involvement with UAEM, personal and professional interests, and because they understood that the complex problems their generation will have to solve would require people from different disciplines to work together and come up with a complex solution. In addition to the advantages of interdisciplinary learning identified by the students, researchers (e.g., Begg and Vaughan, 2011;

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Barisonzi & Thorn, 2003; Eisen, Hall, Lee, & Zupko, 2009; Nissani, 1997) discuss the advantages of interdisciplinarity, which include the fact that often interesting research topics fall in-between fields, that interdisciplinarity may help with communication difficulties between disciplines, and that creativity and flexibility is enhanced by interdisciplinary knowledge.

To teach interdisciplinary subject matter, it is generally accepted that disciplinary grounding is required. That does not mean, though, that students have to be experts in the breadth of several disciplines, but rather that students understand concepts from several disciplines in depth so that they can use them together to develop something new (Mansilla & Duraingh, 2007; DeZure, 2010). Faculty also do not have to be experts in a breadth of several disciplines, but in this context, need to be open to examining and encouraging exploration of diverse ways of thinking in multiple disciplines.

The students also asked to include activism into an interdisciplinary course on real-world problems, which, in our context for the course, translated into problem-solving processes. There is a large body of literature that supports problem-based learning as an effective teaching tool (e.g. Nilson, 2010; Prince, 2004). In fact, some colleges and universities are now offering interdisciplinary, problem-based undergraduate degrees (Sternberg, 2008). Thus, we decided to incorporate problem-based, interdisciplinary group work into our course as a tool to teach the students the basics of effective activism.

Interdisciplinary Course Development

We first had to decide how we would integrate the three disciplines. Universities usually teach separately in disciplines, resulting in students that are not exposed to interdisciplinary thinking. Therefore, we decided to model interdisciplinary thinking in the way we taught the lectures. The three faculty (Juris, Mueller, and Willermet) taught each lecture together and modeled interdisciplinary thinking by discussing each topic from all three points of views, then synthesizing the lecture, often in an interactive discussion with the students. (For specific details about course development, please see Willermet et al., 2013).

Utilizing a “point-of-the-day” strategy, we developed the lecture content and facilitated the lectures. This “point-of-the-day” strategy served to focus content on only the necessary facts and helped to scaffold content information into a continuous, interrelated story that aligned with the student learning objectives instead of a collection of facts. Also, by developing the content together as well as teaching it together, we were able to look at each concept that we had agreed on as important from all disciplinary viewpoints and discuss the integration in class, modeling it for the students as they were learning the concepts. Thus, we taught them how to integrate knowledge in an interdisciplinary manner (Haynes, n.d.). In brief, as one example, when we talked about how humans impact water quality and availability, we discussed the nitrogen cycle and fertilizer as a water pollutant (Chemistry), algae blooms (Biology), and aquifer depletion as an effect of human water use that affects water access (Anthropology). We asked the students what additional effects humans could have on water access and quality, eventually adding to the discussion additional examples we had prepared in advance.

Equally important, we added a seminar portion to the class, which included group work and interdisciplinary problem solving, allowing the students to practice working in a group and implementing and integrating interdisciplinary understanding to develop an activism strategy.

Interdisciplinary Course Goals and Objectives

Student learning outcomes (SLO) are sometimes challenging to assess effectively in an interdisciplinary freshmen course; for students to gain truly interdisciplinary understanding to a point that they can apply it to solve an interdisciplinary problem in a group setting, they have to first gain several skills, such as working in a group, and then synthesize and combine information from different disciplines. Since this class is designed for freshmen/sophomores, it has to be assumed that these skills need to be taught during the class as well. Thus, assignments and grading rubrics needed to consider how students will demonstrate their attainment of the SLOs related to interdisciplinary understanding in not only the final product, but the various steps that lead to this outcome.

In addition to the SLO focused on water issues, we identified two additional overarching goals for the course: 1) developing interdisciplinary thinking rather than focusing specifically on content; and 2) encouraging students to engage in actively solving current, real-world problems in an interdisciplinary way. (See the Master Course Syllabus, Appendix 1). We considered collaborative learning to be an essential goal to allow students to see how real-world complex problems can be solved in real-life.

We hypothesized that: 1) students would increase their knowledge about water and water-related issues, such as water chemistry, water-borne pathogens, and global access to clean water; 2) students would increase their desired level of social activism; and 3) students would increase their interdisciplinary thinking. These hypotheses guided our assessment efforts, as described below.

Research Design and Methods

Our research design included two separate assessment strategies: a pre-post survey to address hypotheses one and two, and an interdisciplinary project to address hypothesis three.

We obtained Internal Review Board (IRB) approval (CMU 377609-2) to collect student data assessing whether students increased their competency in interdisciplinary thinking, as well as increased their knowledge of activism and human rights. The Internal Review Board approval extended to administration of a pre- and post-course survey and application of a rubric to specific group-assigned course activities to assess interdisciplinary thinking. On the first day of class, we invited interested students to join us in a research study that would help assess how well they learned about water issues, their level of activism, and degree of interdisciplinary thinking. Students received a manila envelope that contained two copies of the consent form, a bubble-sheet response form, and two surveys, the research survey and a similar-looking alternate survey. If students wished to participate, they signed a consent form and completed the research survey; if not, they completed the alternate. Both surveys and bubble sheet were returned to the envelope. One author, Eron Drake, acted as the project's "honest broker." She assigned each student a randomly generated three-digit code and kept the key of student names and keys in a secure, locked location. The instructional team does not know which students participated in the study; students received the same number of points for completing either survey.

There were 29 students that registered and completed the course. Of the 29 students registered for the course that ultimately completed the course, 12 were male and 17 were female. These students registered for the course in one of three disciplines (anthropology, biology, and chemistry); 15 students registered under the anthropology designator, 13 students registered

under the biology designator, and 1 registered under the chemistry designator. Twenty-eight students completed the pre- and post-test associated with the research project.

Interdisciplinary thinking can be difficult to assess through objective means such as multiple-choice exams. Rather, interdisciplinary thinking can be better assessed through projects, essays, and discussion. To that end, we assigned a semester-long group project for which students chose a water-related problem and developed an interdisciplinary solution and a strategy for implementation. The proposed solution had to include perspectives from anthropology, biology, and chemistry. We decided to break up the interdisciplinary project development process into several steps; we needed to start groups out with a solid, disciplinary foundation for their project, before we could start them on the steps to integrate that information by bridging the concepts, integrating them into a complex discussion and finally into an interdisciplinary solution to the problem (Mansilla & Duraisingh, 2007). In this manner, the students could practice and improve their interdisciplinary understanding and implementation strategy.

We started with a group contract, to make sure that all students understood their role in the group and could solve problems within the groups more easily. One of the authors (Eron Drake) prepared the students for group work and group contract by presenting them with information about group formation, group roles, and group expectations, and giving them examples for group contracts. Students next completed a problem statement so that the groups had to decide early what exactly to work on. This problem statement needed to include how the three disciplines would be part of the solution. Students were also taught how to search for materials for their project in the library. The material was mostly disciplinary and part of the disciplinary grounding for the project.

