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THE RELATIONSHIP BETWEEN COURSE SYLLABI AND PARTICIPANT EVALUATION
REACTIONS ACROSS WEB-BASED AND FACE-TO-FACE COURSES

by

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B.S. Stetson University, 2009

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Science in Industrial/Organizational Psychology
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in the College of Sciences
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ABSTRACT

A common form of training or education evaluation involves the examination of course participant reactions towards various aspects of the course for summative evaluation purposes. Participant reactions have been examined within the framework of a comparison between online and face to face courses often with a slight positive weight towards online courses (Sitzmann et al., 2006). Past research on this topic has denoted a need for studies examining the relationship between objective course characteristics and participant reactions. This paper seeks to examine the relationship between participant reactions of a sample of geographically disbursed teachers enrolled in a large, national professional development company and objective course characteristics as communicated by course syllabi within a framework of comparison between online and face to face courses. The delivery format, knowledge base, specificity of course objectives, and student interaction levels were all related to some degree to various participant reactions, although the effect sizes were notably small. In many cases, an interaction between the delivery format and objective course characteristic in question influenced the participant reaction. Objective course characteristics as communicated by the syllabi appeared to be major predictors of participant reactions within the face to face courses that were examined, but not for the online courses. Course development stakeholders are recommended to pay attention to the course syllabus design process and craft quality syllabi that communicate relevant information while concurrently anticipating potential participant reactions. Organizations may be able to align the outline for instruction or “contract” as presented by the syllabus with recommendations as offered by participant evaluations so as to instill consistent expectations within the participants and maximize positive reactions towards the courses within which they are enrolled.

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CHAPTER ONE: INTRODUCTION

A massive amount of research has been conducted in the content area of training and education course evaluation. Training programs must be examined for effectiveness in consideration of the expenditure of an often immense amount of organizational resources such as overall monetary expenditures, personnel involvement, and gains in job performance. For similar reasons, courses and programs within educational settings should also be evaluated as a function of resource expenditures and in fulfillment of learning objectives. Furthermore, a consideration of the gains to be obtained from the implementation of effective learning programs, including the proper organizational socialization, professional skill development, and minimization of initial performance loss, is quite a compelling impetus to consider the effectiveness of training/education program evaluation. Kraiger (2002) notes that there may be several reasons for evaluating training programs. First, information produced by training evaluation reactions can be used by the organization for decision making – in consideration of what courses to continue offering and in what course instructors to retain. Furthermore, reactions elicited from participants give course developers an idea of what aspects of the course may be revised in order to make the course more attractive and effective to the participants. Lastly, by amassing reaction data as part of a course evaluation plan, the data may be used to bolster support for the quality of the program, which can be used in turn for marketing purposes and to establish a quality program reputation.

By considering certain factors of the course including the instructional design, use of instructional mediums to facilitate learning, and the selection of instructors with the appropriate KSAs and competencies; organizations may be able to strengthen the effectiveness of their own

developmental efforts. More specifically, Noe and Colquitt (2002) examined the previous research on training program characteristics to identify several administrative aspects that promote program effectiveness, including meaningful content, the communication of clear objectives, etc. In addition, instructor behaviors such as actions that exhibit expressiveness and communicate organization to the trainees have been demonstrated to impact training outcomes (Towler & Dipboye, 2001). Interestingly, informal evaluations of professors by students and communicated to other students via websites such as “Rate My Professors” have seen increasing popularity in recent years. A content analysis by K. Silva, Silva, Quinn, Draper, Cover, and Munoff (2008) on the ratings provided by students on the “Rate My Professors” website generated evidence that students “focused most on Instructor characteristics...and least on Student development” (p. 75). Although websites of this nature have increased in frequency over the years, we must be careful when interpreting these instructor ratings as they are likely to be wrought with bias stemming from polarized critical incidents with the targeted instructors. Through a thorough examination of the effects that these various education and training program aspects have on their effectiveness, valuable information can be produced that can be used to bolster the instructional efforts and ensure learning gains among its employees or trainees.

When considering the evaluation of training programs and education courses, a distinction must be made between “education” and “training” upon which we can better understand course evaluation research. Essenhigh (2000) separated the two processes by splitting their content into the “know how” and the “know why” domains of knowledge. He also suggested that they can be separated in a stepwise fashion – training as the first stage in the learning process and education as the final stage. Within the former stage, one learns how to

perform a task, learn the methods involved within a certain process, or the content involved within a subject area. Education, on the other hand, involves understanding why the task is performed a certain way, the rationale behind a certain process, and understanding the reasoning or mechanics underlying relationships with course content. Although such a distinction can be made between the two processes, a linguistic examination of the two words reveals that they are synonyms and formal definitions of their infinitive forms are similar. “To train” has been defined as “to teach so as to make fit, qualified, or proficient” and “to form by instruction, discipline, or drill” (*Merriam-Webster Online Dictionary*, 2011). “To educate” has been defined as “to train by formal instruction and supervised practice especially in a skill, trade, or profession” and “to develop mentally, morally, or aesthetically especially by instruction” (*Merriam-Webster Online Dictionary*, 2011). Interestingly, the formal dictionary definition of the word “educate” contains the training “element” loosely mirroring Essenhig’s (2000) implication that there may be a stepwise process involving training on the road to becoming “educated.” It’s also interesting to point out that their Latin roots “educere” and “trahere / trahere,” although different, both mean “to draw out,” as in, to draw the potential out of the one undergoing the “learning” transformation (*Merriam-Webster Online Dictionary*, 2011). Regardless, modern conceptions of what the two words mean tend to place an emphasis on the development of skills, procedural knowledge, and professional preparedness when considering “training” and the inculcation of declarative knowledge, mechanics, and reasoning as the tenants of “education.” This sort of distinction is reflected within an adaptation of a colloquialism by Lippincott (1998) in which education (as opposed to training) is likened to seeing the “forest *and* the trees.” Furthermore, Geller (2005) attempts to reconcile this difference by suggesting that

training alone without education can be perceived as insulting to the individual, “limiting their ownership, commitment, and empowerment” as a function of the perceived lack effort or concern on the “trainer’s” part to let the trainee truly understand the underlying process he or she is learning. The best trainers and educators can then be seen as those who develop their pupils’ skills through training, educate them with strategies and reasoning as to why those skills are being utilized, and provide feedback to direct their learning (Geller, 2005).

The course delivery format aspect within training or education has been extensively researched as a result of the advent of the offering of web-based courses as opposed to traditional classroom instruction. A recent report from the Sloan Consortium indicates that over 5.6 million students took at least one online course in the Fall of 2009 at a growth rate 19.9% higher than the annual growth rate of total enrollment (I. E. Allen & Seaman, 2010). As of Fall 2009, approximately 29.3% of students of degree-seeking post-secondary institutions are enrolled in online courses. But what can be considered “distance education?” The term “distance education” has been defined by the American Society for Training and Development as an

Educational situation in which the instructor and students are separated by time, location, or both. Education or training courses are delivered to remote locations via synchronous or asynchronous means of instruction, including written correspondence, text, graphics, audio- and videotape, CD-ROM, online learning, audio- and videoconferencing, interactive TV, and FAX (ASTD, 2010, para. 105).

Moore and Kearsley (1996) suggest that the delivery format of the training program may be a characteristic that may affect trainee reactions to the training program (as cited in Brown, 2005); if such a disparity in reactions exists, it would be beneficial to explore this relationship between

online and traditional classroom courses especially when considering the often large differences in cost and return on investment that may be observed between the two delivery formats. It should be noted that research examining the effectiveness of web-based learning has traditionally been limited to educational environments (Salas, DeRouin, & Littrell, 2005). As a result, working populations and employees within organizations have been underrepresented within this type of research. However, it has been suggested that a portion of the pragmatic imperatives and implications that can be made as a result of the current research on web-based learning are likely to apply to these organizational contexts, but not under certain conditions such as the need for training that is “brief, highly accessible, and...training on skills with immediate application” (Derouin, Fritzsche, & Salas, 2005, p. 936). This hearkens back to the aforementioned argument regarding the distinction between “training” and “education” terminology: there is likely to be a considerable degree of overlap, but certain situations may not be applicable to both domains. Furthermore, there may even be a third distinction made as a typology within potential organizational learning modalities: the metaphor of the “learning organization” and the new paradigm of “knowledge management” within organizations (O’Keeffe, 2002). However, the learning posited within these organizations is largely considered to be a collective effort and not a sum of a collection of individually expended efforts. Regardless, such a domain may have future impact in consideration of advancements in information/technology and telecommuting. In consideration of the advent of the internet and consistently evolving advancements in technology, the need for research examining the effectiveness of web-based instructional programs is imminent and strong. Furthermore, research is needed examining the aspects of online courses that differentiate its content from face to face courses.

The Effectiveness of Web-Based Courses in Comparison with Classroom Instruction

From the research, there are clear advantages of Web-based instruction, and how it represents a “nonlinear instructional medium,” as noted by Spiro & Jehng (1990), that contains a “cluster of instructional methods” (Salomon, 1988; as cited in Sitzmann, Brown, Casper, Ely, & Zimmerman, 2006). Web-based instruction allows for a non-temporally constricted method of instruction (to some degree) that can utilize a variety of media formats to facilitate learning. Singh and Pan (2004) also acknowledge several other general themes they uncovered from the literature: “expanding access to under-served populations; alleviating classroom capacity constraints; capitalizing on emerging market opportunities, such as working adults; and, serving as a catalyst for institutional transformation” (p. 302). They also indicated convenience to take the course anytime/anywhere, feedback that can be quickly given, reactions data that can be easily collected, increased trainee learner control, a possibility of increased peer-to-peer and instructor-to-student contact, interactivity (if incorporated through a built-in mechanism such as a forum), and increased accessibility to geographically displaced students as benefits to e-learning. Flexibility of administration is another benefit to using web-based instruction, as indicated by Fletcher and Dodds (2001): it can be quickly linked to complementary sources of knowledge, conveniently changed or modified, and readily accessed by virtually any participant with access to a computer and the internet (as cited in Olson & Wisner, 2002).

Research examining the web-based methodology of instruction has not gone without criticism. Clark (1983, 1994) pointed out how trainees may self-select into certain delivery formats of the training program based on comfort as a factor – any examination of data from

these studies run the risk of validation criticism due to lack of random assignment. Secondly, he argues that there is no isolation of attributes within a training design that are exclusive to a single delivery format. Lastly, he has argued that studies comparing delivery formats are confounded more often than not by non-equivalent instructional methods across both conditions. In consideration of whether to choose a course in distance-delivery or classroom instruction typology, trainee insight may posit the conditions within which they would prefer to learn and they may match themselves as a result with the method of delivery that better fits their needs. Random assignment may not be possible in some types of conditions, especially within a commercial setting in which self-selection can be a major and active component of the training “product” that is purveyed to individuals in various occupations.

Despite compelling criticisms by researchers to “cease-and-desist” empirical research examining differences between online and face to face courses on the basis of the aforementioned criticisms (R. E. Clark, 1983; R. E. Clark, 1994; Lockee, Burton, & Cross, 1999), other researchers have called for the redirection of research to focus on other areas and some still continue to assert instructional delivery format as a viable variable to be examined. Kozma (1991) countered Clark’s (1983, 1994) criticisms towards the examination of media format as a source of variance in learning outcomes and reactions and instead advocated that computers do posit a very different medium through which information is transmitted. Computers are capable of representing data, concepts, and other relevant information through visual, complex, and symbolic modalities that can serve to amplify the instructional methodology utilized and facilitate the communication of information. Recent research on “information visualization” and “data visualization” tend to provide evidence for Kozma’s (1991) assertions;

as advancements in data mining, visual representation technology and software, and the flexible user control of data facilitate the learning and comprehension of complex data sets, dense conceptual networks, and multi-faceted constructs (Dastani, 2002; Few, 2009; Tufte, 2006). Although these types of visualizations have been introduced into the realm of face to face interaction and instruction; some forms of visualization, because of their complexity and interactive format, are confined to the computer. Other researchers have called for a redirection of research concerning delivery formats. Zhao, Lei, Lai, and Tan (2005) assert that if research is halted within this area, we may be making a mistake if these studies do have good information that we can use to guide future research and practice—we must instead take into account the research of the past while simultaneously examining the research questions through “a different lens,” namely, not solely focusing on media comparison. Lockee, Burton, and Cross (1999) also indicate that effectual alternatives to media comparison studies could include examinations of the research designs (longitudinal studies, developmental studies, etc.) and research constructs (learner characteristics, instructional strategies, and media attributes). Despite the criticisms levied towards these comparison studies, the existing research on the difference between traditional classroom instruction courses and web-based instruction have been synthesized by using meta-analytic techniques, often producing similar results. Meta-analysis as a research methodology helps uncover patterns in operationalized variables across the literature and can combat bias and selective presentation of individual studies within the literature (Wolf, 1986). A large amount of meta-analyses have been performed within this content area over the last several decades.

Sitzmann, Kraiger, Stewart, & Wisner (2006) utilized meta-analytic techniques to synthesize a portion (96 research reports) of the literature comparing web-based and classroom courses and to attempt to uncover the emergence of moderators of their effectiveness. They examined several clusters of research questions involving comparisons in declarative knowledge, procedural knowledge, and trainee reactions between web-based instruction and classroom instruction. They also introduced a blended learning format which they compared to classroom instruction using the same aforementioned evaluation dimensions. Several moderators were also examined: similarity of instructional methods, research design, human interaction, practice, and feedback. Sitzmann et al. (2006) found that “web-based instruction was 6% more effective than classroom instruction for teaching declarative knowledge,” but were equally effective in regards to procedural knowledge (p. 646). This replicates the results of previous meta-analyses (Moore, 1994; Cavanaugh, 2001; Bernard et al., 2004; Zhao, Lei, Lai, & Tan, 2005) to the extent that they suggest that there are no differences in the effectiveness of web-based instruction and classroom instruction. They also found no difference between trainee satisfaction reactions between the two methods of training delivery. This finding actually ran contrary to the results of a previous meta-analysis conducted as a doctoral dissertation by Paul (2001) who found that participants reacted 7% more favorably to web-based instruction courses than in the traditional, classroom instruction format (as cited in Sitzmann et al., 2006). However, Paul’s (2001) studies consisted of literature reviews dating before 2003, which might use outdated web-based technologies (U. S. Department of Education, 2009), that were averaged across procedural and declarative knowledge outcomes, and thus, did not take instructional strategies or learning principles into account (as cited in Sitzmann et al. 2006). In Sitzmann et al.’ (2006) moderator

analyses, uniform instructional methods were shown to be equally effective across the two types of courses. Learner control, length of course, practice, and feedback moderate the relationships of both web-based and classroom instruction. When participants were randomly assigned to courses, the two methods were found to not be equally effective: classroom instruction was found to be more effective in the purveyance of declarative knowledge by 10%. The positive effects of web-based instruction were reversed when considering experimental designs. This may be backing Clark's case (1983, 1994) that when participants are permitted to self-select into courses of their choosing, support will likely be provided in favor of web-based instruction. Sitzmann et al. (2006) offer two complementary explanations: "trainees who are higher in motivation or cognitive ability are self-selecting into" courses with web-based instruction or "trainees who lack technical skills may be forced to participate in" web-based instruction courses as a result of random assignment (p. 649). Indeed, self-selection may be a factor in the examination of learning outcomes and trainee reactions.

The U.S. Department of Education (2009) conducted a meta-analysis utilizing only studies with experimental or quasi-experimental designs to control for experimental methodology. The meta-analysis only examined effects for objective measures of student learning outcomes, indicating that they did not examine participant reactions to the training or education they received. Following suit with the Sitzmann et al. (2006) analysis, the U.S. Department of Education (2009) found that "online learning produced better student learning outcomes than face-to-face instruction" in experimental designs as well as studies with large sample sizes (p. 52). The effectiveness of the online approach also appeared to be applicable for numerous populations: undergraduates and graduate students / professionals. Furthermore,

studies utilizing hybridized instruction (a blend of online and classroom instruction) fared better with greater (on average) student learning outcomes than comparisons of purely online or face to face instruction. Also, the length of time spent learning in an online condition in comparison with a classroom instruction condition emerged as a moderating variable as well as the comparability of the instructional materials and the instructional approach utilized within the conditions of each study acted as a moderator variable for learning outcomes. Overall, the authors of the meta-analysis concluded that “online learning has been modestly *more* effective, on average, than the traditional face-to-face instruction with which it has been compared” (U.S. Department of Education, 2009, p. 51). However, in interpreting these results, we must be careful in drawing conclusions as the examined studies often varied across multiple dimensions as illustrated by the emergence of several moderator variables. These moderators tend to suggest that although the delivery format may play a role in affecting learning outcomes; the instructional and curricular design (learning principles) and time allocated to each condition may actually be responsible for variations in effectiveness. Also, in a critique of the generalizability of the U. S. Department of Education (2009) meta-analysis, Jaggars and Bailey (2010) examined the seven studies within the meta-analysis that were fully online, semester long courses and found that there was a lack of consistent differences in outcomes, they were limited to technological concepts, and were highly selective universities. As a result, they criticized the generalizability of the meta-analysis’ results towards low-income and underprepared students and that online courses may not necessarily be “better” than face-to-face courses as it seems to suggest (despite reasonable caveats to its interpretation at the outset of the article).