Groups were then asked to complete a concept map to develop the connections between the different fields in relationship to their specific problem solution. Building this concept map allowed the students to bridge the different concepts into a first step towards interdisciplinary understanding. The next step was a short, persuasive pitch and an abstract to make sure the groups stayed focused and provide them a means to practice how to present their work. The final project was a poster presentation of their final complex solution strategy for a complex water problem at a campus-wide event. The final project included an interdisciplinary discussion of the problem, as well as the integrative solution the students came up with. At the same time students had to present and pitch their solution to the “general public” as any activist would have to do. We met with the groups at each stage to give them maximum feedback and opportunity for questions.

We were concerned that a heightened interest in assessing interdisciplinarity would bias us to see it more often than students were in fact presenting it. To reduce this bias, we employed a grading rubric for any assignments that required subjective assessment (see below and Appendix 2). The assessment of the group projects for interdisciplinary understanding was developed according to the steps in student learning (Mansilla & Duraisingh, 2007). The first step in this process is to have an effectively presented disciplinary argument (Disciplinary Grounding). To assess disciplinary grounding, we modified our assessment using the Universal Intellectual Standard developed by Drs. Paul and Elder from the Center for Critical Thinking (Elder & Paul, 2013). When we graded the interdisciplinary assignments, each faculty evaluated students for this section based on their discipline. We based the interdisciplinary part of the rubric on Mansilla and Duraisingh’s snapshots of interdisciplinary integration (Mansilla & Duraisingh, 2007). We used integrative summary, conceptual bridging, and complex explanation as the three consecutive steps of interdisciplinary understanding in our rubric.

The group project in this class asked specifically for a solution of a water-related problem. Therefore we needed an additional part for our rubric assessing the pragmatic solution the students proposed. We based the evaluation on Six Sigma, which was invented by a Motorola researcher and is used in industrial project evaluations (Motorola University, 1994). Our guest lecturer, Keith Helferich, presented the basis of Six Sigma to our students as several steps that have to be completed for a successful project: Define (plan), measure (do), analyze (review performance, identify opportunities, root causes, and effects), improve (prioritize actions to enhance performance), and control (implement and establish future assessment program). We wrote the solution assessment on these five steps. The full rubric can be found in Appendix 2.

As mentioned above, students would have to learn all of the steps outlined in the Interdisciplinary Assessment Rubric (Appendix 2) during the class, which takes careful planning and the allotment of time-on-task to enhance student learning. Instruction must be scaffolded to allow for students to develop and practice higher-level cognitive skills associated with interdisciplinary learning. Therefore, we decided to use the rubric in the evaluation of many of the project assignments, but we weighed the three parts (disciplinary grounding, interdisciplinary reasoning, and pragmatic solution) differently throughout the semester. We first weighed disciplinary grounding more heavily than interdisciplinary reasoning, next weighed them equally, and at the end weighed disciplinary grounding least and the pragmatic solution most. Using this redistribution of weighting, we accounted for the increasing interdisciplinary understanding throughout this course.

Two specific assignments provided an excellent opportunity to evaluate student gains in interdisciplinary thinking. The first was the concept map that each group drew at the beginning of their project, to describe how the disciplines would interact in their proposed research. The second was the final presentation that described their problem and proposed solution. We assessed the interdisciplinary understanding at these two stages of their group projects using our interdisciplinary rubric. All instructors of the course separately utilized this rubric to grade every assignment. We then averaged the grades over all instructors to finalize the assignment grade. When disciplinary grounding needed to be established, each of the instructors with expertise in the questioned disciplinary grounding provided guidance on grading criteria.

Goal 1: Increased Knowledge of Water-Related Issues

The student pre-post survey contained questions designed to measure overall student factual knowledge of water-related issues. Students were asked nine questions to assess their overall knowledge of water-related material. The source of the questions was the course textbook. We used the textbook mostly as a reference, with content provided from the lecture materials and supplemental readings. Therefore these questions were not a direct measure of specific fact retention.

To analyze whether factual answers improved over the semester, data were analyzed statistically in R (version 3.0.1) (R, 2013) using a generalized linear model with a binomial error distribution. Calculated probability values were deemed significant with $\alpha = 0.05$ using a sequential Bonferroni adjustment for each question.

Goal 2: Increased Student Interest in Social Activism

The student pre-post survey also contained questions designed to measure a change in student familiarity with water-related issues and their interest in activism. This evaluation included questions about the student's awareness of water issues, to assess the student's personality, the student's interest in volunteering within the university, and about the civic engagement and social awareness of the student.

These questions were posed on a five-point Likert scale. On questions with a Likert scale, increasing values might mean a decrease or increase of improvement, depending how the question was asked. For the statistical analysis, all Likert scales were adjusted so that increasing values meant improvement. Student responses were categorized into three different groups, students who agreed with a statement (i.e. answered 4 or 5 on the Likert scale), students who disagreed with a statement (i.e. answered 1 or 2 on the Likert scale), or students who were neutral about a statement (i.e. answered 3 on the Likert scale). Student responses were paired pre-post, and changes in student opinion in a positive (disagree/neutral stance pre-test to agree stance post-test) or negative (agree stance pre-test to disagree/neutral stance post-test) were analyzed using a McNemar's test and calculating chi-squared. A p-value was obtained using one degree of freedom, and a value of $p < 0.05$ was interpreted as a significant change comparing pre- and post-test data.

Goal 3: Increased Interdisciplinary Thinking

To measure if the interdisciplinary reasoning of the students increased from an earlier assignment (concept map) to the final assignment (poster presentation), we compared student performance on the interdisciplinary sections of the rubric as applied to these two assignments (See Appendix 2). For each of the assignments, assigned points and weights differed due to the nature of the individual assignment. For example, points were given for staying within a 3-minute time limit for the persuasive pitch; the final presentation included a self- and peer-assessment. We needed to remove the effects of these points on the assignment grade, to isolate points related to interdisciplinary understanding and problem solving. To exclude the effect of all other rubric sections and other points that were included in the grade, it was assumed that the students obtained full points for everything but the interdisciplinary section of the rubric. These points were averaged across all groups. We then compared the remaining points assigned exclusively for interdisciplinary reasoning. This technique should, if anything, underestimate the students' performance on interdisciplinary learning. Since the data were organized in this way, we did not perform a statistical analysis, but rather calculated the mean group performance on this measure between the two assignments.

Results and Discussion

The following discusses the results obtained in exploration of our hypotheses:

1) students would increase their knowledge about water and water-related issues, such as water chemistry, water-borne pathogens, and global access to clean water; 2) students would increase their desired level of social activism; and 3) students would increase their interdisciplinary thinking.

Goal 1: Increased Knowledge of Water-Related Issues

The data reported (Table 1) indicate that students gained a deeper overall knowledge of water-related material, although the overall increase is not significant and performance on three of the questions decreased. There was a statistically significant improvement on both the question connected to water required to make one calorie of food (21% increase in correct responses during post-test compared to the pre-test) and the question connected to which food type takes the most water to produce one kilogram of food (18% increase in correct responses during post-test compared to the pre-test). There was decline on questions related to water access, which saw a 7% decline in correct answers; however this decrease was not statistically significant.