Research on participant reactions towards web-based instruction in training programs and educational settings have tended to demonstrate that participants within online courses have varied in their reactions towards the courses. An early meta-analysis examining student satisfaction by C. C. Kulik and J. A. Kulik (1991) showed that students within computer-based instruction conditions responded somewhat more positively towards their instructional programs than those in traditional, face to face instructional conditions. Another meta-analysis focusing on student satisfaction measures between distance education and traditional classroom instruction within higher education revealed that students were slightly more satisfied within the traditional course format as opposed to distance education (M. Allen, Bourhis, Burrell, & Mabry, 2002). Regardless, the authors indicated that the “probable outcome” of the use of distance education technology is that it “should demonstrate little decline in student satisfaction with the quality of the educational process” (M. Allen, Bourhis, Burrell, & Mabry, 2002, p. 91). It is worth noting as well that the distance education technology utilized within this meta-analysis is somewhat outdated. Only 3 of the 24 samples obtained utilized strictly computer-based instruction; the remainder were mostly video, tele-lecture, audio, or other formats. This detracts from the modern generalizability of the meta-analysis towards the web-based instruction or e-learning paradigm. Bolliger and Martindale (2004) utilized confirmatory factor analysis to determine what factors of student satisfaction with online courses are the most salient for a sample of students completing an online course satisfaction survey. They found that instructor variables or reaction items were the most important indicators of student satisfaction, followed by technology and interactivity. One study has attempted to synthesize the previous research on the critical factors into a framework of dimensions (Learner, Instructor, Course, Technology, Design, and

Environmental) that may affect learner satisfaction (Sun, Tsai, Finger, Chen, & Yeh, 2006). They found that items assessing learner computer anxiety, flexibility, course quality, perceived usefulness, ease of use, diversity in assessment, and the instructor's attitude to be the most critical factors that affect student satisfaction. Lastly, as mentioned earlier, the most recent meta-analysis by Sitzmann et al. (2006) demonstrated no difference in participant satisfaction across distance education or face to face courses. Research comparing online and face to face courses across participant satisfaction measures have illustrated that many of the same factors are at play including evaluation of the instructor and utility measures (perceived usefulness, ease-of-use, etc.).

In consideration of the results of the aforementioned research reports and meta-analyses; several patterns, conclusions, and directions for future research can be observed. First, it appears as if there may be no differences in learning outcomes and effectiveness between online courses and face-to-face courses. In some studies, a slight positive weight on outcomes has been uncovered for online courses. The authors of the meta-analyses, however, caution the reader upon attributing the delivery format to be the sole source of variance in learning outcomes and participant reactions. Instead, a composite of factors and variables (but, namely, the comparability of instructional design and length of instruction) should be considered when examining training and education outcomes of online courses. The authors call for future research in understanding the effects of cohort size, objective course design characteristics, process variables, self-selection, and learner control on the effectiveness of web-based instruction. Learner control as a component of online instruction has been explored and has demonstrated mixed results in improved learning outcomes and satisfaction with training;

although the applicability of the instructional material to the course participants and the temporal frame of instruction may be accounting for the discrepancy in affecting learning outcomes within the literature (DeRouin, Fritzsche, & Salas, 2004). As a result of this research on learner control, guidelines for organizations and educational institutions to use when focusing on and amplifying the learner control aspect of online learning have been produced. Furthermore, further research in student satisfaction differences between online and classroom courses should be conducted so as to determine the most important aspects (Richards & Ridley, 1997). Research within these other areas may also be able to provide useful information, which in turn can be translated into pragmatic imperatives for improving the construction of courses regardless of format.

Following a discussion of the scientific examination of courses utilizing web-based instruction and traditional, classroom courses, a brief discussion of the various typologies of distance education that have emerged is appropriate. Lemak, Shin, Reed, and Montgomery (2005) uncovered three major typologies in a review of the literature. The first was introduced through collaboration with one of the co-authors and identifies three models of instructor-trainee interaction: “passive learning” which encompasses interaction-less knowledge transfer often found in traditional correspondence courses, “limited interactive learning” which makes at least some form of dialogue available but has no association with traditional classroom experience, and “fully interactive learning” which incorporates two-way audio and visual interaction mimicking the traditional classroom experience (Lemak & Miskin, 1995). The second typology by Miller (2000) begins with an examination of “independent learning” which essentially encompasses correspondence courses through the use of modern delivery methods, is followed by the “distributed classroom” which is made up of technologies such as interactive video that

are often used to connect local and remote sites, and ends with a description of “asynchronous learning networks” which enable students to engage in dialogue with the instructor and their peers without being subject to time constraints. This “asynchronous learning network” is characterized by increasing accessibility of information presentable and a wide variety of formats, amplification of the students’ pool of resources, and interaction, dialogue, and collaboration that is not restricted by time or physicality (Miller, 2000). A final typology is introduced by Katz (2002) in sequence of the “generations” in which they were presented as mediums: the first generation corresponds to traditional “one-way” mediated communication, the second generation corresponds to audio/visual broadcasts lacking an interactive element, and the third generation corresponds to flexible communication between the instructor and teacher through asynchronous technology. Modern Computer-Based Instructional courses that are offered online are likely to follow the Katz (2002) “third generation” and Miller (2000) “asynchronous learning network” technology. The emergence of these typologies reflects how advancements in learning technology produce the need for research examining how instructional design, curriculum, and instructional methodology may be affected by advancements in technology and an amplification of the quality of learning that may be achievable through such modalities.

Participant Reaction Methodology and Dimensionality

Research on training evaluation can begin by examining the cornerstone establishment of four levels of training criteria: reaction, learning, behavior, and results (Kirkpatrick, 1994). Kirkpatrick stipulates that each of these levels is not commutative in relation to the others, but

proceeds in a step-by-step fashion starting with the “reaction” category. As the first level, reaction is critical in “setting the stage” for an appropriate and productive learning atmosphere, for “if participants do not react favorably, they probably will not be motivated to learn” and, furthermore, that “positive reaction may not ensure learning, but negative reaction almost certainly reduces the possibility of its occurring” (Kirkpatrick, 1994, p. 22). This first level is most likely the most commonly used in evaluating training programs; this suggestion is mirrored in the findings of the “Benchmarking Forum Comparative Report” by the American Society for Training and Development in which 94% of all courses were found to use Level One, “reaction” evaluations (as cited in Bassi, Benson, & Cheney, 1996). An important amendment to the training evaluation criteria has been made by Alliger, Tannenbaum, Bennett, Traver, and Shotland (1997) in which the “reaction” level was augmented to differentiate between “utility judgments” and “affective reactions,” or reactions of “usefulness” of facets of the course and those eliciting reactions to how enjoyable various parts of the course were. Warr and Bunce (1995) also included “utility judgments” and “affective reactions” as categories of reaction criteria but furthered the classification to include “training difficulty.” There is even evidence to suggest that “utility judgments” may have the largest effect when compared to other reaction measures such as “perceived training efficiency” and “perceived trainer performance” (Giangreco, Sebastiano, & Peccei, 2009). These various differentiations that have been made within the reaction evaluation categories are useful in that they distinguish between the various dimensions of a reaction item response.

The rejection of a unidimensionality to training evaluation reaction measures has been supported by research conducted by Morgan and Casper (2000) to examine the underlying factor

structure of training program participant reactions. These 32 item reactions were obtained from over 9,000 employees in a government agency. By using both exploratory and confirmatory factor analysis, Morgan and Casper (2000) observed the emergence of six factors in their research: “satisfaction with instructor,” “satisfaction with the training management administration process,” “satisfaction with the testing process,” “utility of training,” “materials,” and “course structure.” They concluded from their findings that the depiction of reaction measures as dualistic, as Alliger et al. (1997) suggested, may be inappropriate by not effectively eliciting enough quality information to be used in training course evaluations, as the multi-faceted factor structure Morgan and Casper (2000) uncovered suggests. However, their research did support “utility” as its own factor, confirming this categorical designation as previously made by Alliger et al. (1997). A meta-analysis conducted by Traci Sitzmann et al. (2008) examined the relationship between participant reactions and participant characteristics, situational characteristics, learning outcomes, and organizational outcomes – all while exploring if any variables moderate these relationships. Although several participant characteristics including agreeableness, anxiety, pre-training motivation, as well as organizational support were all shown to predict trainee reactions; instructor style and human interaction were shown to be the strongest predictors of reactions (Sitzmann et al., 2008). This suggests that even though trainee characteristics do have an impact on trainee reactions, the largest concern and focus should be placed upon situational and program design characteristics. These results suggest that trainee characteristics like disposition and attitudes (Noe, 1986) act in combination with training characteristics to impact trainee reactions. The training characteristics, however, can be inferred to have a much larger impact based on the results of the meta-analysis. Furthermore, Kraiger

(2002) suggests that evaluation efforts should be goal based: if one is focusing on the evaluation of course characteristics, reaction measures are suitable – granted that they take into account important variance factors such as instructor style and human interaction levels; if training focus is on the acquisition of knowledge and skills, various learning measures should be used. The goals and objectives of these training programs may also be considered as complementary to their delivery format; for example, Benigno and Trentin (2000) expand the scope of the course trainee evaluation for online courses to include additional factors of “participation modalities (logistics) of individual students” and “technical aspects related of the use of the net and the suggested technologies” (p. 268).

A call for future research in this meta-analysis (among others) on “the direct influence of objective training characteristics on perceived training characteristics and reactions would help to clarify what types of training characteristics and experiences are most useful for creating positive reactions” (Sitzmann et al., 2008, p. 290). Objective course characteristics that can be directly manipulated, such as the delivery format, should be examined so as to determine which are the most useful in eliciting positive reactions. A problem that is likely to arise in future research is that the characteristics of courses could be considered as subjective, rather than objective. Regardless of the presentation of objective characteristics and stimuli (such as provision of a textbook, method of delivery, etc.), qualitative assessments may still be made by the trainees regarding the usefulness or affective evaluation of each elemental characteristic of the program. For an organization or training administrator to derive the most value from reaction measures, it would be beneficial to continue to observe the frequency of positive and negative

reactions for consistent elements within a training program so as to make modifications to the quality of those aspects as stable patterns in evaluation emerge.

In contrast to the direction of previous research, Brown (2005) attempted to forge a nomological network of trainee reactions that was built under the assumption that all reactions were affect-driven, hierarchical, and explainable by overall satisfaction measures which are in turn predicted by trainee characteristics. Brown (2005) also suggests that the variance in reactions are really just facets of a singular construct as suggested by the high “correlations among the facets of utility (or relevance) and enjoyment” in some studies (p. 992). However, previous research is not cited which may demonstrate this as a trend. Furthermore, it can be said that high correlations between these two item subgroups do not necessarily posit that they are tapping into a single construct, but could suggest that the utility and affect constructs are quite related. The negative or positive directionality underlying each construct could suggest that characteristics of “good” training programs are both useful and perceived as “good” to trainees. Regardless, Brown (2005) did note that longer, multi-day training programs would most likely not apply to the nomological network he proposed due to the “time delay between affect experienced in training and reaction measures collected after training” (p. 992). This would bring into question the feasibility of the nomological network he has proposed, especially in consideration of the multi-day training programs that are likely to abound within the realm of industry.

In consideration of the previous research, it appears as if instructor behaviors should constitute a focal point for participant reaction research. The results of the meta-analysis indicate that instructor style emerged as the strongest predictor of trainee reactions (Sitzmann et

al., 2008). Also, the instructor reactions emerged as the highest loading factor within Morgan and Casper's (2000) study. By analyzing the instructor behaviors and traits which result in the most positive trainee reactions, the organization can determine how likely selecting instructors who are most capable of exhibiting those types of behaviors may influence trainee reactions. Furthermore, another important aspect to be considered in training evaluation that aligns with the Morgan and Casper (2000) training evaluation factor structure would be utility. Utility can be considered as complementary to affective reaction measures due to the fact that it correlates with on-the-job performance measures more highly than affective measures both singularly and when combined with affective measures (Alliger et al., 1997). Utility measures also rationally serve as a method of gauging the applicability and relevancy of the materials presented within the course. Tricker, Rangecroft, Long, and Gilroy (2001) suggest that in the case of online courses, that it "is essential that the course materials...are as far as possible appropriate and seen by the students as valuable" (p. 166). This may be because of the posited and increased transactional distance found within distance delivery courses; the mainstay pedagogical/academic role of the instructor is replaced in terms of physicality by the course materials (Tricker et al., 2001). This accentuates the idea that utility measures can be very useful to the organization in decisions concerning the purchasing of appropriate materials and the development of relevant content. It should be noted, however, that "there is little correlation between reaction and learning, and even less between reaction and performance" as indicated by Ruona, Leimbach, Holton, and Bates (2002) in their examination of the literature (p. 219). This denouncement of participant reactions as indicators of job performance and learning does hold a strong level of merit and in following this train of thought, it can be concluded that reaction measures cannot be considered robust substitutes for

other learning measures and performance transfer measures (Alliger et al., 1997). Regardless, evidence has been provided that participant evaluations are determined by how much students enjoyed the content of the course or felt engaged by the course, which in turn has been shown to be a function of the participants' perceived quality of teaching and instruction (Remedios & Lieberman, 2008). This suggests that course evaluations eliciting affective reactions from participants are mostly influenced by perception of the instructor and engagement within the course material.

Despite the criticisms towards the utilization of participant reactions, Kraiger's (2002) recognition of the usefulness of training evaluation research, especially in consideration of modifying the training program to be more attractive to trainees and consideration of effective training as a marketing tool, evaluation research with a focus on reactions can serve as an important tool within the realm of industry in which one can gauge the perceived quality of the "product" to those who are participating and sometimes even funding the training efforts. Calder (1995) acknowledges this elicitation of reactions for course revision purposes as the "market research" component in distance-delivery course evaluation and planning; by determining what students desire from the course and their importance ratings of training program characteristics, one can continue to provide an optimum experience (Open University, 1986; as cited in Tricker et al., 2001). Also, participant reactions have become part of the explicit criteria (in certain situations) that are used as the base of faculty / instructor retention and promotion decisions (Whitman & Weiss, 1982). As indicated earlier, reactions can be useful within industry to gauge the participants' evaluations and appraisal of the training/education "product" and permit the

course developers to continue (or begin) to develop quality training that aligns with student needs.

Course Syllabi

A major aspect of any online course (or any organized, scheduled series of learning events, for that matter) is the course syllabus. According to Kearsley and Lynch (1996), the syllabus is “the single most important instrument of structure in a course” that outlines the goals and objectives of a course (which restricts the domain of knowledge for the learner), prerequisites (limiting the student population to only those with the relevant experiences), the grading/evaluation scheme (which communicates to the students what types of learning experiences are to be valued), materials to be used (textbooks, software), topics to be covered (content the developer / instructor deems important), a schedule, and a bibliography” (para. 8). Existing research on course syllabi is primarily focused on analyses of its components based on singular perspectives and its functionality. Eberly, Newton, and Wiggins (2001) suggest that course syllabi are significant to three domains of education: interpersonal, course development, and administration. Bers, Davis, and Taylor (1996) reason that syllabi are important to the administrative domain of education because they act as open descriptions of courses available to the public, they are often used in judicial and grievance hearings as pieces of evidence, and they are often used in the determination of whether or not certain course credits are able to be transferable in certain situations. The course syllabus is also important for course development purposes, as instructors and course developers are urged to explicitly outline the plans and strategies to be used within the course (Grunert, 1997; Madson, Melchert, & Whipp, 2004). This

can be beneficial to the institution, organization, and instructor because the systematic and periodic analysis of syllabi may be used for formative evaluation purposes and in determining whether or not there are any semester-contingent idiosyncrasies or severe faults with the current curriculum in question (Ecker, 1994). Matejka and Kurke (1994) separate this function of the syllabus into a differentiation between the “plan” and the “cognitive map” for learning: one function provides the schedule for what is to be covered and the other involves an imperative on the instructor’s part to match the needs and objectives of the students through appropriate teaching methodology and presentation style. Similarly, Altman (1989) presents a synthesis of the “plan/map” and “contract” paradigms as a legally-binding written covenant that binds students and the instructor to a particular guided course of study. Finally, the course syllabus is important to the interpersonal domain of learning, reflected in the emerging paradigm of the syllabus as a contract. Bers et al. (1996) and McKeachie (1978) assert that the syllabus is a contract that should provide participants with an idea of what they may expect when they take a course (as cited in Eberly et al., 2001). Also relative to the interpersonal realm of education / training, Danielson (1995) asserted that a well-constructed syllabus can serve as a mechanism to facilitate the “organization socialization” process within the classroom, which she also deemed to be to some extent like a “mini-organization.” The syllabus assists with this process by reducing the uncertainty of the course participants and by establishing the normative culture of the class. Some researchers even suggest that the multi-functionality of the syllabus is so important, that the development and administration of a take-home syllabus quiz is necessary for the communication of expectations and a possible boost in effectiveness of the course (Raymark & Connor-Greene, 2002). Furthermore, some have even argued that providing rich information

within course syllabi is an ethical imperative: erring on the side of “too much information” may be justifiable through arguments of maximized autonomy and utility for all parties involved due to the plethora of information (and the provision of a choice to “opt out” of what one may be getting himself/herself into) as well as a promotion of beneficence and non-maleficence (Handelsman, Rosen, & Arguello, 1987). This social / educational contract is important because it serves as the platform, communication medium, and formal agreement of the rules, directives, and norms that are expected to be conformed to by all parties involved throughout the scheduled learning experience.

Although the importance and functionality of the syllabus has been discussed thoroughly throughout the literature, discussion and study of its characteristics and relation to other aspects of the course have been scant (Bers, Davis, & Taylor, 1996). However, research has been conducted on how participants react *specifically* to syllabi (Becker & Calhoun, 1999; Smith & Razzouk, 1993). Also, most of the literature concerning the syllabus has been of a prescriptive nature (Parkes & Harris, 2002), but some research has been conducted in efforts to deconstruct the syllabus into its common components and complementarities with its multi-functionality. Eberly, Newton, and Wiggins (2001) analyzed 145 course syllabi from various departments at a mid-sized state university and grouped the various sections that appeared into various “themes”: basic course information, course format, performance evaluation, responsibility for learning, use of technology, course content, required reading, and acknowledgement of general education guidelines. They determined that the administrative and course development purposes generally dominated the structural themes that emerged. Very little attention seems to be paid to the interpersonal theme (responsibility for learning was the only category that reflected this theme).

The authors suggest, as a result, that more attention should be paid to developing the syllabus as a contract: communicating the responsibilities of all parties involved to form the foundation for their interaction. The syllabus elements derived from their analysis were very similar to previous syllabi component extrapolations; additional headings may exist, but they are likely to be included within other sections with differences in nomenclature (e.g. educational philosophies or beliefs, textbooks, methods of instruction, student resources, etc.) (Lowther, Stark, & Martens, 1989). The job-analysis technique has also been used in the analysis of course syllabi. Job-analysis was utilized on a survey of BTech engineer incumbents in order to redesign the syllabus of the BTech training course so that it may be more efficiently aligned with engineer job duties (Doron & Marco, 1999). Efforts have also been devoted to the creation of an instrument which may be used for syllabus analysis. Madson, Melchert, and Whipp (2004) developed an instrument, the “Syllabus Assessment Instrument,” which they used to analyze 88 syllabi from a private, Midwest university for evidence of course use of computer technology skills (as derived from the ISTE standards). Although their instrument was specifically designed for assessing the presence of technology-use as communicated through the course syllabi, the instrument demonstrated evidence of reliability and validity and can be altered for use within other learning domains by establishing criteria for implicit and explicit references to the learning domain area and by using a generalizable, standardized skill set (i.e. ISTE, IACET, NBPTS).

An examination of the course syllabi in relation to participant course evaluations can be beneficial to furthering the research on what makes for effective curriculum, course, and instructional design and can have a plethora of pragmatic implications. Gould and Padavano (2006) have suggested that by posting the syllabus on the web (or by making it available through

other means), the course developers can manage the students' expectations for the course by letting the "students know up front how the course is organized" (para. 5). Another reason is that students are often asked on their evaluation forms questions relating to the syllabi as indicated by Kelley, Conant, and Smart (1991) such as whether the instructor adequately communicated the course objectives, purpose, evaluation criteria, project instructions, etc. (as cited in Smith & Razzouk, 1993). Furthermore, a more accurate depiction of syllabi is needed that can provide a perspective of how teachers present syllabi (and how they are perceived by students). Along with other methodology proposed by Thompson (2007) including learning what participants think instructors are trying to communicate through syllabi and how the rules that are aspects of the syllabi are perceived by the participants; she has also proposed that an excellent quantitative question would involve examining the effects of communication strategies involved in syllabus design on the students' impressions of the teacher and the course. Research involving the systematic analysis of course syllabi is rare within the literature, with only a handful of studies conducted focusing on the component analysis of course syllabi (with a plethora of studies concerning "best practices" and syllabi construction prescriptiveness) and seemingly none focusing on how they may be related to participant reactions or evaluations.

Hypotheses and Research Questions

The aim of this study is to determine the effects of varying aspects of course syllabi on participant reactions and evaluations of a variety of professional development courses for teachers. The national professional development organization under study is accredited by the Distance Education and Training Council. Teachers enroll in courses with the target

organization for a variety of different reasons: to meet state/local professional development requirements, to become eligible for salary increases, to meet requirements for certification, to maintain certification, etc. Online courses are nationally available to any teacher. Face to Face courses are offered in various locations within the states of New York, Pennsylvania, and Florida. Participants self-select into various courses contingent upon their temporal and geographic availability. The frequency of course offerings vary greatly across formats – this is due to the fact that the online courses are not restricted by location and physical presence demand of participants. Rather, the online courses are offered every other month in consideration to content and are generally never in danger of cancellation due to extraneous factors. The face to face courses are generally offered less frequently than the online courses because of the physical demands levied by having to reserve meeting space, assemble participants, etc.

The teacher population from which the sample is derived can be described through an examination of national education statistics. In examining the National Center for Education Statistics of the United States Department of Education (2009, Table 188) statistics for total Fall enrollment in degree-granting institutions for the year of 2005, the minimum age enrolled into a Bachelors Degree program was between 14 and 17 years old (approximately 1% of the total enrollment across all age groups). As the United States Department of Education (2010, Indicator 21) statistics for the time to complete a Bachelors Degree fall between 4 to 6 years, one can infer that the absolute minimum age for trainees enrolling within the professional development institute should be 18 years old. In reference to the gender of the trainees, the respondents belong to the national population of teachers which was determined by the United

States Department of Education (2008a, Table 3) Schools and Staffing Survey to be, on average, 75.6% Female and 24.4% Male. According to the United States Department of Education (2008b, Table 3), the mean percentage distributions for gender (Female and Male, respectively) are 71.4% and 28.6% for Pennsylvania; 77.8% and 22.2% for Florida; and 74.9% and 25.1% as pooled across New York, New Jersey, and Connecticut (as teachers from all three populations complete coursework at the Long Island and New York City face to face locations). With respect to race/ethnicity, the United States Department of Education (2008c, Table 2) determined the mean percentage distribution of teachers to be 83.5% White/non-Hispanic and 16.5% from minority groups. The mean percentage distributions for ethnicity (White/non-Hispanic and pooled across minorities, respectively) are 96.7% and 3.3% for Pennsylvania; 73.1% and 26.9% for Florida; and 87.7% and 12.3% as pooled across New York, New Jersey, and Connecticut. The accessible population is expected to conform approximately to these norms and figures of the target population. Whereas the gender distributions are roughly equivalent to a certain extent across the aforementioned states; the ratios of White/non-Hispanic responses appear to be quite different. This is not expected to be a major issue, due to the fact that the majority of the course evaluation data has been submitted from New York state students, who have a distribution that more closely resembles the national average.

Five facets of the content of course syllabi will be compared across participant evaluations, including items assessing the participants' reactions towards the instructor and perceived course utility. The course objectives listed on the syllabi are expected to affect participant reactions towards the course when they vary in number, specificity, and knowledge base. In terms of the number of course objectives and specificity, previous research suggests that

participants' are often inattentive to the syllabus, refer to it sparingly, and are often "foggy" in regards to recall of its tenants (Raymark & Connor-Greene, 2002; Smith & Razzouk, 1993). Furthermore, student anxiety and repeated requests for clarification are often the hallmark of an ambiguous syllabus (Kearsley & Lynch, 1996). As a result, the number of course objectives and their specificity are expected to be positively related to the participants' reactions to the course because the course syllabus will appear to be thorough and direct in its coverage of course objectives. The specificity in objectives will improve the communicative ability of the syllabus, and as a result, the course will be well-received. The communication of course content through objectives occurs regardless of the medium that is in place to communicate that knowledge, so it is not expected to be affected by the delivery format.

Hypothesis 1: Participant reactions will be positively related to the number of course objectives found within the course syllabi.

Hypothesis 2: Participants will react more favorably to courses with specific course objectives found within the course syllabi.

The knowledge base of the course (as derived from the syllabus) is also expected to be a factor that may differentially affect the varying conditions of online and face to face courses. Anderson (1982) has made the definitive distinction between the two forms of knowledge; both were intended to act as the "products" of the first two stages of Fitts' (1964) skill acquisition process. Declarative knowledge consists of an initial coding of the information (the "what") that is sufficient enough to posit adequate recall or execution of the desired behavior. Procedural

knowledge refers to a direct application of knowledge (the “how”) often in the form of practice that outlines the process behind a skill or objective. The previous meta-analytical research tends to suggest that online courses (and courses with computer-based instruction) fair better than their traditional counterparts in terms of participant reactions (Kulik & Kulik, 1991; Paul, 2001; Zhao et al., 2005). Although distinctions have been made between declarative and procedural learning outcomes between online and face to face courses, to my knowledge there has been no attempt to see how participants differ in their reactions when considering the knowledge base of the course. Courses that have a procedural knowledge base are expected to be reacted to more favorably within a face-to-face course than an online course due to the individualized level of feedback and reduced transactional distance.

Hypothesis 3: Overall participant reactions will be more positive for online courses than face-to-face courses combined across the two levels of knowledge base.

Hypothesis 4: Participant reactions will be more positive for online courses than face-to-face courses, as a function of the knowledge base of the course communicated by the syllabi.

In consideration of the course content, the amount of student interaction and workload as derived from the syllabi may also have an effect on the participants’ ratings and evaluation of the courses. Because group interaction is an important moderator of trainee reactions (Bolliger & Martindale, 2004; Sitzmann et al., 2008) and because student interaction can be assumed to be maximized within a traditional classroom (face to face) environment, courses with higher levels

of student interaction will be rated more positively when offered in face-to-face conditions as opposed to those offered online. Furthermore, the workload involved (even though it is expected to negatively impact participant reactions as a result of a possibility of cognitive overload and mental over-exertion) is not expected to differ as a function of the course delivery format.

Hypothesis 5: Participant reactions will be more positive for courses with higher student interaction levels.

Hypothesis 6: Participant reactions will be more positive for face to face courses than online courses, as a function of the student interaction levels rated on the syllabi.

Hypothesis 7: Participants will react more negatively to courses with a substantial workload.

In addition to all of the aforementioned hypotheses, the effect of the delivery format on the magnitude of the participant reactions will be explored as a research question.

Summary

The benefits of exploring facets of training and education programs and how they are related to participant reactions are numerous, obvious, and worthy of exploration. The institution or organization may be able to alter the professional development, education, training, and opportunities that it offers its employees or clients after examining how participants react to course they are enrolled or participating in, which can be especially valuable within an industrial or commercial environment. It may also be beneficial to differentiate between the aspects of the

course which tend to moderate the effectiveness of the online and face to face course formats. The existing research and theory posits that we may find this by examining learning principles and instructional methodologies; not the medium in-and-of-itself. Furthermore, research examining course syllabi has been rather limited and generally focused on how participants react specifically to the syllabi, prescriptions as to what constitutes the most “effective” syllabi (as riddled with conjecture as it may be), and several content analyses of syllabus elements. More research is needed regarding the aspects of course syllabi and how they may be related to participant reactions collected upon completion of the course. The aim of this study is to determine the effects of varying aspects of course syllabi on participant reactions and evaluations of a variety of professional development courses for teachers. Differences in the number or specificity of course objectives are expected to affect the participant reactions that are to be elicited. Participant reactions will be positively related to the specificity and number of course objectives found within the course syllabus. Course objectives will be separated categorically into declarative or procedural knowledge bases. Participant reactions will tend to be more positive for online courses than face to face courses, as reflected in previous research. Participant reactions will also tend to be more positive for online courses than face to face courses as a function of the knowledge base as communicated by the course syllabi. The amount of student interaction and workload that are present within the course syllabi will also be examined for their effect on participant reactions. Participant reactions are expected to be more positive for face to face courses than online courses when examining courses with higher student interaction levels. They are also expected to be more positive when examining higher student interaction levels as a function of the delivery format, with more positive reactions for face-to-

face courses with high student interaction levels. Furthermore, participants will react more negatively to courses with a substantial workload.

CHAPTER TWO: METHOD

Participants

Course participants. The entire accessible population of the organization's course participants was selected for the years 2009 and 2010. Although the participants self-assign themselves to either face to face or online courses; their motivation to take the course based on designation of delivery can be taken as a composite decision assimilating other factors that can influence a teacher's propensity to choose the course including price, convenience of location, need to fulfill requirements, course content, forecast of individual utility for taking the course based on course subject matter, quality comparison with competitors, etc. Online participants are not geographically limited and may come from any state within the United States. The face to face participants are generally from New York, Florida, or Pennsylvania (and often from the surrounding areas), as these are the only states in which face to face courses are offered through this organization. Because the course evaluation survey was designed to be anonymous to protect the identity of the students, no demographic information regarding participant gender, ethnic background, age, etc. has been collected by the organization. However, as the online courses are all at a graduate level, all trainees must have obtained their Bachelors degree and provided documented proof before being permitted to enroll in the classes. Furthermore, the vast majority of participants within these training courses are teachers. Although an exit survey conducted by the organization in the year 2009 contained participant responses declaring "therapist," "counselor," "administrator," "librarian," and "tutor" as occupations; their responses counted for 1.47% of the total survey responses with the remaining 98.53% declaring a teaching occupation. Of the 13,506 participants who took the courses, a total of 11,892 participant

evaluations were returned (a response rate of approximately 88.05%). After the deletion of 1,091 partial responses, there were a total of 10,801 participant evaluations. Furthermore, after the deletion of 522 responses from 19 single format (only online or only face-to-face) classes, there were a total of 10,279 participant evaluations from 31 classes.

Instructors. A total of 71 instructors taught the teacher training courses; 28 instructors taught online courses and 45 taught face to face courses. 15 instructors taught both online and face to face courses. Among the course instructors, 25 were Male and 46 were Female. All instructors for the training program are current or former K-12 classroom teachers, hold a Master's Degree or higher, and have been pre-approved by the organization's academic partner universities as eligible adjunct faculty. As a qualification for selection, all instructors throughout the organization are required to be former or current, certified classroom teachers and, as a result, are expected to conform to the same aforementioned demographic distributions as the course participants, with the exception of the graduate degree requirement.

Graduate research assistants. Five graduate-level research assistants between 23 and 27 years of age were recruited from the Department of Psychology at the University of Central Florida to serve as assessors of the course syllabi. Among the graduate research assistants, three were Male and two were Female. Graduate students in Psychology are considered subject matter experts due to their extended exposure to psychological scaling techniques and psychometrics as well as graduate course syllabi.

Materials

Course evaluations. Two types of course evaluation forms were administered to course registrants contingent upon the course format. The face to face course registrants were given a

paper-based course evaluation form upon completion of the course (Appendix A). The online course registrants completed an online course evaluation survey by accessing a link to “Survey Monkey” listed at the end of the final course module and also sent by e-mail upon completion of the course (Appendix B). Each evaluation form contained items relevant to assess the trainee reactions to the courses based on delivery format. No personally identifiable information was required to be provided on the form. The organization’s scoring procedures for determining instructor effectiveness is considered to be proprietary information and lies beyond the scope of the study. The course evaluations are utilized to make recommendations to instructors by the employee responsible for Human Resources functions within the organization and to determine whether or not remedial actions need to be taken to address deficiencies.