Table 1

Student familiarity with material questions related to water (N=28)

	Pre-Test Correct Answer	Post-Test Correct Answer	% Change	p value
"Please answer the questions below with your best answer."				
How many people in the world do NOT have consistent access to drinking water?	17	15	-7%	0.31
How much water does it take to make one calorie of food?	7	13	21%	0.012*
How many calories of food per day are needed for an average 175-lb male to maintain his body's basic metabolic functions at rest?	4	6	7%	0.15
How much water does it take to produce one calorie of energy?	7	6	-4%	0.59
What percentage of water withdrawals is used for agriculture?	4	8	14%	0.041
The biggest threat to our global water supply is:	10	11	4%	0.64
The ratio of people who don't have water piped into their homes is:	18	16	-7%	0.37
In an average industrialized country, the average household uses what percentage of its water use to flush the toilet?	6	9	11%	0.10
Which food type takes the most water to produce one kilogram of food?	13	18	18%	0.015*

Note: * denotes significance at the p=0.05 level.

Goal 2: Increased Student Interest in Social Activism

The student pre-post survey contained questions designed to measure overall student interest in water-related issues and degree of student activism. Students were asked 48 questions to assess their agreement with statements connected to clean water access and degree of willingness to play a role in university and/or community activism. Questions were rated on a

five-point Likert scale, for which one indicates “strong disagreement” and five indicates “strong agreement”. Students were pooled into one of two categories depending on their answers to the questions – 1) students who answered 1-3 for a question (i.e. disagreed/neutral with the question), and 2) students who answered 4 or 5 for a question (i.e. agreed with the question). The data reported (Table 2) represent percent changes in each of these two categories when comparing pre-test and post-test answers, where a negative change was scored when a student answered 4 or 5 on the pre-test and 1-3 on the post-test, and a positive change was scored when a student answered 1-3 on the pre-test and 4 or 5 on the post-test. Results indicate that students gained a deeper appreciation and understanding of water-related issues. Of note was a statistically significant greater agreement with statements concerning the potential for a water crisis in America (39.3% increase in students agreeing post-test) and a statistically significant stronger agreement on the negative impact of bottled water on the world’s water supply (35.7% increase in students agreeing post-test). Furthermore, there was a statistically significant stronger agreement in students when asked whether social problems directly affect the quality of life in their community (32.1% increase in students agreeing post-test)

Interestingly, data collected indicate that students changed their potential for civic engagement, and this change seemed to be a refocusing of student energy away from university organizations towards community involvement. There was a trend in students disagreeing with questions asking about plans to become involved in university organizations (although not statistically significant) with a concurrent increase in the importance of civic engagement issues. However, this may be an inadvertent artifact of the question text, which asks, “During this term, to what degree do you intend to...” As a pre-term question, it asks the student what he/she might do in the near future. However, as a post-term question, students might answer in the negative either as the term is over and they don’t intend to do it in the next few days, or since they know they didn’t in fact do it this term. The wording of this question might not capture student intent in the future.

Every question concerning civic engagement issues showed an increase in agreement with the statements posed, with ten showing statistically significant increases: participating in a community action program (17.9% positive increase post-test, $p = 0.0253$); helping promote racial understanding (25% positive increase post-test, $p = 0.0082$); influencing social values (25% positive increase post-test, $p = 0.0082$); finding a career that directly benefits others (25% positive increase post-test, $p = 0.0082$); giving some income to those in need (28.6% positive increase post-test, $p = 0.0196$); becoming a community leader (25% positive increase post-test, $p = 0.0339$); working toward equal opportunity for all people (17.9% positive increase post-test, $p = 0.0253$); viewing social issues from multiple perspectives (25% positive increase post-test, $p = 0.0082$); developing a meaningful philosophy of life (25% positive increase post-test, $p = 0.0339$); and developing leadership abilities in others (25% positive increase post-test, $p = 0.0339$). There were correlative increases in other questions including participating in programs to help clean up the environment (25% positive increase post-test), serving the community (17.9% positive increase post-test) and participation in voting (28.6% positive increase post-test), although these increases were not statistically significant. It is interesting to speculate that a shift from focus on involvement in student organizations to involvement in community organizations may be due to a redefined student view on the ability to affect change within the community more directly depending on the organization with which they are involved.

Table 2

Student Familiarity with Clean Water Issues and Willingness to Participate in Social Activism (N=28)

"Please rate the level to which you agree (or disagree) with each of the following statements about water issues." (1 = strongly disagree, 5 = strongly agree)			
	% students with negative change	% students with positive change	p-value
Access to clean water is a problem all Americans face	10.7	17.9	0.4795
Access to clean water is something that only people in developing nations face	3.6	7.1	0.5637
We will face a water shortage in America in the next few decades	0	39.3	0.0009*
Irrigation systems are generally water wasters	10.7	21.4	0.3173
Drinking commercially bottled water contributes to global water shortages	7.1	35.7	0.0209*
We are losing lots of available water due to climate change	17.9	17.9	1
Cholera is a disease that people get when they don't keep themselves clean	7.1	7.1	1
	% students with negative change	% students with positive change	p-value
Participate in a student organization	10.7	3.6	0.3173
Hold a leadership position in a college/university student organization	7.1	7.1	1
Participate in class discussions	21.4	7.1	0.1573
Investigate current events topics of personal interest	17.9	10.7	0.4795
Volunteer my time to an organization or cause I care about	25	17.9	0.5637
	% students with negative change	% students with positive change	p-value
I believe that every citizen has a responsibility to serve the community	21.4	10.7	0.3173
I am concerned about local community issues	14.3	17.9	0.7389
I am concerned with the rights and welfare of others	7.1	17.9	0.2568
I am interested in knowing and working with people from diverse backgrounds	14.3	7.1	0.4142
I believe that cultural diversity within a group makes the group more interesting and/or effective	0	10.7	0.0833

I feel that social problems directly affect the quality of life in my own community	0	32.1	0.0027*
I see myself as a member of a larger social fabric	10.7	14.3	0.7055
I have a responsibility to serve my community	21.4	10.7	0.3173
I feel that I can make a difference in my local community	7.1	14.3	0.4142
I feel that I can make a difference in the world	14.3	21.4	0.5271
I view myself as an active citizen	7.1	21.4	0.1573
I am concerned about global community issues	14.3	21.4	0.5271
	% students with negative change	% students with positive change	p-value
Participating in a community action program	0	17.9	0.0253*
Helping others who are in difficulty	7.1	21.4	0.1573
Helping promote racial understanding	0	25	0.0082*
Becoming involved in programs to help clean up the environment	7.1	25	0.0956
Influencing social values	0	25	0.0082*
Influencing the political structure	10.7	21.4	0.3173
Serving the community	3.6	17.9	0.1025
Finding a career that directly benefits others	0	25	0.0082*
Giving some of my income to help those in need	3.6	28.6	0.0196*
Becoming a community leader	3.6	25	0.0339*
Keeping up to date with political affairs	10.7	17.9	0.4795
Working toward equal opportunity for all people	0	17.9	0.0253*
Viewing social issues from multiple perspectives	0	25	0.0082*
Promoting social justice	7.1	21.4	0.1573
Developing a meaningful philosophy of life	3.6	25	0.0339*
Developing leadership abilities in others	3.6	25	0.0339*
Participating in civic duties such as voting	10.7	28.6	0.1317

Note: * denotes significance at the p=0.05 level.

The increased dedication of students becoming involved in a community issue was apparent based on the dedication students had of their group projects that they developed throughout the semester (connected to Goal 3 below). Several groups continued to seek outcomes of their projects after the semester had ended and had developed plans to further promote their project agenda through the formal submission of proposals or letters to their corresponding agencies/affected communities in order to affect change.