The face to face course evaluation form consists of five parts (Appendix A). The first part of the evaluation consists of an elicitation of course information including the Location, Date, and Instructor name. A five item evaluation of “Part I - The Course” in a Likert-type rating scale (ranging from 1 to 5, “Low” to “High”) format follows the previous section with items gauging the utility of various aspects of the course, a comparison with other education courses, and an overall application utility measure. Next, a five item evaluation of “Part II” in which the Instructor is rated on several traits using a Likert-type rating scale (ranging from 1 to 5, “Low” to “High”) is provided. In Parts III and IV include a post-training measure of individual “self-efficacy,” a global measure of the facilities at which the course is held using a Likert-type rating scale (ranging from 1 to 5, “Poor” to “Excellent”) format, and other sections including an elicitation of possible location suggestions and additions to organization’s e-mail list. Parts III and IV will not be utilized within this study.

The online course evaluation form begins with a section soliciting information consisting of the Instructor's name, the registrant's state, and the start date of the course (Appendix B). The items included within the evaluation are based on a Likert-type rating scale (ranging from 1 to 5, "Lowest" to "Highest"). Individual comments sections are also included after the Course and Instructor sections of the Course Evaluation form to provide an opportunity for the student to provide reactions that lie beyond the content area of the aforementioned items. There is not a post-training measure of individual self-efficacy like the face to face course evaluation, for ease-of-use of the organization, the pre and post test measures have been separated from the course evaluation form and administered separately through "Survey Monkey." The final 10 items of the evaluation are all free response items that attempt to elicit each registrant's particular reactions to the online delivery format, previous exposure to technology and teaching, etc.

The common items from the online and face to face evaluation forms were the only elements of the course evaluation forms that were utilized within this study. The common items across both forms included ratings of instructor "preparation/organization," "knowledge of subject," "creation of a positive learning atmosphere," and "equal concern for theory and practice." The aggregation of these instructor rating items were included as a singular participant reaction rating that was verified through principal components analysis. The remaining common items were deemed to be conceptually distinct and were analyzed as separate dependent variables also verified through principal components analysis: "compared to other education courses you have taken, how would you rate" this course, "Rate the usefulness of the text," and "How well did this course apply to your classroom?" The common items across both of the online and face to face course evaluations had a high reliability, Cronbach's $\alpha = .90$. The

instructor evaluation subscale also had a high reliability, Cronbach's $\alpha = .95$. The reliability for the remaining items, although also high, was slightly lower than the instructor evaluation subscale and the evaluation as a whole, Cronbach's $\alpha = .79$.

Course syllabi. The course outlines / syllabi are standardized for use by all instructors within the organization and are publically available on the institution's website. They are made publically available so that potential participants may have a document to submit to their districts or state departments of certification so that they may receive credit for the course. The syllabi for the online courses are separated from those of the face to face, or classroom courses, but are presented on the same website. The sections are generally the same on both syllabi and contain the following elements: course description, objectives, curriculum design and time requirements, course materials, session outline, grading, student requirements, and student academic integrity. The online courses generally have an additional section entitled, "hardware and computer skills requirements." The syllabi sections mirror those produced by in-depth analyses of syllabi components and sections (Eberly, Newton, & Wiggins, 2001; Kearsley & Lynch, 1996; Lowther, Stark, & Martens, 1989). The wording and presentation of the course syllabi was slightly altered so that participants were blind to the explicit indication of whether a course is offered online or face to face. This included the removal of the "hardware and computer skills requirements" and "curriculum design and time requirements" sections from each syllabus. The elements of the course syllabi were rated and examined by five graduate-level research assistants for presence (or absence) of learning principles and aspects.

Graduate assistant rating materials. The ratings of a selection of the course syllabi aspects served as nominal or ordinal attribute independent variables upon which the participant reactions

were compared. The graduate assistants assigned each course syllabi to either a procedural knowledge or declarative knowledge category for the variable of knowledge base (Cronbach's $\alpha = .99$). The ordinal attribute independent variables of course objectives specificity (Cronbach's $\alpha = .90$), student interaction (Cronbach's $\alpha = .95$), and workload (Cronbach's $\alpha = .85$) were rated by the research assistants using a 3-point likert type rating scale. This type of scale was chosen (as opposed to one with more points i.e. a 5-point or 7-point rating scale; or a balanced rating scale) because the syllabi aspects are likely to be more accurately assessed utilizing a unipolar scale in which the course aspect is either present, not present, or somewhat present. This is also expected to be of high fidelity to how students and course participant also make global assessments or judgments of the syllabi. The anchors provided for the specificity of course objectives were determined through examination of the definition as specified by the Florida Center for Instructional Technology (2009). Furthermore, the anchors provided for the determination of substantiality of course workload were determined by examining the four factors (difficulty, workload, pace, and additional time allocated) of workload from student evaluation of educational quality responses (Marsh & Hocevar, 1991). Pace was omitted as a dimension of the workload factor and only difficulty, workload, and additional time required were examined. This dimension was omitted because the pacing for the coursework at this professional development institution is uniform across all courses of each delivery format and also because the curriculum and time requirements section was deleted from the sets of syllabi examined to mask the delivery format.

Procedure

Course evaluation data has been obtained and coded from a national professional development organization that provides training and education for teachers. The course evaluation forms were submitted anonymously by each student upon completion of the course within which they are enrolled. The course evaluations vary in methodology of collection across training delivery format. The face to face courses are completed and collected on the last day of the course by a student volunteer in the class who encloses them within a stamped, pre-addressed envelope included with the organization's provided course materials. This envelope is mailed by the student to the organization's offices where the evaluation forms are examined, scored, and filed by organization personnel. Submission of the online course evaluations is instantaneous after the course is completed and they are sent directly to the company Survey Monkey account. Utilizing the Survey Monkey account, organization personnel examine the ratings and evaluate the effectiveness of the course based on these report measures (in conjunction with the separate pre and post tests). The course evaluations were derived from a total of 30 courses over a two year period, 2009 to 2010. All courses were components of the institution's 52 course catalogue. Partial responses, inconsistent evaluation forms, and non-responses were treated as deleted cases and removed from consideration in the analyses. The data was collected and synthesized from course participants and analyzed as part of a large database. At the time of data collection and analysis, there was no electronic database in place for the synthesis of course evaluation data. After the course evaluation data were collected and synthesized, the 56 syllabi for the examined courses (half online and half face to face, with four identical courses) were distributed to the five, independent, graduate research-assistants. The research assistants rated the course syllabi over

four dimensions: “specificity of the course objectives,” “knowledge base,” “student interaction requirement,” and “workload.” The research assistants were also provided with instructions on how to complete the rating form for each course syllabus (Appendix C).

The study utilized an ex post facto comparative research design. The courses/course syllabi consisted of six different attribute independent variables: course delivery format, number of course objectives, specificity of course objectives, knowledge base, student interaction, and workload. Assignment to each independent variable grouping was determined through the average of the ratings for each course syllabus from the five graduate-research assistants; except for the course delivery format and the number of course objectives which were derived from each course syllabus without ratings. All course groups were intact prior to the start of the study. The dependent variables measured within this study were the participant reaction scores which consisted of the common items across each format’s evaluation form, whose groupings were verified by principal components analysis. The sum of the participant perceptions of the instructor items at the levels of preparation/organization, knowledge of subject, creation of a positive learning atmosphere, and equal concern for theory and practice were treated as one dependent variable. The remaining items deemed conceptually distinct were assessed as separate dependent variables: comparison of course to previously taken education courses, text usefulness, and classroom application.

CHAPTER THREE: RESULTS

The Statistical Package for the Social Sciences version 19 (SPSS v. 19.0.0) was utilized to perform the statistical analyses that were associated with this research. Before conducting the analysis, the data set was split into two equally-sized subsamples. This split was performed in order to ensure that the online and face to face subgroup sizes were equivalent. The data set, originally containing 10,279 cases (3,182 online and 7,097 face to face), was randomly split using SPSS into subsamples of 2,000 cases for each of the delivery format conditions (online and face to face). The resulting data set consisted of 4,000 total cases.

Descriptive Statistics

Tables 1 and 2 present the means, standard deviations, and zero-order correlations for all independent and dependent variables, respectively. To explore the conformity of the various dependent variable distributions to the assumptions of normality, the Komogorov-Smirnov (K-S) test was computed for each dependent variable. The “comparison with other education courses,” $D(4000) = 0.34, p < .001$, “usefulness of text,” $D(4000) = 0.27, p < .001$, “classroom application,” $D(4000) = 0.36, p < .001$, and the instructor evaluation sum, $D(4000) = 0.41, p < .001$ were all significantly non-normal. In addition, Q-Q plots were plotted for all dependent variables. The usefulness of text, classroom application, and comparison with other education courses items all exhibited evidence of kurtosis and skew to some degree. The Q-Q plot for the sum of the instructor evaluation scores also suggested some degree of kurtosis but was more indicative of skew. Examination of the frequency distributions of the dependent variables also provided evidence of negatively skewed and kurtotic distributions. Based on the consistency of

the K-S tests and the Q-Q plots, the evidence suggests that the distributions of the dependent variables are non-normal.

The averages of the majority of the syllabi ratings (specificity of course objectives, student interaction, and workload) as well as the mode of the knowledge base rating were utilized to determine group membership into the various independent variable groups of the same name. The assignment of score clusters to various levels of the independent variables was based on several factors: the goal of creating roughly equivalent groups in terms of equal sample sizes, the spread of the syllabi ratings across the course evaluation data, and the possible and observed ranges of the Likert-type scales. Examination of the cumulative percentile of the frequency distribution of each set of syllabi ratings was also utilized in the determination of forging roughly equivalent sample sizes. In terms of the number of course objectives presented in each syllabus, a similar group assignment rationale was utilized that also involved examining the cumulative percentages of the course objectives frequency distribution as well as the observed ranges of the number of course objectives. The course objectives were grouped into samples that roughly resemble thirds.

Table 1: Descriptive Statistics and Correlations among Independent Variables

Variable	<i>M (SD)</i>	1	2	3	4	5	6
1. Delivery Format	1.50 (0.50)	-					
2. Number of Course Objectives	1.99 (0.79)	.02	-				
3. Specificity of Course Objectives	2.03 (0.88)	.05**	.20**	-			
4. Knowledge Base	1.40 (0.49)	.18**	-.05**	.25**	-		
5. Student Interaction	1.51 (0.50)	.09**	.10**	-.02	.05**	-	
6. Workload	1.96 (0.60)	.25**	-.04*	.15**	.03	-.21**	-

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

Table 2: Descriptive Statistics and Correlations among Dependent Variables

Variable	<i>M (SD)</i>	1	2	3	4	5	6	7
1. Knowledge of Subject	4.78 (0.59)	-						
2. Creation of a Positive Learning Atmosphere	4.76 (0.64)	.81**	-					
3. Preparation / Organization	4.74 (0.64)	.85**	.80**	-				
4. Equal Concern for Theory and Practice	4.72 (0.65)	.81**	.85**	.81**	-			
5. Usefulness of Text	4.16 (0.99)	.35**	.35**	.37**	.37**	-		
6. Classroom Application	4.46 (0.80)	.50**	.51**	.52**	.52**	.48**	-	
7. Comparison with other Education Courses	4.42 (0.81)	.60**	.63**	.62**	.64**	.57**	.67**	-

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

Principal Component Analysis

In order to examine the relationship between the common items on the course evaluation forms, a principal component analysis (PCA) was conducted on the standardized scores of the 7 items with oblique rotation (Promax). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated that the sample size was at a “meritorious” level (Kaiser, 1974) for this analysis, $KMO = .89$, and for all individual items in this analysis as well, $KMO > .88$. Bartlett’s test of sphericity, $\chi^2(21) = 22,605.44$, $p < .001$, was highly significant indicating that correlations between items were appropriate in magnitude for principal component analysis. A preliminary analysis was conducted to obtain eigenvalues for each component of the data. Only 1 component had an eigenvalue over Kaiser’s criterion of 1 and explained 66.94% of the variance.

Examination of the residual correlations computed between the observed and reproduced correlations reveal that 80.00% of them have an absolute value greater than 0.05, inferring that the preliminary principal component analysis model could be improved in terms of fit and also providing justification for the extraction of additional components. Inspection of the scree plot revealed an inflection that would justify extracting a second component. Lastly, the eigenvalue from the second component of the preliminary analysis was 0.99, very close to exceeding Kaiser’s criterion of 1. In an attempt to improve the model, an additional principal component analysis was conducted extracting a second component. The 2 components cumulatively explained 81.12% of the variance. Examination of the residual correlations computed between the observed and reproduced correlations of the second analysis reveal that 28.00% of them have an absolute value greater than 0.05, revealing a superior-fitting model than that which was produced in the preliminary analysis. Table 3 shows the pattern and structure matrix of factor

loadings after rotation. The structure matrix takes into account shared variance and thus contains high loadings on both factors. This suggests that the factors are related, which one might expect with items taken from a course evaluation. The pattern matrix factor loadings emphasize the unique contribution of each variable to each factor. The items that cluster on the first component suggest that component 1 represents the items assessing various aspects of the instructor and that component 2 represents the remaining items. Resultantly, there is support for aggregating the items representing the instructor component as a sum and treating it as a dependent variable. Although the other items cluster together as a second component, there is theoretical reason to believe that they are conceptually different. As such, these three items will be treated as separate dependent variables.

Table 3:
Factor Loadings, Eigenvalues, and Percentage of Variance for Principal Component Analysis with Promax Rotation of Course Evaluation Items

Item	Instructor Ratings (I)		Other Evaluations (II)	
Knowledge of Subject	.95	(.94)	.04	(.53)
Creation of a Positive Learning Atmosphere	.94	(.93)	.04	(.55)
Preparation / Organization	.93	(.93)	-.05	(.52)
Equal Concern for Theory and Practice	.92	(.93)	-.03	(.54)
Usefulness of Text	.00	(.38)	.99	(.86)
Classroom Application	.01	(.70)	.72	(.84)
Comparison with other Education Courses	.04	(.58)	.66	(.81)
Eigenvalues	4.69		.99	
% of Variance	66.94		14.19	

Note: Factor loadings > .40 are in boldface. The structure coefficients (r_s) are presented in parentheses.

Hypothesis Tests

Hypothesis 1. Separate statistical analyses for each dependent variable were conducted to test this hypothesis. The first hypothesis examined the relationship between the number of course objectives found on the course syllabi and the participant reactions. The independent variables in this analysis included delivery format (at the levels of online and face to face) and the number of course objectives. In the online condition, the number of course objectives variable was grouped into “low” ($n = 666$), “medium” ($n = 710$), and “high” ($n = 624$) groups. In the face to face condition, the number of course objectives variable was grouped into “low” ($n = 587$), “medium” ($n = 806$), and “high” ($n = 607$) groups. Table 4 presents the means and standard deviations and Table 5 presents the factorial analysis of variance results for the delivery format and number of course objectives for all of the dependent variables.

Table 4: Levels of Participant Reactions by Delivery Format to Courses with Varying Numbers of Course Objectives: Means and Standard Deviations

Dependent Variable	Grouped Number of Course Objectives	Online	Face to Face
		<i>M (SD)</i>	<i>M (SD)</i>
Classroom Application	Low	4.44 (0.80)	4.43 (0.85)
	Medium	4.51 (0.74)	4.43 (0.83)
	High	4.56 (0.69)	4.42 (0.85)
Usefulness of Text	Low	4.18 (0.96)	4.14 (1.05)
	Medium	4.22 (0.93)	4.19 (0.97)
	High	4.35 (0.84)	3.89 (1.13)
Comparison with other Education Courses	Low	4.41 (0.77)	4.43 (0.86)
	Medium	4.42 (0.78)	4.42 (0.87)
	High	4.47 (0.68)	4.36 (0.88)
Instructor Evaluation Item Sums	Low	19.23 (1.87)	18.91 (2.63)
	Medium	18.95 (2.32)	18.89 (2.69)
	High	19.20 (1.93)	18.83 (2.43)

Table 5: Two-way Independent Factorial ANOVA Results for Number of Course Objectives by Delivery format for all Dependent Variables

Dependent Variable	Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>Partial</i> η^2
Classroom Application	Delivery Format	1	5.61	8.87**	.003	.002
	Number of Course Objectives	2	0.97	1.54	.21	.001
	Interaction	2	1.45	2.29	.10	.001
	Error	3994	0.63			
Usefulness of Text	Delivery Format	1	32.92	34.36**	.00	.009
	Number of Course Objectives	2	2.62	2.73	.07	.001
	Interaction	2	20.24	21.12**	.00	.010
	Error	3994	0.96			
Comparison with other Education Courses	Delivery Format	1	1.04	1.58	.21	.000
	Number of Course Objectives	2	0.03	0.04	.96	.000
	Interaction	2	1.64	2.49	.08	.001
	Error	3994	0.66			
Instructor Evaluation Item Sums	Delivery Format	1	59.65	10.89**	.001	.003
	Number of Course Objectives	2	7.79	1.42	.24	.001
	Interaction	2	9.19	1.67	.19	.001
	Error	3994	5.49			

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

A 3 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped number of course objectives and the delivery format on the classroom application dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(5, 3994) = 7.35, p < .001$. There was a significant

main effect of the delivery format on the reported application of the course to the respondent's classroom, $F(1, 3994) = 8.87, p < .05$, partial $\eta^2 = .002$, demonstrating that online courses were reacted to slightly more favorably in terms of application of the course to the respondent's classroom as can be seen in Tables 4 and 5. The main effect of the number of course objectives was non-significant, $F(2, 3994) = 1.54, p = .21$, partial $\eta^2 = .001$. The interaction effect was non-significant, $F(2, 3994) = 2.29, p = .10$, partial $\eta^2 = .001$.

A 3 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped number of course objectives and the delivery format on the "usefulness of text" dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(5, 3994) = 6.52, p < .001$. There was a significant main effect of the delivery format on the reported application of the course to the respondent's classroom, $F(1, 3994) = 34.36, p < .001$, partial $\eta^2 = .009$, demonstrating that online courses were reacted to slightly more favorably in terms of application of the course to the respondent's classroom as can be seen in Tables 4 and 5. The main effect of the number of course objectives was non-significant, $F(2, 3994) = 2.73, p = .07$, partial $\eta^2 = .001$. However, the interaction effect was significant, $F(2, 3994) = 21.12, p < .001$, partial $\eta^2 = .01$. The interaction effect can be seen in Figure 1, which displays the comparison by delivery format of the text usefulness means of courses grouped by the number of course objectives. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of the number of course objectives. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.017 for each main effect. There was no significant difference between delivery format conditions for courses with a low amount of course objectives, $F(1,$

3994) = 0.59, $p = .44$, and those with a medium amount of course objectives, $F(1, 3994) = 0.41$, $p = .52$. However, there was a significant difference between the delivery format conditions for courses with a high amount of course objectives, $F(1, 3994) = 71.80$, $p < .001$, partial $\eta^2 = .02$, indicating that online courses with a high amount of course objectives are reacted to much more positively in terms of text usefulness than face to face courses.

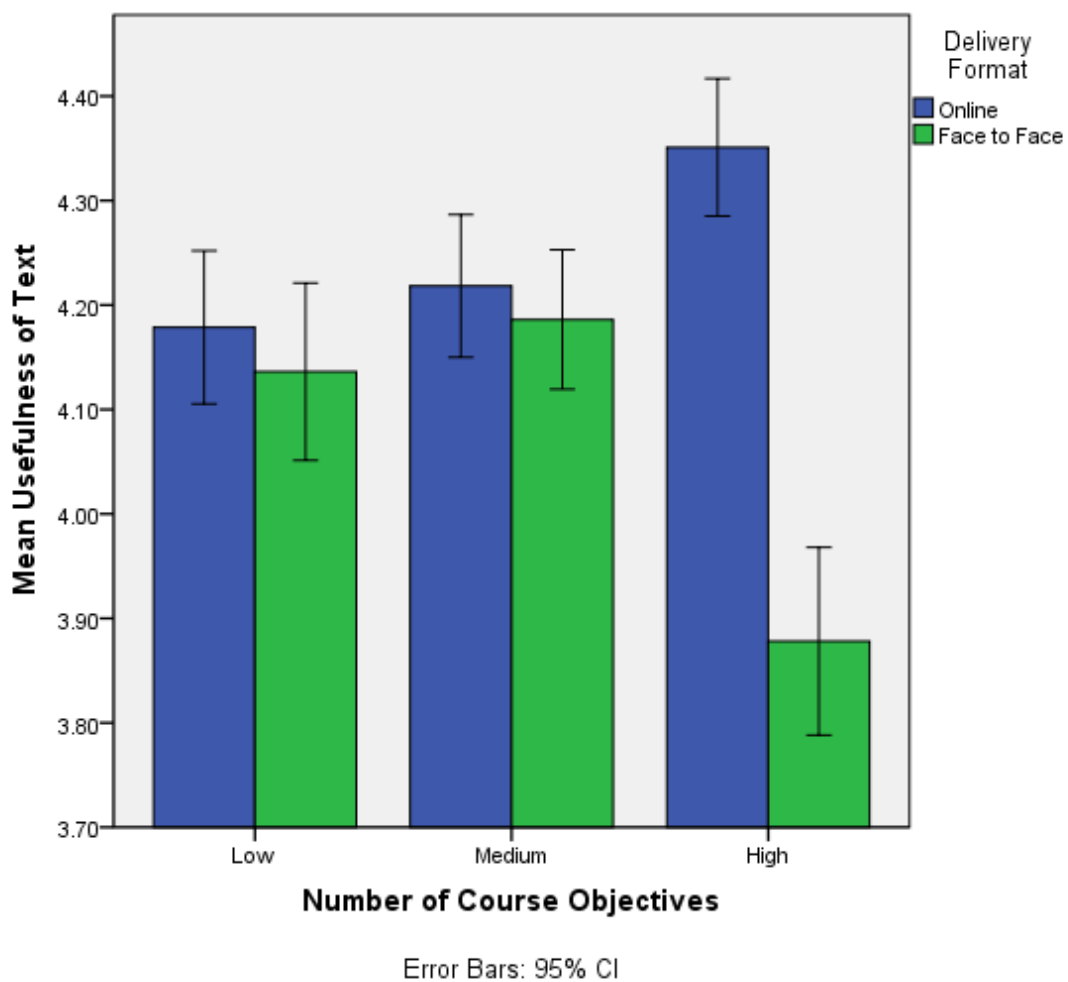


Figure 1: Mean Usefulness of Text Reaction Ratings by Delivery Format for Courses Varying by Number of Course Objectives

A 3 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped number of course objectives and the delivery format on the “comparison with other education courses” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(5, 3994) = 7.25, p < .001$. Table 4 displays the means and standard deviations of the “comparison with other education courses” variable by delivery format for courses grouped by gradients of number of course objectives. There was not a significant main effect of the delivery format on the reported comparison with other education courses, $F(1, 3994) = 1.58, p = .21$, partial $\eta^2 < .001$. The main effect of the number of course objectives was non-significant, $F(2, 3994) = 0.04, p = .96$, partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(2, 3994) = 2.49, p = .08$, partial $\eta^2 = .001$.

A 3 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped number of course objectives and the delivery format on the sum of the instructor evaluation items. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(5, 3994) = 12.61, p < .001$. There was a significant main effect of the delivery format on the sum of the instructor evaluation items, $F(1, 3994) = 10.86, p = .001$, partial $\eta^2 = .003$, demonstrating that online courses were reacted to more favorably in terms of the combined instructor evaluation items as can be seen in Tables 4 and 5. The main effect of the number of course objectives was non-significant, $F(2, 3994) = 1.42, p = .24$, partial $\eta^2 = .001$. The interaction effect was also non-significant, $F(2, 3994) = 1.67, p = .19$, partial $\eta^2 = .001$.

The grouped number of course objectives was not found to be positively related to participant reactions, thus failing to provide support for Hypothesis 1. However, the interaction

term for Usefulness of Text was significant, the main effect of the number of course objectives for usefulness of text was nearly significant, and the interaction terms for comparison with other courses and classroom application were also very close to being significant. An examination of the means and standard deviations presented in Table 4 reveal that in some circumstances (i.e. the aforementioned participant evaluation terms), the participant's reactions to the course may act in support of the first hypothesis for online courses as opposed to face to face courses. This relationship can also be seen in Figure 1 for the usefulness of text reaction.

Hypothesis 2. Separate statistical analyses for each dependent variable were conducted to test this hypothesis. This second hypothesis posits a positive relationship between the specificity of course objectives found on the course syllabi and participant reactions. The independent variables in this analysis included delivery format (at the levels of online and face to face) and the specificity of course objectives. In the online condition, the specificity of course objectives variable was grouped into "low" ($n = 1092$) and "high" ($n = 908$) groups. In the face to face condition, the specificity of course objectives variable was grouped into "low" ($n = 995$) and "high" ($n = 1005$) groups. Table 6 presents the means and standard deviations and Table 7 presents the factorial analysis of variance results for the delivery format and specificity of course objectives for all of the dependent variables.

Table 6: Levels of Participant Reactions by Delivery Format to Courses with Varying Specificity of Course Objectives: Means and Standard Deviations

Dependent Variable	Specificity of Course Objectives	Online	Face to Face
		<i>M (SD)</i>	<i>M (SD)</i>
Classroom Application	Low	4.47 (0.78)	4.44 (0.82)
	High	4.55 (0.70)	4.41 (0.86)
Usefulness of Text	Low	4.20 (0.95)	3.92 (1.14)
	High	4.31 (0.87)	4.23 (0.93)
Comparison with other Education Courses	Low	4.41 (0.77)	4.44 (0.83)
	High	4.46 (0.71)	4.36 (0.91)
Instructor Evaluation Item Sums	Low	19.14 (2.06)	19.14 (2.10)
	High	19.09 (2.06)	18.63 (2.99)

Table 7: Two-way Independent Factorial ANOVA Results for Specificity of Course Objectives by Delivery format for all Dependent Variables

Dependent Variable	Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>Partial</i> η^2
Classroom Application	Delivery Format	1	6.01	9.58**	.002	.002
	Specificity of Course Objectives	1	0.98	1.55	.21	.000
	Interaction	1	3.20	5.06*	.03	.001
	Error	3996	0.63			
Usefulness of Text	Delivery Format	1	30.28	31.68**	.000	.008
	Specificity of Course Objectives	1	44.02	46.06**	.000	.011
	Interaction	1	9.75	10.20**	.001	.003
	Error	3996	0.96			
Comparison with other Education Courses	Delivery Format	1	1.01	1.53	.22	.000
	Specificity of Course Objectives	1	0.36	0.55	.46	.000
	Interaction	1	4.08	6.19*	.01	.002
	Error	3996	0.66			
Instructor Evaluation Item Sums	Delivery Format	1	55.54	10.16**	.001	.003
	Specificity of Course Objectives	1	76.48	13.99**	.000	.003
	Interaction	1	53.90	9.86**	.002	.002
	Error	3996	5.47			

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped specificity of course objectives and the delivery format on the classroom application dependent variable. All other assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 11.99, p < .001$. There was a significant main effect of the delivery format on the reported application of the course to the respondent's

classroom, $F(1, 3996) = 9.58, p < .01, \text{partial } \eta^2 = .002$, demonstrating that online courses were reacted to slightly more favorably in terms of application of the course to the respondent's classroom as can be seen in Tables 6 and 7. The main effect of the specificity of course objectives was non-significant, $F(1, 3996) = 1.55, p = .21, \text{partial } \eta^2 < .001$. However, the interaction effect was significant, $F(1, 3996) = 5.06, p < .05, \text{partial } \eta^2 = .001$. The interaction effect can be seen in Figure 2, which displays the comparison by delivery format of the classroom application reaction grouped by the specificity of course objectives. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of the specificity of course objectives. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between delivery format conditions for courses with a low level of course objective specificity, $F(1, 3996) = 0.38, p = .54$. However, there was a significant difference between the delivery format conditions for courses with a high level of course objective specificity, $F(1, 3996) = 13.68, p < .001, \text{partial } \eta^2 = .003$, indicating that online courses with a high level of specificity of course objectives are reacted to much more positively in terms of the classroom application reactions than face to face courses. Another simple effects analysis was utilized to compare the differences in means of the low and high objectives specificity groups at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was a significant difference between course objectives specificity groups for online courses, $F(1, 3996) = 6.08, p = .01, \text{partial } \eta^2 = .002$. There was, however, no significant difference between course objectives specificity groups for face to face courses, $F(1, 3996) = 0.51, p = .48$.

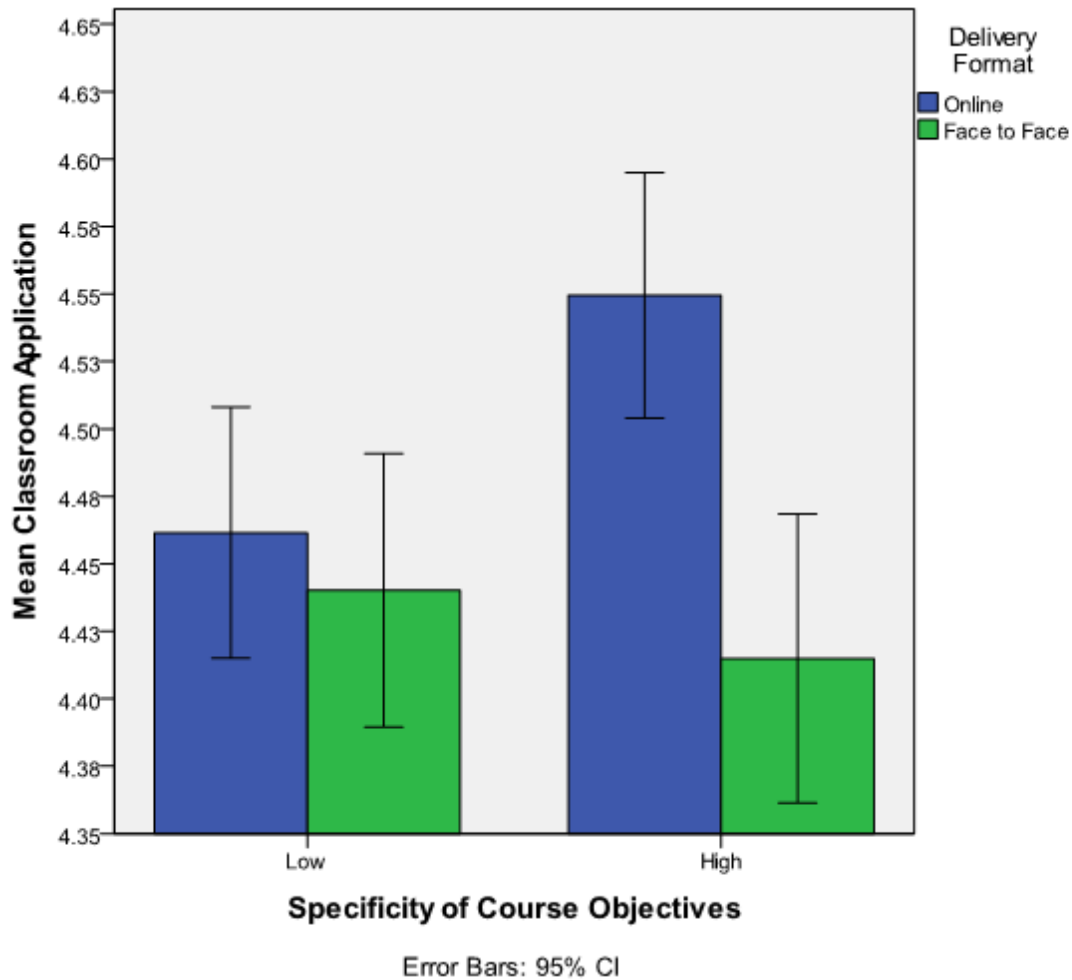


Figure 2: Mean Classroom Application Reaction Ratings by Delivery Format for Courses Varying by Specificity of Course Objectives

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped specificity of course objectives and the delivery format on the “usefulness of text” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 14.61, p < .001$. There was a significant main effect of the delivery format on the usefulness of text reaction, $F(1, 3996) = 31.68, p <$

.001, partial $\eta^2 = .008$, demonstrating that online courses were reacted to slightly more favorably in terms of application of the course to the respondent's classroom as can be seen in Tables 6 and 7. The main effect of the specificity of course objectives was also significant suggesting that participants may rate their textbooks as slightly more useful in courses with highly specific course objectives as opposed to those that are more ambiguous, $F(1, 3996) = 46.06, p < .001$, partial $\eta^2 = .011$. Furthermore, the interaction effect was significant, $F(1, 3996) = 10.20, p = .001$, partial $\eta^2 = .003$. The interaction effect can be seen in Figure 3, which displays the comparison by delivery format of the text usefulness means of courses grouped by the specificity of course objectives. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of the number of course objectives. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was a significant difference between the delivery format conditions for courses with a low amount of course objectives, $F(1, 3996) = 40.70, p < .001$, partial $\eta^2 = .01$, indicating that online students enrolled in courses with a low level of course objectives specificity consider their textbooks to be more useful than participants in face to face courses. However, there was no significant difference between delivery format conditions for courses with a high level of course objectives specificity, $F(1, 3996) = 2.84, p = .09$.