Goal 3: Increased Interdisciplinary Thinking

The students had free choice of which problem they wanted to solve as collaborative groups. The groups came up with a list of problems and solutions spanning issues at local, regional, and international levels:

- Development of a time-release version of an existing anti-worming drug for schistosomiasis in Uganda, along with educational call-and-response children's song on how to avoid getting sick;
- A plastic water bottle deposit campaign to promote recycling and tap water usage;
- Installation of composting toilets at CMU to reduce water consumption;
- Community education on hydrologic fracturing to understand water contamination;
- Modification of city green-lawn ordinances to reduce local water contamination through chemical runoff;
- Analysis of strategies to connect Iowa farmers to government programs to promote bioswale buffer zones along the Mississippi River, to reduce downriver dead zones;
- Proposal to Mayoral Office in Copacabana, Bolivia to design totora reed beds that clean wastewater before it enters Lake Titicaca;
- Investigation of water disinfection techniques using solar UV radiation (SODIS) in plastic bottles in Uganda.

For the concept map, 32% of total points were available for interdisciplinary learning based on the rubric in Appendix 2. Students were graded on the concept maps based on development of their solution to a global problem and whether their solution contained the three disciplines associated with the course (anthropology, biology, chemistry) and was sustainable. For the final project, 45% of the points were assigned to interdisciplinary learning. The student groups' performance improved from an average of 40.1% of the total available points for interdisciplinary learning on the concept map to 71.6% of the total available points for the final project. The standard deviation decreased between the two assignments, from 22% to 11.8%, which suggests that student groups as a whole performed more consistently on their final projects. All groups but one experienced a large improvement in performance on the interdisciplinary rubric; the remaining group (Group 5) was the highest performing group, doing very well on both assignments.

Discussion

Besides teaching anthropological, biological, and chemical facts about water, there were two overarching goals for the course that we assessed: 1) developing interdisciplinary thinking rather than focusing specifically on content; and 2) encouraging students to engage in actively solving current, real-world problems in an interdisciplinary way. Real world-problem solving often occurs in groups, combining different strengths and backgrounds. We wanted to mimic that; at the same time, benefiting the learning of diverse students in collaborative assignments and projects is also recognized as a high impact practice (Kuh, 2008). We encouraged the students to reach out to NGOs and other community groups in the process; this community connection, as well as the service rendered with the project, is considered a high-impact teaching process as well.

As discussed above, the fact-based questions might not have been an accurate measure for students' content knowledge. Upon reflections, questions aligned with the content covered would better reflect content learning. The end-of-term Student Opinion Survey comments for each faculty did indicate that factual learning took place. Examples for the question "What are some specific things your instructor does that help you learn in this course?" are "Helped fill in knowledge for "non-chemists;" "Powerpoints – helped me learn Chemistry I had never understood before;" "There were always good examples and explanations on subjects covered for the Anthro portion of the class;" "Helped me understand biology that I had never learned before;" "For the non-bio student he explained things well so they were easy to understand."

Table 3

Comparison of Student Group Means for Interdisciplinary Learning Portion of Group Projects, as Percentage of Total Interdisciplinary Learning Points Possible (N=8)

	Concept Map*	Final Project**	% Change
Group 1	20.8%	69.8%	48.9%
Group 2	50.0%	73.4%	23.4%
Group 3	4.2%	45.0%	40.8%
Group 4	37.5%	81.8%	44.3%
Group 5	79.2%	70.2%	-8.9%
Group 6	37.5%	72.0%	34.5%
Group 7	50.0%	79.8%	29.8%
Group 8	41.7%	80.9%	39.2%
Mean percentage	40.1%	71.6%	31.5%
Standard deviation	22.0%	11.8%	

*Note: 32% of the total points for the concept map assignment aligned with interdisciplinary learning goals.

** Note: 45% of the total points for the final project assignment aligned with interdisciplinary learning goals.

On the students' social activism, the awareness about critical water problems increased significantly. Interestingly, the willingness to participate socially in the university decreased (although this may be an artifact of the question wording, as discussed above). On the other hand, becoming active in the community at large increased significantly; in fact, it was the largest change measured.

Interdisciplinary understanding was measured by a rubric for the group projects that assessed the three steps of interdisciplinary learning, disciplinary grounding, interdisciplinary bridging, and interdisciplinary problem solving. The students became proficient in the disciplinary information early, but it took most of the semester for them to become proficient in interdisciplinary bridging and problem solving. At the end we were able to show a significant increase in interdisciplinary learning.

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Appendices

Appendix 1: Master Course Syllabus

Central Michigan University
College of Science and Technology
Department of Biology

Master Course Syllabus

<u>BIO 250</u>	<u>Water as Life, Death, and Power</u>	<u>3 (2-2)</u> Credit
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I. Bulletin Description

Problems of water access, water-borne pathogens, water treatment, and power relationships in global cultures from anthropology, biology, and chemistry perspectives, via lecture and seminar. Cross-listed with ANT 250 and CHM 250. No credit on chemistry major or minor. No credit towards any Biology major or minor.

II. Prerequisites, Pre/Co-requisites, Co-requisites, Recommended

Recommended: ANT 171 or 170; BIO 101 or 110; CHM 111, 120, or 131.

III. Rationale for Course Level

This course will be taught in an interdisciplinary manner, and will include material from anthropology, chemistry, and biology. It will foster synthesis of information from all three disciplines in order to

evaluate issues and interventions related to water access rights, health issues, and water treatment, thus is designed for a more mature undergraduate student with little content background.

IV. Suggested Textbooks

The interdisciplinary nature of this course requires texts from several perspectives. Texts that will make up the readings include:

Black M, King J. 2009. The Atlas of Water. 2nd edition. Berkeley: University of California Press.

Fagan B. 2011. Elixir: A History of Water and Humankind. London: Bloomsbury Press.

Morris RD. 2007. The Blue Death: Disease, Disaster, and the Water We Drink. New York: HarperCollins Press.

American Chemical Society 2012. Chemistry in Context, 7th Edition. New York: McGraw Hill.

V. Other Requirements and/or Materials for the Course

Additional articles will be uploaded into Blackboard.

VI. Student Learning Course Objectives

Upon completion of the course, students will be able to:

1. examine water-related health disparities from multiple perspectives, such as water access, water-borne pathogens, water treatment, and power relationships;
2. describe the interrelationships of these different perspectives;
3. describe the life-cycle of cholera and its connection to human health;
4. describe behaviors that bring populations in contact with cholera, and provide regional examples from many global cultures;
5. compare and contrast political, economic, and technological access to water treatment methods from different global cultures;
6. summarize and analyze seminar readings related to water-related health disparities, and intervention case studies, from different global cultures;
7. define a plan to develop or improve a grassroots campaign to address water issues.