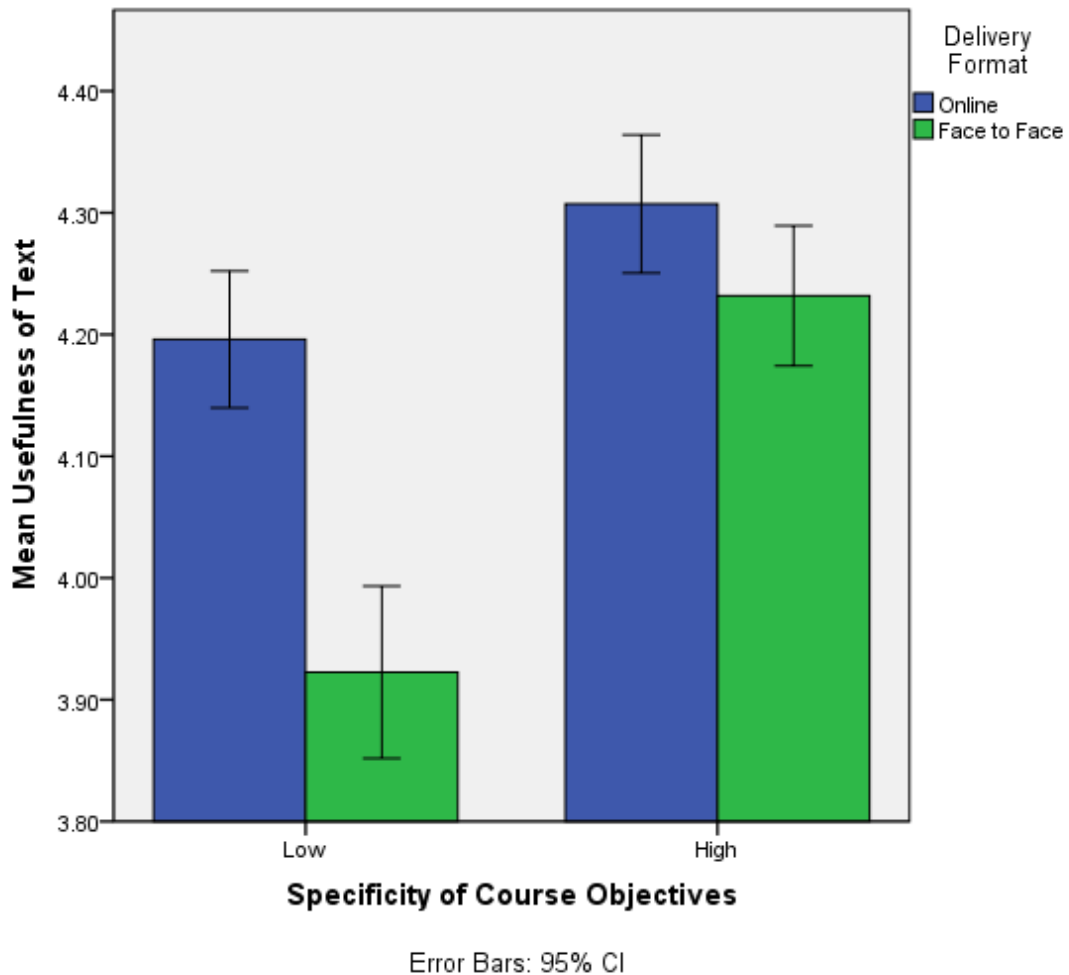


Figure 3: Mean Usefulness of Text Reaction Ratings by Delivery Format for Courses Varying by Specificity of Course Objectives

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped specificity of course objectives and the delivery format on the “comparison with other education courses” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 14.03, p < .001$. Table 6 displays the means and standard deviations of the “comparison with other education courses” variable by delivery format for courses grouped by course objectives specificity. There was no

significant main effect of the delivery format on the reported comparison with other education courses, $F(1, 3996) = 1.53, p = .22, \text{partial } \eta^2 < .001$. The main effect of the specificity of course objectives was also non-significant, $F(1, 3996) = 0.55, p = .46, \text{partial } \eta^2 < .001$. However, the interaction effect was significant, $F(1, 3996) = 6.19, p < .05, \text{partial } \eta^2 = .002$. The interaction effect can be seen in Figure 4, which displays the comparison by delivery format of the “comparison with other education courses” means of courses grouped by the specificity of course objectives. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of the specificity of course objectives. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between delivery format conditions for courses with a low level of course objective specificity, $F(1, 3996) = 0.82, p = .37$. However, there was a significant difference between the delivery format conditions for courses with a high level of course objective specificity, $F(1, 3996) = 6.65, p = .01, \text{partial } \eta^2 = .002$, suggesting that online courses with a high level of specificity of course objectives are reacted to more positively in terms of the “comparison with other courses reactions” than face to face courses. An additional simple effects analysis was utilized to compare the differences in means of the low and high specificity courses at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between objectives specificity levels for online courses, $F(1, 3996) = 1.52, p = .22$. However, there was a significant difference between objectives specificity levels for face to face courses, $F(1, 3996) = 5.23, p = .022, \text{partial } \eta^2 = .001$, indicating that objectives

specificity levels significantly differ in terms of “comparison with other courses” reactions for face to face courses.

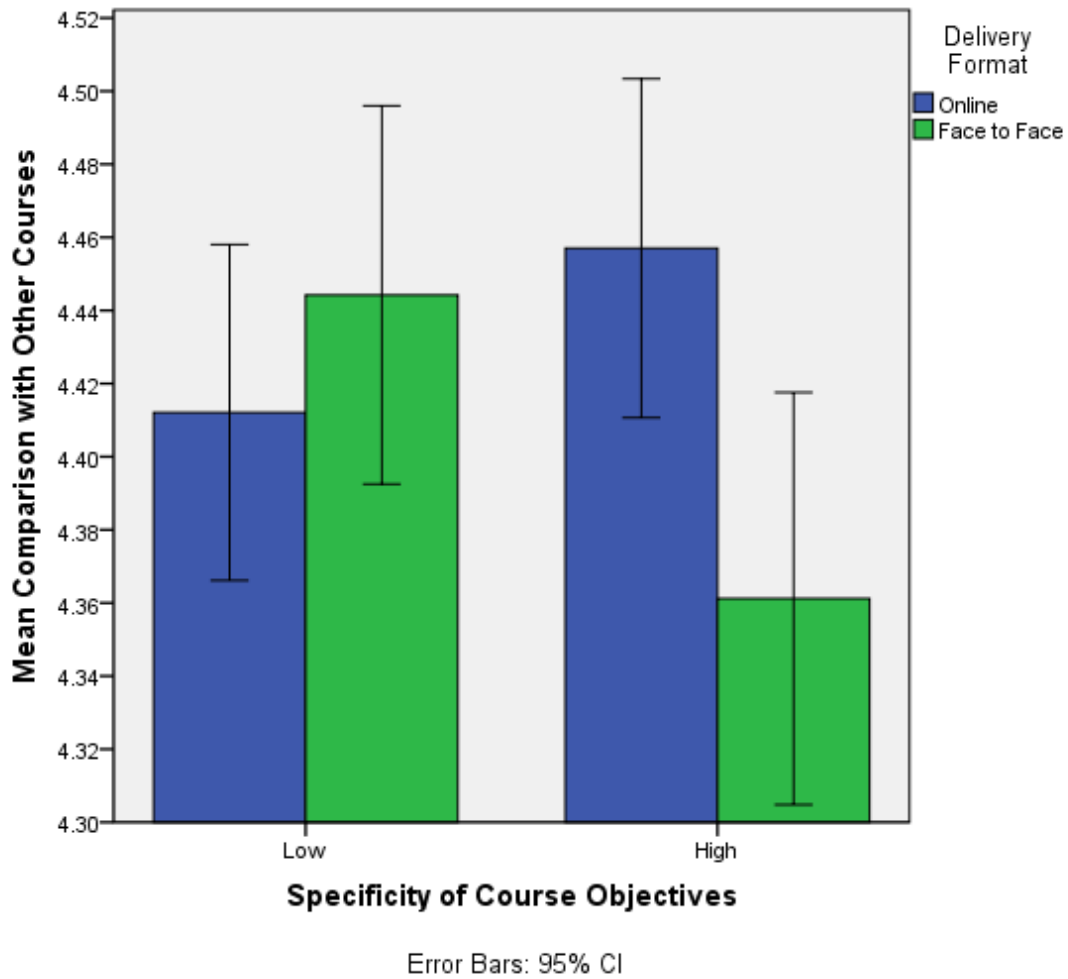


Figure 4: Mean Comparison with Other Courses Reaction Ratings by Delivery Format for Courses Varying by Specificity of Course Objectives

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the grouped specificity of course objectives and the delivery format on the instructor evaluation items. All assumptions of ANOVA were met, except for the assumptions of normality and

homogeneity of variance, $F(3, 3996) = 38.46, p < .001$. Table 6 displays the means and standard deviations of the instructor evaluation variable by delivery format for courses grouped by course objectives specificity. There was a significant main effect of the delivery format on the instructor evaluation items, $F(1, 3996) = 10.16, p = .001$, partial $\eta^2 = .003$, demonstrating that online courses were reacted to slightly more favorably in terms of instructor evaluation as can be seen in Tables 6 and 7. The main effect of the specificity of course objectives was also significant suggesting that participants may rate their instructors lower in courses with highly specific course objectives as opposed to those that are more ambiguous, $F(1, 3996) = 13.99, p < .001$, partial $\eta^2 = .003$. Furthermore, the interaction effect was significant, $F(1, 3996) = 9.86, p = .002$, partial $\eta^2 = .002$. The interaction effect can be seen in Figure 5, which displays the comparison by delivery format of the instructor evaluation items means of courses grouped by the specificity of course objectives. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of the specificity of course objectives. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between delivery format conditions for courses with a low level of course objective specificity, $F(1, 3996) = 0.001, p = .973$. However, there was a significant difference between the delivery format conditions for courses with a high level of course objective specificity, $F(1, 3996) = 19.18, p < .001$, partial $\eta^2 = .005$, suggesting that online courses with a high level of specificity of course objectives are reacted to more positively in terms of the instructor evaluation items than face to face courses.

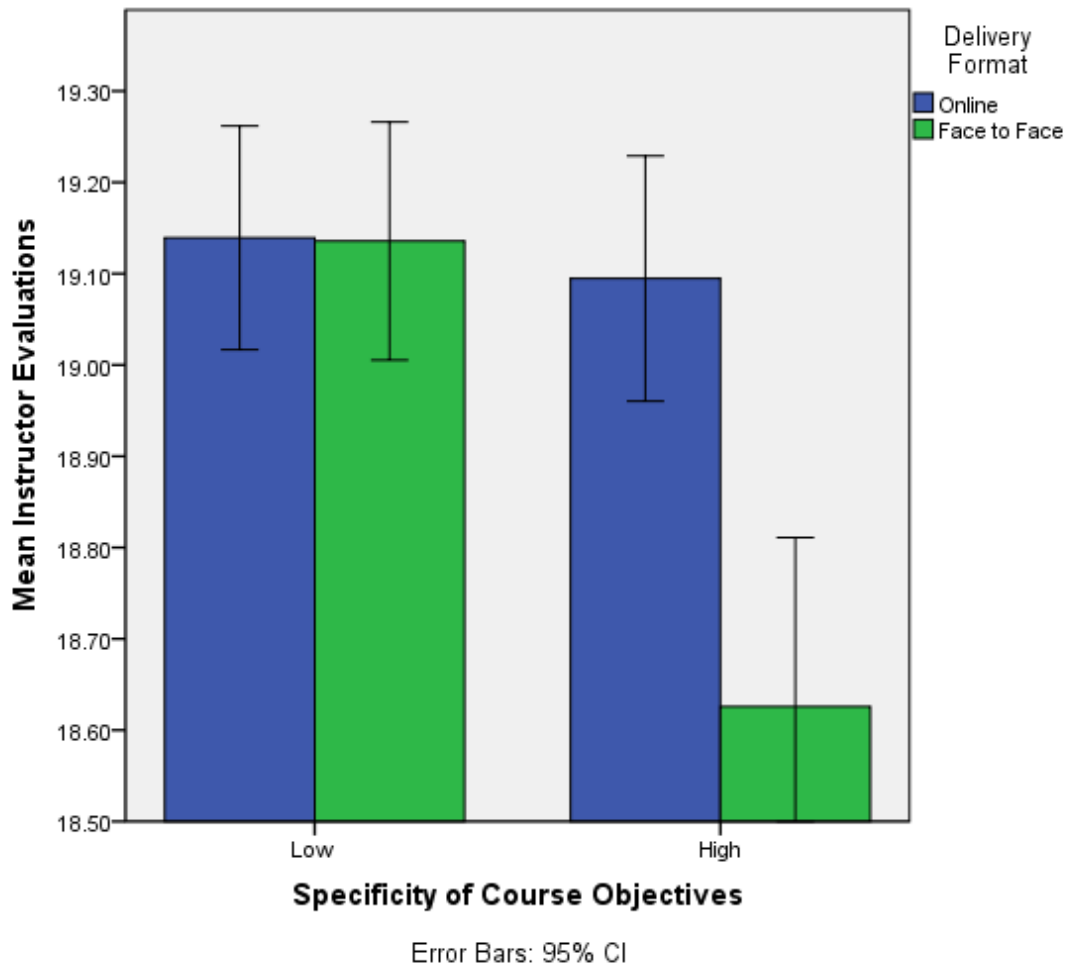


Figure 5: Mean Instructor Evaluation Reaction Ratings by Delivery Format for Courses Varying by Specificity of Course Objectives

Partial support was attained for Hypothesis 2 in terms of the participants’ reactions to the usefulness of text in that they reacted more favorably to courses with high course objective specificity. However, the inverse of this relationship appeared to occur for the instructor evaluation items illustrated by a decrease in reaction means for both online and face to face courses. For the classroom application variable, although online courses scored significantly higher than face to face courses, each delivery format did not differ in reactions at different levels of course objectives specificity. Furthermore, a decrease in “comparison with other

education courses” can be observed as the specificity of the course objectives increases for face to face courses while an increase in the dependent variable can be observed for online courses. It may be that the participant evaluations vary as a function of the constructs they assess, and the specificity of course objectives and their interaction with delivery format depends upon the evaluation being made.

Hypotheses 3 and 4. Separate statistical analyses for each dependent variable were conducted to test these hypotheses. The third hypothesis posits that participant reactions will be more positive for online than face to face courses combined across the course knowledge base. The fourth hypothesis stipulates that participant reactions will be more positive for online courses than face to face courses as an interactive function of the knowledge base of the course communicated by the syllabi. The independent variables in this analysis included delivery format (at the levels of online and face to face) and the knowledge base of the course. In the online condition, the knowledge base variable was grouped into “declarative” ($n = 1385$) and “procedural” ($n = 615$) groups. In the face to face condition, the knowledge base variable was also grouped into “declarative” ($n = 1033$) and “procedural” ($n = 967$) groups. Table 8 presents the means and standard deviations and Table 9 presents the factorial analysis of variance results for the delivery format and knowledge base for all of the dependent variables.

Table 8: Levels of Participant Reactions by Delivery Format to Courses with Varying Knowledge Bases: Means and Standard Deviations

Dependent Variable	Knowledge Base	Online	Face to Face
		<i>M (SD)</i>	<i>M (SD)</i>
Classroom Application	Declarative	4.50 (0.74)	4.36 (0.90)
	Procedural	4.51 (0.78)	4.50 (0.77)
Usefulness of Text	Declarative	4.25 (0.91)	3.88 (1.13)
	Procedural	4.24 (0.93)	4.29 (0.91)
Comparison with other Education Courses	Declarative	4.43 (0.74)	4.36 (0.91)
	Procedural	4.43 (0.75)	4.45 (0.83)
Instructor Evaluation Item Sums	Declarative	19.17 (1.97)	18.84 (2.57)
	Procedural	19.01 (2.25)	18.92 (2.62)

Table 9: Two-way Independent Factorial ANOVA Results for Knowledge Base by Delivery format for all Dependent Variables

Dependent Variable	Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>Partial</i> η^2
Classroom Application	Delivery Format	1	5.19	8.24**	.004	.002
	Knowledge Base	1	5.53	8.78**	.003	.002
	Interaction	1	3.29	5.21*	.02	.001
	Error	3996	0.63			
Usefulness of Text	Delivery Format	1	23.35	24.60**	.000	.006
	Knowledge Base	1	34.69	36.54**	.000	.009
	Interaction	1	39.54	41.66**	.000	.010
	Error	3996	0.95			
Comparison with other Education Courses	Delivery Format	1	0.70	1.06	.30	.000
	Knowledge Base	1	1.90	2.89	.09	.001
	Interaction	1	2.31	3.51	.06	.001
	Error	3996	0.66			
Instructor Evaluation Item Sums	Delivery Format	1	40.27	7.33**	.007	.002
	Knowledge Base	1	1.38	0.25	.62	.000
	Interaction	1	11.52	2.10	.15	.001
	Error	3996	5.50			

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of knowledge base and the delivery format on the classroom application dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 12.45, p < .001$. There was a significant main effect of the delivery format on the reported application of the course to the respondent's classroom, $F(1, 3996) = 8.24, p =$

.004, partial $\eta^2 = .002$. The main effect of knowledge base was also significant suggesting that participants may rate courses based on conveying procedural knowledge as more applicable to their own classrooms, $F(1, 3996) = 8.78, p = .003$, partial $\eta^2 = .002$. Furthermore, the interaction effect was significant, $F(1, 3996) = 5.21, p < .05$, partial $\eta^2 = .001$. The interaction effect can be seen in Figure 6, which displays the comparison by delivery format of the classroom application estimated marginal means of courses grouped by knowledge base. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of knowledge base. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was a significant difference between the delivery format conditions for courses with a declarative knowledge base, $F(1, 3996) = 17.09, p < .001$, partial $\eta^2 = .004$, indicating that online students enrolled in courses with a declarative knowledge base consider the course to be more applicable to their own classroom than face to face students also enrolled into declarative-based courses. However, there was no significant difference between delivery format conditions for courses with a procedural knowledge base, $F(1, 3996) = 0.14, p = .71$.