VII. Suggested Course Outline

Week	Lecture topic	Seminar topic
6.67%	Settlement patterns and water Food collection/production strategies and water A: Human food collection/production strategies and their relative water needs B: Biotic/abiotic factors affecting water cycle C: Water cycle, Carbon cycle	Introduction to group work
6.67%	Water chemistry A: How human activity can alter water chemistry B: Transport of molecules across membranes C: water properties, acid-base, pH, solubility, adsorption and ion exchange	Introduction to non-governmental organizations (NGOs)
6.67%	Human co-evolution with pathogens Waterborne diseases A: Pathogens common to settled v. foraging human groups B: Host-pathogen interaction/evolution C: dilution, adsorption	Evidence-gathering approaches to regional-specific diseases
6.67%	Cultural practices and interaction with water (food washing, bathing, food production, religious	Cultural awareness and sensitivity

	practices) Sanitation A: Cultural practices and water (food washing, bathing, food production, religious practices) B: Antibacterial compound activity C: surfactants, nutrients, fertilizers, pesticides	
6.67%	Pathogens in water A: Human-bacteria interface B: Importance of water in life C: Hydrophilicity/phobicity, adsorption in the body	Introduction to neglected tropical diseases
6.67%	Historical context of epidemics Epidemiology and the spread of diseases A: Cultural/historical factors impacting development/spread of epidemics B: Spread of disease in populations C: kinetics of transport in the body (bacteria and drug)	Multidisciplinary approaches to addressing water-borne diseases
6.67%	Bacterial ecosystems A: Human interaction with bacterial ecosystem B: Bacterial survival in water C: water systems (fresh, sea, brackish)	Intervention case study analysis
6.67%	Biochemistry of cholera Treatment of cholera A: Human activities that impact contraction/spread of cholera B: Cholera life cycle, toxin action C: Ion exchange in the body	Intervention case study analysis
6.67%	Cholera outbreaks in the U.S., India, Haiti Water treatment as prevention of cholera A: Indigenous approaches to disease prevention and treatment B: Susceptibility of cholera to antibacterials C: Solutions, impurities, water transport	Intervention case study analysis
6.67%	Municipal water treatment in a global context A: Cultural factors affecting development of water treatment B: Action of bacteria and toxins C: Overview: filtration, sedimentation, biological purification, toxins (e.g. Arsenic)	Resolutions to solving existing problems in water treatment
6.67%	Physical water treatment methods A: Impact of physical water treatment methods on local/regional populations B: Prokaryotic cell structure C: Filtration, flocculation, ion exchange, membranes, sterilization	Water conservation
6.67%	Biological water treatment methods A: Impact of biological water treatment methods on local/regional populations B: Susceptibility of bacteria to biological water treatment C: anaerobic, aerobic, use of sludge, nutrient cycles, toxins	Poster and podium presentation basics
6.67%	Structural inequalities to water treatment and health A: Political, social, economic power structures and clean water access B: Inequalities in water supplies and contaminants C: drinking water and wastewater systems in US and Haiti	Group work day
6.67%	Human right to fresh water (United Nations) Potential legal consequences to unequal access to clean water A: Political, social, economic power structures and	SRCEE presentation week

	clean water access B: Examples of contaminants in water systems C: e.g. water in Arizona (arsenic)	
6.67%	New water treatment solutions A: Cultural factors affecting adoption of new technologies B: Susceptibility of pathogens to new treatment examples C: simple filtration and sterilization methods	Discussion and next steps
Finals week	Examination	Final presentations due

VIII. Suggested Course Evaluation

- 20% Journal entries on seminar readings (e.g., ten 1-page journal entries)
- 20% In-class participation/group discussion (e.g., free writes, clicker activities)
- 20% Written assignments (e.g., three 3-4 page essays) highlighting interdisciplinary content analysis
- 20% Pre/post examinations, with multiple choice/short answer questions
- 20% Presentation in seminar on grassroots campaign for water issues

IX. Bibliography

- Alley KD. 2002. *On the Banks of the Ganga: When Wastewater Meets a Sacred River*. Ann Arbor: University of Michigan Press.
- Alley KD. 1994. Ganga and Gandagi: interpretations of pollution and waste in Benaras. *Ethnology* 33(2): 127-145.
- Baer H, Singer M, Susser I. 2003. *Medical Anthropology and the World System*. 2nd edition. Westport, CT: Bergin and Garvey.
- Bakker K. 2010. *Privatizing Water: Governance Failure and the World's Urban Water Crisis*. Ithaca: Cornell University Press.
- Barlow M, Clark T. 2002. *Blue Gold: The Fight to Stop the Corporate Theft of the World's Water*. New York: The New York Press.
- Barzilay EJ, Aghoghovbia TS, Blanton EM, Akinpelumi AA, Coldiron ME, Akinfolayan O, Adeleye OA, LaTrielle A, Hoekstra RM, Gilpin U, Quick R. 2011. Diarrhea prevention in people living with HIV: an evaluation of a point-of-use water quality intervention in Lagos, Nigeria. *AIDS Care* 23(3): 330-339.
- Bennett V. 1995. *The Politics of Water: Urban Protest, Gender, and Power in Monterrey, Mexico*. Pittsburgh: University of Pittsburgh Press.
- Berrittella M, Hoekstra AY, Rehdanz K, Roson R, Tol RS. 2007. The economic impact of restricted water supply: a computable general equilibrium analysis. *Water Research* 41(8) 1799-1813.
- Binnie C, Kimber M, Smethhurst G. 2002. *Basic Water Treatment*. 3rd edition. London: Royal Society of Chemistry.
- Black M, King J. 2009. *The Atlas of Water*. 2nd edition. Berkeley: University of California Press.

- Bodley JH. 1996. Anthropology and Contemporary Human Problems. Mountain View, CA: Mayfield Publishing Company.
- Charles RC, Ryan ET. 2011. Cholera in the 21st century. *Current Opinion in Infectious Disease* 24:472-477.
- Cifuentes E, Blumenthal U, Ruiz-Palacios G. 1995. Riego agrícola con aguas residuales y sus efectos sobre la salud en México. In: Restrepo I (editor), *Agua, Salud, y Derechos Humanos*. México, DF: Comisión Nacional de Derechos Humanos. pp. 189-201.
- Cox S, Annis S. 1988. Community participation in rural water supply. In: Annis S, Hakim P (editors), *Direct to the Poor: Grassroots Development in Latin America*. Boulder, CO: Lynne Rienner Publishers. pp. 65-72.
- DeVilliers M. 2001. *Water: the Fate of Our Most Precious Resource*. Boston: Houghton Mifflin.
- Doolittle WE. 1990. *Canal Irrigation in Prehistoric Mexico: The Sequence of Technological Change*. Austin: University of Texas Press.
- Ennis-McMillan MC. 2006. *A Precious Liquid: Drinking Water and Culture in the Valley of Mexico*. Belmont, CA: Thomson Wadsworth.
- Fagan B. 2011. *Elixir: A History of Water and Humankind*. London: Bloomsbury Press.
- Farmer P. 2003. *Pathologies of Power: Health, Human Rights, and the New War on the Poor*. Berkeley: University of California Press.
- Gerbens-Leens W, Hoekstra AY. 2012. The water footprint of sweeteners and bio-ethanol. *Environment International* 40: 202-211.
- Gelles PH. 2000. *Water and Power in Highland Peru: The Cultural Politics of Irrigation and Development*. New Brunswick, NJ: Rutgers University Press.
- Gleick PH. 1996. Basic water requirements for human activities: meeting basic needs. *Water International* 21: 83-92.
- Gleick PH. 1999. The human right to water. *Water Policy* 1(5): 487-503.
- Gleick PH, editor. 1993. *Water in Crisis: A Guide to the World's Fresh Water Resources*. Oxford: Oxford University Press.
- Greene SK, Daly ER, Talbot EA, Demma LJ, Holzbauer S, Patel NJ, Hill TA, Walderhaug MO, Hoekstra RM, Lynch MF, Painter JA. 2008. Recurrent multistate outbreak of *Salmonella newport* associated with tomatoes from contaminated fields, 2005. *Epidemiology and Infection* 136(2): 157-165.
- Gupta SK, Sheikh MA, Islam MS, Rahman KS, Jahan N, Rahman MM, Hoekstra RM, Johnston R, Ram PK, Luby S. 2008. *Journal of Applied Microbiology* 104(2): 388-395.

- Gupta SK, Suantio A, Gray A, Widyastuti E, Jain N, Rolos R, Hoekstra RM, Quick R. 2007. Factors associated with *E. coli* contamination of household drinking water among tsunami and earthquake survivors, Indonesia. *American Journal of Tropical Medicine and Hygiene* 76(6): 1158-1162.
- Hoekstra AY, Mekonnen MM. 2012. The water footprint of humanity. *Proceedings of the National Academy of Sciences*, Early Edition, published ahead of print February 13, 2012.
- Hoff H. 2009. Global water resources and their management. *Current Opinions in Environmental Sustainability* 1: 141-147.
- Jain S, Sahanoon OK, Blanton E, Schmitz A, Wannemuehler KA, Hoekstra RM, Quick RE. 2010. Sodium dichloroisocyanurate tablets for routine treatment of household drinking water in periurban Ghana: a randomized controlled trial. *American Journal of Tropical Medicine and Hygiene* 82(1): 16-22.
- Luby SP, Agboatwalla M, Painter J, Altaf A, Billhimer W, Keswick B, Hoekstra RM. 2006. Combining drinking water treatment and hand washing for diarrhoea prevention, a cluster randomised controlled trial. 2006. *Tropical Medicine and International Health* 11(4): 479-489.
- Metcalf E. 2005. *Wastewater Engineering, Treatment, and Reuse*. 4th edition. New Delhi: Tata McGraw Hill.
- Morris RD. 2007. *The Blue Death: Disease, Disaster, and the Water We Drink*. New York: HarperCollins Press.
- Nelson EJ, Harris JB, Morris JG Jr, Calderwood SB, Camilli A. 2009. Cholera transmission: the host, pathogen, and bacteriophage dynamic. *Nature Reviews Microbiology* 7:693-702.
- Nichter M. 1985. Drink boiled water: a cultural analysis of a health education message. *Social Science and Medicine* 21(6): 667-669.
- O'Reilly CE, Bowen AB, Perez NE, Sarisky JP, Shepherd CA, Miller MD, Hubbard BC, Herring M, Buchanan SD, Fitzgerald CC, Hill V, Arrowood MJ, Xiao LX, Hoekstra RM, Mintz ED, Lynch MF. 2007. A waterborne outbreak of gastroenteritis with multiple etiologies among resort island visitors and residents: Ohio, 2004. *Clinical Infectious Diseases* 44(4): 506-512.
- O'Reilly CE, Freeman MC, Ravani M, Migele J, Mwaki A, Ayalo M, Ombeki S, Hoekstra RM, Quick R. 2008. The impact of a school-based safe water and hygiene programme on knowledge and practices of students and their parents: Nyanza Province, western Kenya, 2006. *Epidemiology and Infection* 136(1): 80-91.
- Paul BD. 1977. The role of beliefs and customs in sanitation programs. In: Landy D (editor), *Culture, Disease, and Healing*. New York: Macmillan Press. pp. 233-236.
- Reisner M. 1986. *Cadillac Desert: The American West and its Disappearing Water*. New York: Viking Press.
- Restrepo I (Editor). 1995. *Agua, Salud, y Derechos Humanos*. México, DF: Comisión Nacional de Derechos Humanos.

Mueller, A., Juris, S. J., Willermet, C., Drake, E., Upadhaya, S., & Chhetri, P.

Ritchie JM, Waldor MK. 2009. *Vibrio cholerae* interactions with the gastrointestinal tract: lessons from animal studies. *Current Topics in Microbiology and Immunology* 337:37-59.

Solomon S. 2010. *Water, the Epic Struggle for Wealth, Power, and Civilization*. New York: Harper Perennial.

Van der Leeden F, Troise FL, Todd DK. *The Water Encyclopedia*. 2nd edition. Boca Raton, FL: CRC Press.

Well AA, Ivers LC, Harris JB. 2012. Cholera: lessons from Haiti and beyond. *Current Infectious Disease Reports* 14: 1-8.

Whiteford LM. 1997. The ethnoecology of dengue fever. *Medical Anthropology Quarterly* 11(2): 202-223.

Appendix 2: Interdisciplinary assessment rubric.

Interdisciplinary Project Rubric

	Proficient (4)	Acceptable (3)	Developing (2)	Deficient (1)
<i>Disciplinary Grounding</i>				
Clarity: Explanation of disciplinary insights, methods, findings, mode of thinking is free from confusion and ambiguity.	All disciplinary explanations are clear in purpose and organization.	All but one disciplinary explanations are clear in purpose and organization; or several miss either purpose or organization	Only one disciplinary explanation is clear in purpose and organization; or all miss either purpose or organization	None of the disciplinary arguments are clear
Logical: Each disciplinary argument fits together well, conclusions follow from reasoning and evidence; well-reasoned; plausible, consistent, coherent.	All disciplinary arguments are logical, coherent, and based on evidence	All but one disciplinary arguments are logical, coherent, and based on evidence	Only one disciplinary argument is logical, coherent, and based on evidence	None of the disciplinary arguments are logical, coherent, and based on evidence
Complete: Includes all disciplinary information needed; lacking none of its parts or aspects thorough, whole.	All disciplinary information needed is presented.	Most of the disciplinary information needed is presented.	Only some of the disciplinary information needed is presented.	None of the disciplinary information needed is presented.
<i>Interdisciplinary Reasoning</i>				
Integrative Summary: All disciplinary arguments are distilled into a coherent summary with an overall meaning or result.	All disciplinary information has been included in the summary in a logical manner.	2 disciplines are favored over the 3 rd .	1 discipline is favored over all other disciplines.	No integrative summary is attempted.
Conceptual Bridging: A particular concept, instrument, skill is used in a variety of concepts resulting in a deeper understanding of the tool itself.	The topic is investigated from the viewpoint of all disciplines, leading to deeper understanding of the topic.	2 disciplines are favored over the 3 rd .	1 discipline is favored over all other disciplines.	No deeper understanding has been achieved.
Complex Explanation: The interdisciplinary argument is developed to a higher level of abstraction	Coherent whole is synthesized to a higher level of abstraction	Several parts of the bridged concepts are developed to a higher level of abstraction	A few parts of the bridged concepts are developed to a higher level of abstraction	Abstraction has not been attempted
<i>For final seminar project only: Pragmatic solution</i>				
Pragmatic Solution: A practical problem is solved by the inclusion of all disciplinary perspectives	The pragmatic solution plan is interdisciplinary and includes all processes of 6σ: define, measure, analyze, improve, and control	The pragmatic solution plan is interdisciplinary includes at least 4 of the processes of 6σ: define, measure, analyze, improve, and control	The pragmatic solution plan only includes only 2 out of fields or only 3 of the processes of 6σ: define, measure, analyze, improve, and control	The problem was not solved in an interdisciplinary manner or did not include 6σ processes.