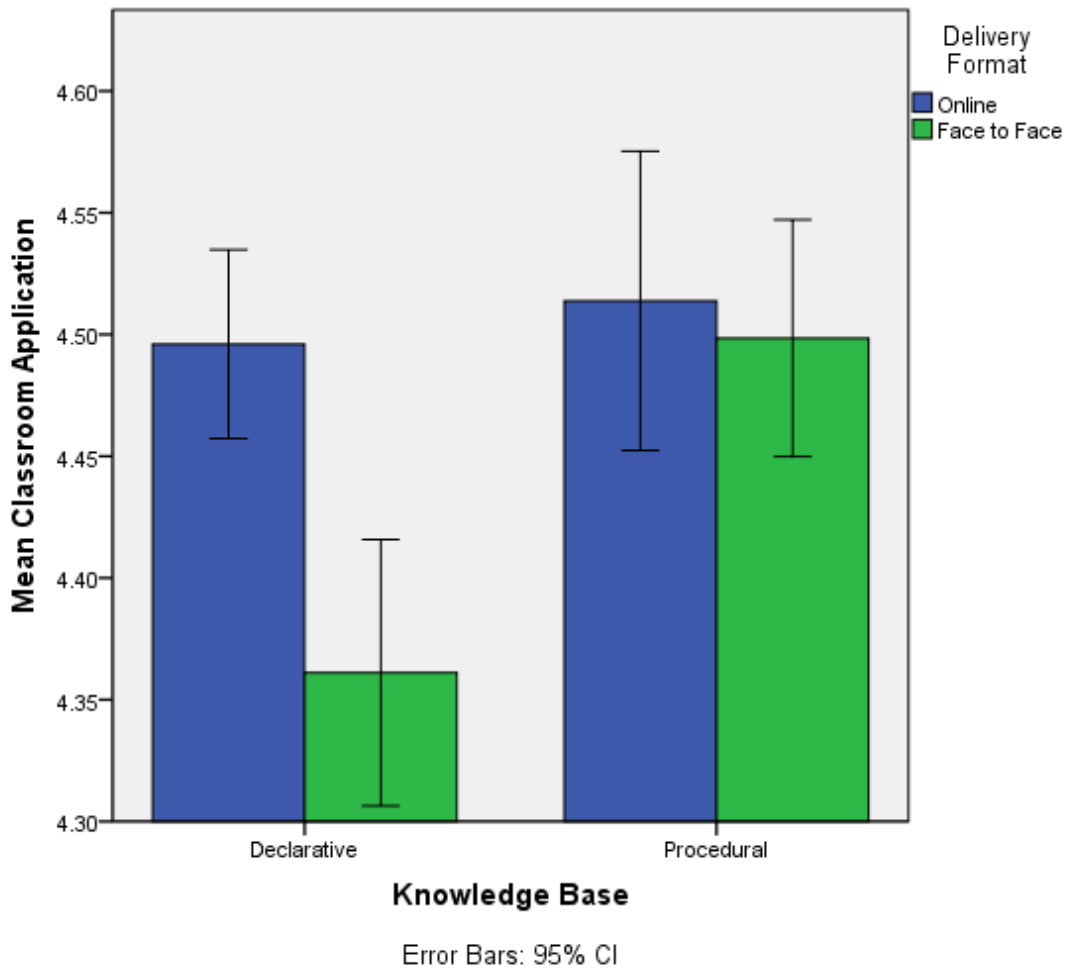
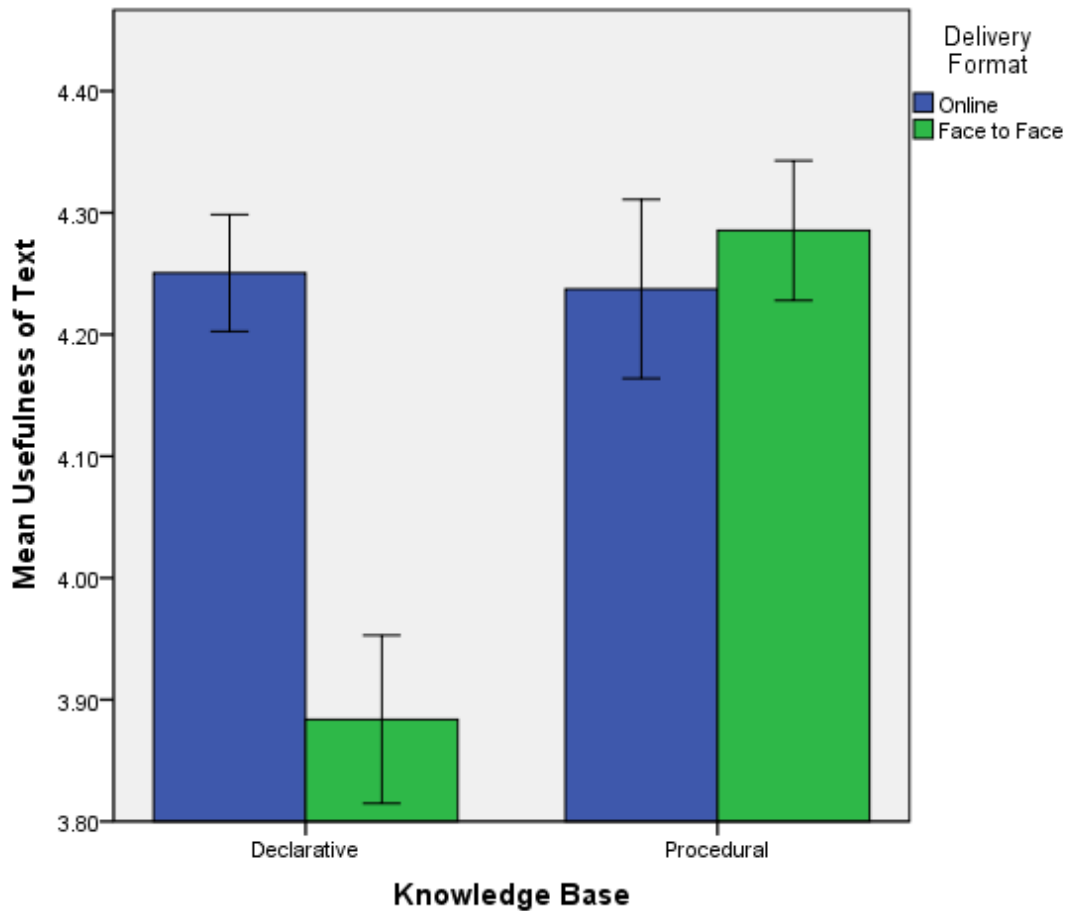


Figure 6: Means Classroom Application Reaction Ratings by Delivery Format for Courses Varying by Knowledge Base

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of knowledge base and the delivery format on the “usefulness of text” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 13.89, p < .001$. There was a significant main effect of the delivery format on the usefulness of text reaction, $F(1, 3996) = 24.60, p < .001$, partial $\eta^2 = .006$, that was indicative of an inverse relationship as can be seen in Tables 8 and 9. The main effect of knowledge base was also significant suggesting that participants may generally rate their

textbooks as slightly more useful in courses with a procedural knowledge base, $F(1, 3996) = 36.54, p < .001, \text{partial } \eta^2 = .009$. Furthermore, the interaction effect was significant, $F(1, 3996) = 41.66, p < .001, \text{partial } \eta^2 = .010$. The interaction effect can be seen in Figure 7, which displays the comparison by delivery format of the text usefulness means of courses grouped by knowledge base. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of knowledge base. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was a significant difference between the delivery format conditions for courses with a declarative knowledge base, $F(1, 3996) = 83.83, p < .001, \text{partial } \eta^2 = .02$, indicating that online students enrolled in courses with a declarative knowledge base consider their textbooks to be more useful than participants in declarative-based face to face courses. However, there was no significant difference between delivery format conditions for courses with a procedural knowledge base, $F(1, 3996) = 0.91, p = .34$. An additional simple effects analysis was utilized to compare the differences in means of the declarative and procedural knowledge based courses at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between types of knowledge base for online courses, $F(1, 3996) = 0.08, p = .78$. However, there was a significant difference between types of knowledge base for face to face courses, $F(1, 3996) = 84.87, p < .001, \text{partial } \eta^2 = .02$, indicating that knowledge base levels significantly differ in terms of text usefulness reactions for face to face courses (procedural-based courses are rated higher).



Error Bars: 95% CI

Figure 7: Mean Usefulness of Text Reaction Ratings by Delivery Format for Courses Varying by Knowledge Base

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of knowledge base and delivery format on the “comparison with other education courses” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 12.93, p < .001$. Table 8 displays the means and standard deviations of the “comparison with other education courses” variable by delivery format for courses varying by knowledge base. There was not a significant main effect of the delivery format on the reported comparison with other education courses, $F(1, 3996) =$

1.06, $p = .30$, partial $\eta^2 < .001$. The main effect of knowledge base was non-significant, $F(1, 3996) = 2.89$, $p = .09$, partial $\eta^2 = .001$. The interaction effect was also non-significant, $F(1, 3996) = 3.51$, $p = .06$, partial $\eta^2 = .001$.

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the knowledge base and delivery format on the sum of the instructor evaluation items. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 17.29$, $p < .001$. There was a significant main effect of the delivery format on the sum of the instructor evaluation items, $F(1, 3996) = 7.33$, $p = .007$, partial $\eta^2 = .002$, demonstrating that online courses were reacted to more favorably in terms of the combined instructor evaluation items as can be seen in Tables 8 and 9. The main effect of knowledge base was non-significant, $F(1, 3996) = 0.25$, $p = .62$, partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 2.10$, $p = .15$, partial $\eta^2 = .001$.

Support for Hypothesis 3 was obtained in part through all of the dependent variables except for “comparison with other education courses.” Online courses were consistently rated higher in consideration of knowledge base in the classroom application and also in the combination of instructor evaluation items. Partial support for Hypothesis 3 was obtained from the usefulness of text reactions in that online courses scored significantly higher for declarative based courses. However, face to face courses did score somewhat higher than online courses in terms of text usefulness in procedural based courses. The usefulness of text and “classroom application” items provided partial support for Hypothesis 4. For these items, the participants’ reactions were a function of the interaction of the delivery format and the knowledge base of the course. In all cases (even those that were non-significant), online courses scored higher than

face to face courses in participant reactions for courses based on declarative knowledge. For most procedural based courses, the reaction scores tended to be very similar between online and face to face courses.

Hypotheses 5 and 6. Separate statistical analyses for each dependent variable were conducted to test these hypotheses. The fifth hypothesis posits that participant reactions will be more positive for courses with higher student interaction levels. The sixth hypothesis stipulates that participant reactions will be more positive for face to face courses than online courses as an interactive function of the student interaction levels of the course communicated by the syllabi. The independent variables in this analysis included delivery format (at the levels of online and face to face) and the student interaction levels of the course. In the online condition, the student interaction variable was grouped into “low” ($n = 1072$) and “high” ($n = 928$) groups. In the face to face condition, the student interaction variable was also grouped into “low” ($n = 893$) and “high” ($n = 1107$) groups. Table 10 presents the means and standard deviations and Table 11 presents the factorial analysis of variance results for the delivery format and student interaction levels for all of the dependent variables.

Table 10: Levels of Participant Reactions by Delivery Format to Courses with Varying Levels of Student Interaction: Means and Standard Deviations

Dependent Variable	Student Interaction	Online	Face to Face
		<i>M (SD)</i>	<i>M (SD)</i>
Classroom Application	Low	4.48 (0.76)	4.48 (0.79)
	High	4.53 (0.73)	4.38 (0.88)
Usefulness of Text	Low	4.16 (0.96)	4.10 (1.11)
	High	4.35 (0.84)	4.06 (1.00)
Comparison with other Education Courses	Low	4.41 (0.75)	4.43 (0.86)
	High	4.46 (0.74)	4.38 (0.89)
Instructor Evaluation Item Sums	Low	19.06 (2.15)	19.04 (2.31)
	High	19.19 (1.95)	18.75 (2.80)

Table 11: Two-way Independent Factorial ANOVA Results for Student Interaction by Delivery format for all Dependent Variables

Dependent Variable	Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>Partial</i> η^2
Classroom Application	Delivery Format	1	4.87	7.72**	.006	.002
	Student Interaction	1	0.84	1.33	.25	.000
	Interaction	1	5.51	8.73**	.003	.002
	Error	3996	0.63			
Usefulness of Text	Delivery Format	1	29.76	30.86**	.000	.008
	Student Interaction	1	5.75	5.97*	.02	.001
	Interaction	1	14.13	14.65**	.000	.004
	Error	3996	0.96			
Comparison with other Education Courses	Delivery Format	1	0.83	1.26	.26	.000
	Student Interaction	1	0.00	0.01	.94	.000
	Interaction	1	2.25	3.41	.07	.001
	Error	3996	0.66			
Instructor Evaluation Item Sums	Delivery Format	1	51.84	9.45 **	.002	.002
	Student Interaction	1	6.56	1.20	.27	.000
	Interaction	1	41.73	7.61 **	.006	.002
	Error	3996	5.49			

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of student interaction and the delivery format on the “classroom application” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 10.89, p < .001$. There was a significant main effect of the delivery format on the classroom application, $F(1, 3996) = 7.72, p = .006$, partial $\eta^2 = .002$, that was

indicative of a minutely inverse relationship as can be seen in Tables 10 and 11. The main effect of student interaction was non-significant, $F(1, 3996) = 1.33, p = .25$, partial $\eta^2 < .001$. However, the interaction effect was significant, $F(1, 3996) = 8.73, p = .003$, partial $\eta^2 = .002$. The interaction effect can be seen in Figure 8, which displays the comparison by delivery format of the classroom application means of courses grouped by student interaction levels. A simple effects analysis was utilized to compare the differences in means of the online and face to face courses at each level of knowledge base. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between the delivery format conditions for courses with low student interaction levels, $F(1, 3996) = 0.02, p = .90$. However, there was a significant difference between the delivery format conditions for courses with high student interaction levels, $F(1, 3996) = 10.56, p < .001$, partial $\eta^2 = .004$, indicating that online students enrolled in courses with a high level of student interaction consider their courses to be more applicable to their own classrooms than those participants in highly interactive face to face courses would indicate. An additional simple effects analysis was utilized to compare the differences in reaction means of the low and high student interaction levels at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between student interaction levels for online courses, $F(1, 3996) = 1.63, p = .20$. However, there was a significant difference between student interaction levels for face to face courses, $F(1, 3996) = 8.41, p = .004$, partial $\eta^2 = .002$, indicating that student interaction levels significantly differ in terms of classroom application for face to face courses (courses with low levels of student interaction are rated higher).