References

- Barisonzi, J., & Thorn, M. (2003). Teaching Revolution: Issues in Interdisciplinary Education. *College Teaching*, 51(1), 5-8. doi: 10.1080/87567550309596402
- Barkley, E. F., Cross, K. P., & Major, C. H. (2005). *Collaborative Learning Techniques: A Handbook For College Faculty*. San Francisco, CA: Jossey-Bass.
- Begg, M. D., & Vaughan, R. D. (2011). Are Biostatistics Students Prepared to Succeed in the Era of Interdisciplinary Science? (And How Will We Know?) *The American Statistician*, 65(2), 71-79. doi: 10.1198/tast.2011.10222
- DeZure, D. (2010). Interdisciplinary Pedagogies in Higher Education. In R. Frodeman, J. Thompson Klein, & C. Mitcham (Eds.), *The Oxford Handbook of Interdisciplinarity* (372-386). Oxford, England: Oxford University Press. doi: 10.3200/CTCH.57.2.99-104
- Eisen, A., Hall, A., Lee, T. S., & Zupko, J. (2009). Teaching Water: Connecting Across Disciplines and into Daily Life to Address Complex Societal Issues. *College Teaching*, 57(2), 99-104.
- Elder L., Paul R. (2013). *The National Council for Excellence in Critical Thinking*. Retrieved from <http://www.criticalthinking.org/pages/the-national-council-for-excellence-in-critical-thinking/406>.
- Haynes, C. (n.d.). *Designing and Teaching an Interdisciplinary Course*: Paper presented at Teaching Outside the Lines workshop, John Hope Franklin Humanities Institute, Durham, NC.
- Kuh, G.D. (2008). *High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter*. AAC&U.
- Mansilla, V.B., & Duraisingh, E.D. (2007). Targeted Assessment of Students' Interdisciplinary Work: An Empirically Grounded Framework Proposed. *The Journal of Higher Education*, 7 (2), 215-237. doi: 10.1353/jhe.2007.0008
- Motorola University (1994). *The Inventors of Six Sigma*. <http://web.archive.org/web/20051106025733/http://www.motorola.com/content/0,,3079,00.html>. Archived from the original on November 6, 2005. Retrieved June 7, 2013.
- Nilson, L. B., (2010). *Teaching at its Best*. (3rd Ed.). San Francisco, CA: Jossey-Bass.
- Nissani, M. (1997). Ten Cheers for Interdisciplinarity: The Case for Interdisciplinary Knowledge and Research. *The Social Science Journal*, 34(2), 201-216. doi: 10.1016/S0362-3319(97)90051-3
- Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, 93, 223-231. doi: 10.1002/j.2168-9830.2004.tb00809.x

Mueller, A., Juris, S. J., Willermet, C., Drake, E., Upadhaya, S., & Chhetri, P.

R (2013) *R for Mac OS X*, <http://cran.r-project.org/bin/macosex/>

Real Statistics (2013) *Real Statistics Resource Pack*, downloaded Sept. 24, 2013)
<http://www.real-statistics.com/free-download/real-statistics-resource-pack/>.

Sternberg, R.J. (2008). Interdisciplinary Problem-Based Learning: An Alternative to Traditional Majors and Minors. *Liberal Education*, 94(1), 12-17.

Willermet, C., Mueller, A., Juris, S.J., Drake, E., Upadhaya, S., & Chhetri, P. (2013) Water as Life, Death, and Power: Building an Integrated Interdisciplinary Course Combining Perspectives From Anthropology, Biology, and Chemistry. *Journal of the Scholarship of Teaching and Learning*, 13(5), 105-123.

Book Review

Teaching Intensive and Accelerated Courses: Instruction that Motivates Learning

Edgar Alan Burns¹

Citation: Raymond Wlodkowski and Margery Ginsberg. (2010) *Teaching Intensive and Accelerated Courses: Instruction that Motivates Learning*, San Francisco: Jossey-Bass. ISBN: 978-0-7879-6893-9

Publisher's Description: In this comprehensive resource, Raymond J. Wlodkowski and Margery B. Ginsberg describe how to meet the challenge of teaching intensive and accelerated courses to nontraditional learners and working adults. By making motivation and cultural relevance essential to instruction, they clearly show what instructors can do to enhance learning in classes that can last from three to six hours. *Teaching Intensive and Accelerated Courses* makes full use of the authors' twenty years of experience researching and teaching accelerated courses, along with selected strategies from Wlodkowski's classic *Enhancing Adult Motivation to Learn*, to offer tried-and-true practices instructors can use to provide continuously engaging learning.

Some of the rich interest in this book is off the page: expert teachers describing their practice and summarizing their experience in comments and suggestions. On the page, the authors provide a wealth of resources for designers and instructors involved in producing intensive teaching courses. The many years development these authors have committed their professional lives to in the adult education field make current debates over changing worlds of MOOCs, flipped learning, inclusive education, and similar contemporary tertiary concerns, seem over-inflated – a lot of thinking and teaching practice has in fact anticipated many of these changes, as seen in this thoughtful text.

The book has for me two distractions and four real strengths. The first two are noted briefly so readers are prepared to connect to the book's underlying value which makes it a welcome addition to the shelves of practicing adult education teachers. The authors spend the book – except for opening and closing remarks – treating intensives and accelerated learning as broadly the same; so does this review. Other terms such as block courses, or block teaching, also mean intensified teaching, often occupying one or two days over several weekends separated by individual assignment work, rather than semester-long sequences of 1-3 hours of lectures and small classes every week. Thus the crucial task of maintaining students' interests and attention when concentrating class contact hours into a much shorter time is the defining characteristic of such instruction.

The distractions: First, the staging between chapters is somewhat clunky. Chapter three seemed out of sync – an interpolation between setting up the four-fold motivation model of chapter two which is resumed in chapters 4-7. Each of those chapters elaborates on the four

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components of motivating learners in intensive courses. Again, the final chapter 9 seems a step-change from the previous discussions. In each of these chapters there is plenty of useful material; just that the mixture of advocacy for intensive instructors and questions of instructor retention sit awkwardly within the flow of how and why instructors do, or can learn to do, good work teaching intensives. I have no disagreement with the point that sessional/casual/adjunct/ contract staff who do much of the “heavy lifting” in such teaching settings are undervalued, merely the fit of these thoughts with the main flow of the book.

Second, the repeated emphasis of the importance of cultural openness was an interesting inflection in the book. I am not sure if it emerges from a period of time shifting educators’ sensibilities about the need to be less “white” and more flexible and inclusive in responding to learning needs of migrant, Black, Hispanic, or other marginalized student cohorts. Or possibly it is a United States inflection which other educational systems and cultures talk about in some similar ways, but also in different ways. Nowhere else is there such a large block of Anglo-European white population, so perhaps the need to keep moving towards more accepting learning modes, especially for adult learners to whom a sense of exclusion can be terribly demotivating, is appropriate. Whatever the reason, I am not faulting this orientation, but in full sympathy and approval of it. Formal or official policies of inclusion certainly benefit from reminders and urging to help genuinely embed these values in everyday teaching practice and other spheres of life. The authors did not have space to develop this connection they see with adult learning in intensives, but it kept recurring as a meme in the text.

Neither of these are wrongs, but worth commenting on for readers inside and outside the United States to position the book relative to their interests, and gaining the value of the ideas for their own needs and purposes. The four strengths of the book are what make it worth having in an institutional library, borrowing it, or owning a copy as a teacher’s companion. It would also serve well as a text for training instructors developing or delivering intensives. My copy I view in similar light to Ken Bain’s book on excellent teachers, to which I refer below.

The first of the book’s strengths is the description of the motivational framework. The authors say (p. 14) this is offered to “enhance learning in intensives,” for adults. In many ways this has wider application than just intensives, or adults, though obviously this field is where their educational work has developed the value of these strategies for motivating students. The four motivational cores that need addressing the authors posit are the following: establishing inclusion, developing a positive learning attitude, amplifying meaning, and engendering competence. For each of these they suggest a pair of measures (p. 25), “that indicate, from the learner’s perspective, that the condition is present in the learning environment.” Of the four motivational components proposed, the one I have seen the least described and explored in practical terms in educational literature is inclusion. I want to offer a special commendation for pointing to the empowering and enabling effects that inclusive teaching confers on learners.

The two criteria the authors suggest in gauging inclusion are the sense of general respect, and the feeling of connection, found in positive learning environments. Perhaps there is a link here the authors are implicitly making to their underlying theme of cultural openness or sensitivity: “motivation and culture are inseparable,” they affirm at p. 16. Perhaps they are saying adults who do not fit the traditional WASP stereotype because of different cultural experiences and life knowledge are particularly hard-hit by the invisible negativity of lack of respect and disconnection – “you” or “them,” rather than “we” or “us.” It is not an easy thing for instructors to comprehend and learn inclusion when they do not know they are *not* being inclusive; good intentions are necessary but insufficient for inclusive teaching in themselves.

Teachers from any majority, or any predominant group, find it difficult to incorporate this most diffuse but effective agent of learning. Formal rules will not in themselves cause deep inclusion to happen, even if they provide a framework to allow it. I would like to write much more here than is possible, but the stimulus of doing this review pushes me to reflect further on a wide range of experiences about inclusive teaching and learning.

The second strength that appeals to me is the last chapter's suggestions for engagement and retention. Despite my comment on this as an awkward step change earlier in this review, the authors' concern with not just the process of motivation or instructional process is, in itself, commendable. Motivation is indeed a psycho-social process, but teaching is not just a game played on the surface. These are authors genuinely immersed in their industry, who have seen adult education growing in significance across their careers, contributing to that change in socially beneficial ways, but also conscious of the unhappy realpolitik of how casual staff are often used-up in the production of adult education. There are questions of power in this, not just idealization of educational practice. There seems no ready way of changing this given present economic pressures on college education. The authors' unwillingness to simply bracket the issue raises questions about sustainable education policies. So despite my perception of the chapter sitting awkwardly, it contains a valuable point.

The third strength I enjoyed is the teacherly experience seeping into the pages. There are many gems of teaching wisdom and observation made in the pages that are independent of the particular structures of the book, or exposition of material within the chapters, but flow from long experience of teaching adult learners in intensive settings. These, at times, include the charts or boxes that summarize runs of ideas, or the multiple exercises described, but can also be found in notes on methods and strategies that are offered throughout. Sometimes just a phrase or a juxtaposition of two ideas is productive of reflection and thought. Different readers will undoubtedly respond to different ones of these observations depending upon their interests, teaching backgrounds and intended next step in career or understanding. That is all to the good, and the richness of this subtext allows this to occur. As a fan of developments in the scholarship of teaching and learning, the sense here of careful observation made from depth of experience reminds me of Ken Bain's (2004) book, *What the Best College Teachers Do*, based on his long-running research across many institutions and exemplary and inspiring teachers. Teaching research and rigor are ultimately contributions to the professional delivery of excellent teaching and learning.

The fourth and final point raised in this review is the value of the discussion of the motivating effects of meaning and learning, particularly but not solely in chapter 6. The efficacy of meaning-making for adult learning appeals to me. Although I am trained in both psychology and sociology, perhaps this fits my orientation as a teaching sociologist. Other readers may just as readily find main points of interest for them, or extensions of their own insights, in other parts of the book. Again, like inclusion, meaning is integral to the soft, diffuse practices of good teaching. It is the heart and energy around which structures and formalities act as carapace. For my money, the authors well express how inclusion and meaning construction and reconstruction are ultimately the most powerful and effective motivators for adult learning. Inclusion is a key kind of meaning making which is motivational and fundamental for creating willingness and ability to learn. The table at p. 117 of "guiding critical questions" is a great instance of a practical resource in a discussion of meaning in the teaching process. There are plenty of other examples that indicate additional value of the book as a reference or resource for instructors.

Reference

Bain, Ken. (2004). *What the Best College Teachers Do*. Cambridge, MA: Harvard University Press.

Mission

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

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5. Comments and communications: Primarily, these are comments based on previously published JoSoTL articles, but can also include book reviews, critiques and evaluations of other published results in new contexts or dimensions

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

John Dewey¹ and Marie Curie²

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

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

General Guidelines for the Manuscript

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

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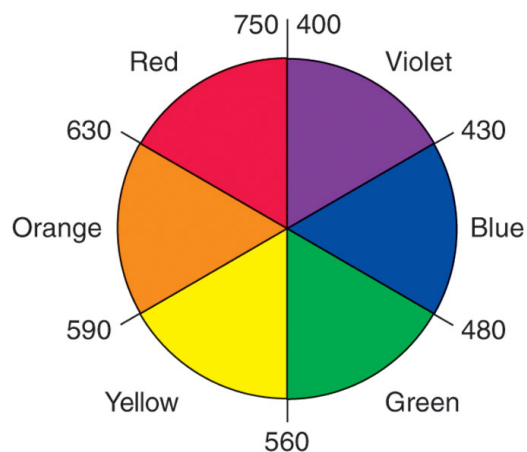


Figure 1. Color wheel with wavelengths indicated in millimicrons. Opposite colors are complementary.

Acknowledgements

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

Appendix

Please insert any appendices after the acknowledgments. If your submission has only one appendix, this section should be labeled '*Appendix.*' More than one appendix will change the section label to '*Appendices.*' Each appendix should have a title; if you are including items from your class or research, please alter them to include a title. Appendices should be alpha-order (Appendix A, Appendix B, etc.) These labels and titles should be at the top of the page, left justified, italicized.

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References

- Coffin, D. A. (1993). Using the competitive edge. *Journal of Economic Education*, 24(1), 62-69.
- Garcia, J., & Rodriguez, P. (2002). The determinants of football match attendance revisited: Empirical evidence from the Spanish football league. *Journal of Sports Economics*, 3(1), 18-38. doi: 10.1177/152700250200300103
- Hamilton, S. J. (1995). *My name's not Susie: A life transformed by literacy*. Portsmouth, NH: Boynton/Cook Publishers.
- Pappas, D. (2004). Fixing the fan cost index: A more realistic view. Retrieved April 21, 2004, from <http://www.baseballprospectus.com/article.php?articleid=2790>.



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