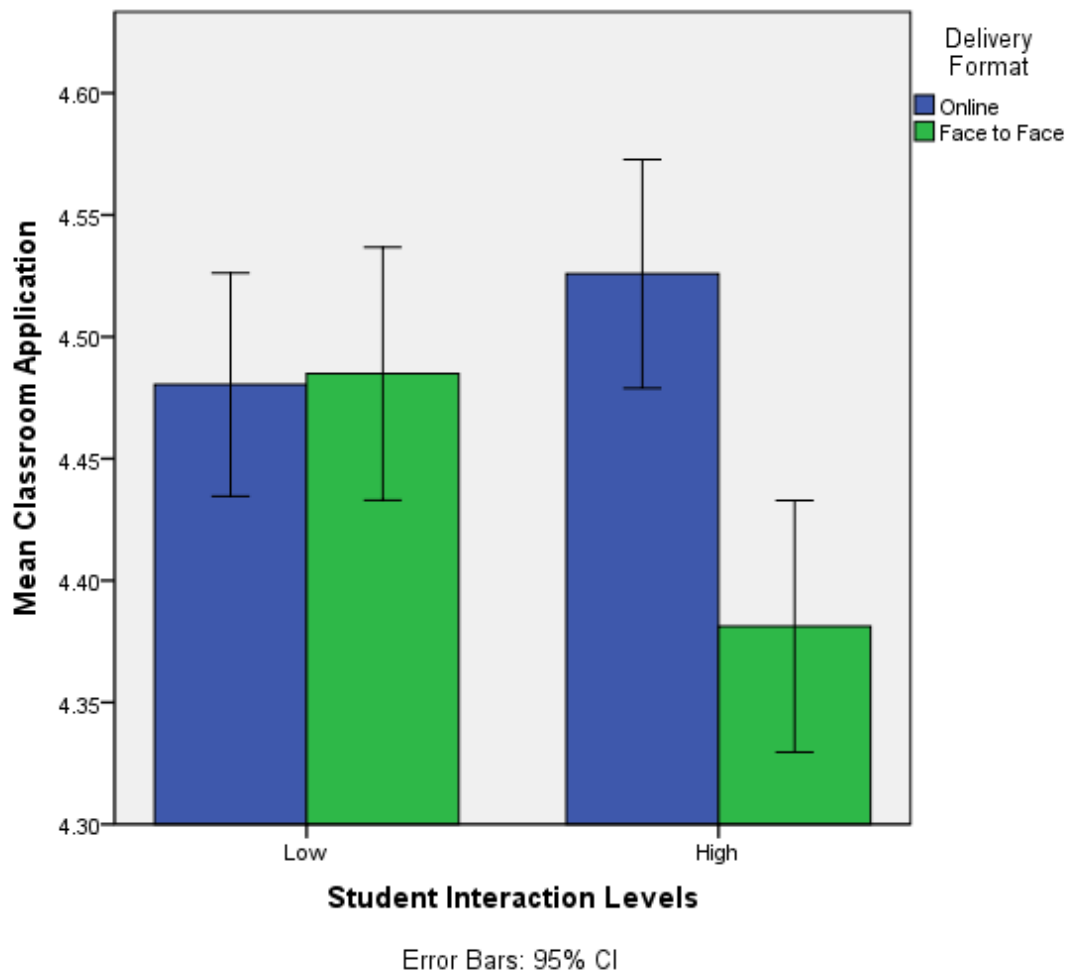


Figure 8: Mean Classroom Application Reaction Ratings by Delivery Format for Courses with Varying Levels of Student Interaction

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of student interaction levels and the delivery format on the “usefulness of text” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 9.92, p < .001$. There was a significant main effect of the delivery format on the usefulness of text reaction, $F(1, 3996) = 30.86, p < .001$, partial $\eta^2 = .008$, demonstrating that online courses were reacted to slightly more favorably in terms of text

usefulness as can be seen in Tables 10 and 11. The main effect of student interaction was also significant suggesting that online participants may rate their textbooks as slightly more useful in courses with high levels of student interaction as opposed to face to face participants in similar highly interactive situations who may rate their textbooks as less useful, $F(1, 3996) = 5.97, p < .05$, partial $\eta^2 = .001$. Furthermore, the interaction effect was significant, $F(1, 3996) = 14.65, p = .001$, partial $\eta^2 = .004$. The interaction effect can be seen in Figure 9, which displays the comparison by delivery format of the text usefulness means of courses grouped by their levels of student interaction. A simple effects analysis was utilized to compare the differences in means of courses with low and high levels of student interaction at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was a significant difference between student interaction levels for online courses, $F(1, 3996) = 19.72, p < .001$, partial $\eta^2 = .005$, indicating that student interaction levels significantly differ in terms of text usefulness for online courses (courses with high levels of student interaction are rated higher). However, there was no significant difference between student interaction levels for face to face courses, $F(1, 3996) = 0.96, p = .33$. An additional simple effects analysis was utilized to compare the differences in means of online and face to face courses at each level of student interaction. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between delivery formats for courses with low student interaction levels, $F(1, 3996) = 1.47, p = .23$. However, there was a significant difference between delivery formats for courses with high student interaction levels, $F(1, 3996) = 44.81, p < .001$, partial $\eta^2 = .011$,

indicating that student interaction levels significantly differ in terms of text usefulness for courses with high levels of student interaction.

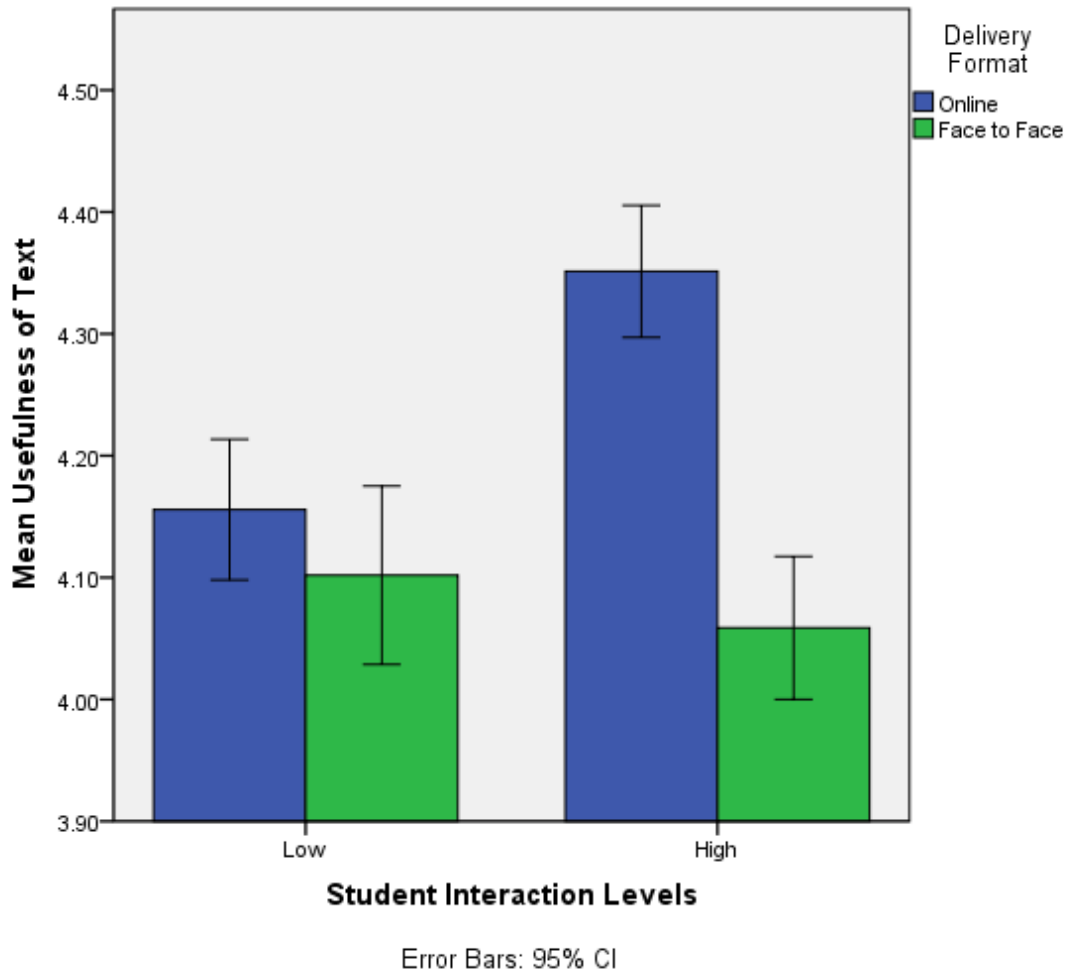


Figure 9: Mean Usefulness of Text Reaction Ratings by Delivery Format for Courses with Varying Levels of Student Interaction

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of student interaction and delivery format on the “comparison with other education courses” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 10.20, p < .001$. Table 10 displays the

means and standard deviations of the “comparison with other education courses” variable by delivery format for courses varying by student interaction. There was not a significant main effect of the delivery format on the reported comparison with other education courses, $F(1, 3996) = 1.26, p = .26, \text{partial } \eta^2 < .001$. The main effect of student interaction was non-significant, $F(1, 3996) = 0.01, p = .94, \text{partial } \eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 3.41, p = .07, \text{partial } \eta^2 = .001$.

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the student interaction and delivery format on the instructor evaluation items. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 24.20, p < .001$. Table 10 displays the means and standard deviations of the instructor evaluation variable by delivery format for courses grouped by student interaction. There was a significant main effect of the delivery format on the instructor evaluation items, $F(1, 3996) = 9.45, p = .002, \text{partial } \eta^2 = .002$, demonstrating that online courses were reacted to slightly more favorably in terms of instructor evaluation as can be seen in Tables 10 and 11. The main effect of student interaction was not significant, $F(1, 3996) = 1.20, p = .27, \text{partial } \eta^2 < .001$. However, the interaction effect was significant, $F(1, 3996) = 7.61, p = .006, \text{partial } \eta^2 = .002$. The interaction effect can be seen in Figure 10, which displays the comparison by delivery format of the instructor evaluation score means of courses grouped by their levels of student interaction. A simple effects analysis was utilized to compare the differences in means of courses with low and high levels of student interaction at each level of delivery format. To avoid the occurrence of type I errors, the α level for the simple effects analysis was set to 0.025 for each main effect. There was no significant difference between student interaction levels for online courses, $F(1,$

3996) = 1.39, $p = .24$. However, there was a significant difference between student interaction levels for face to face courses, $F(1, 3996) = 7.39, p = .007$, partial $\eta^2 = .002$, indicating that student interaction levels significantly differ in terms of instructor evaluation ratings for face to face courses (instructors proctoring courses with high levels of student interaction are rated lower).

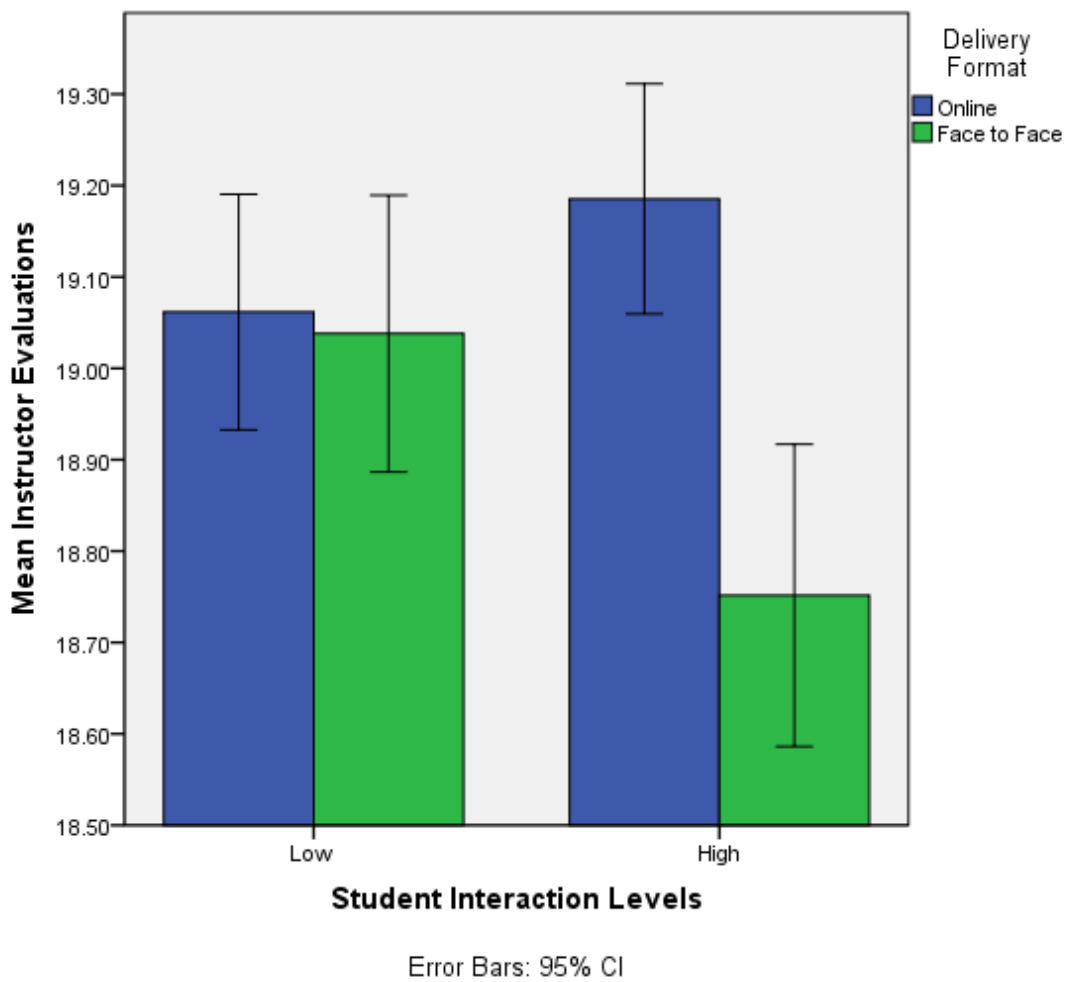


Figure 10: Mean Instructor Evaluation Reaction Ratings by Delivery Format for Courses with Varying Levels of Student Interaction

The results show that the student interaction levels did not differ for the “comparison with other education courses,” “classroom application,” and instructor evaluation variables. Text usefulness was the exception as reaction scores significantly differed between low and high levels of student interaction for online courses, providing partial support for Hypothesis 5 in this situation. This same relationship was not observed for the face to face courses. As the majority of dependent variables did not significantly differ by participant reactions in terms of student interaction, Hypothesis 5 was not supported. The usefulness of text, “classroom application,” and instructor evaluation participant reactions all varied as a function of the student interaction levels and delivery format. However, the hypothesized positive direction of face to face courses as a function of student interaction levels was actually reversed and online courses were rated more positively as a function of student interaction levels, failing to provide support for Hypothesis 6. Furthermore, the “comparison with other education courses” variable did not differ in terms of delivery format or student interaction levels.

Hypothesis 7. Separate statistical analyses for each dependent variable were conducted to test this hypothesis. Participant reactions are expected to be negative towards courses with a substantial workload. The independent variables in this analysis included delivery format (at the levels of online and face to face) and the course workload. In the online condition, the workload variable was grouped into “low” ($n = 1194$) and “high” ($n = 806$) groups. In the face to face condition, the workload variable was also grouped into “low” ($n = 693$) and “high” ($n = 1307$) groups. Table 12 presents the means and standard deviations and Table 13 presents the factorial analysis of variance results for the delivery format and workload for all of the dependent variables.

Table 12: Levels of Participant Reactions by Delivery Format to Courses with Varying Levels of Workload: Means and Standard Deviations

Dependent Variable	Workload	Online	Face to Face
		<i>M (SD)</i>	<i>M (SD)</i>
Classroom Application	Low	4.50 (0.76)	4.39 (0.87)
	High	4.50 (0.73)	4.45 (0.82)
Usefulness of Text	Low	4.26 (0.90)	4.11 (1.00)
	High	4.23 (0.93)	4.06 (1.07)
Comparison with other Education Courses	Low	4.44 (0.75)	4.39 (0.86)
	High	4.42 (0.74)	4.41 (0.88)
Instructor Evaluation Item Sums	Low	19.14 (2.10)	18.82 (2.58)
	High	19.08 (2.01)	18.91 (2.61)

Table 13: Two-way Independent Factorial ANOVA Results for Workload by Delivery format for all Dependent Variables

Dependent Variable	Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>Partial</i> η^2
Classroom Application	Delivery Format	1	6.24	9.86**	.002	.002
	Workload	1	0.56	0.88	.35	.000
	Interaction	1	0.79	1.25	.26	.000
	Error	3996	0.63			
Usefulness of Text	Delivery Format	1	23.11	23.85**	.00	.006
	Workload	1	1.70	1.75	.19	.000
	Interaction	1	0.06	0.06	.80	.000
	Error	3996	0.97			
Comparison with other Education Courses	Delivery Format	1	0.91	1.39	.24	.000
	Workload	1	0.00	0.00	.97	.000
	Interaction	1	0.70	1.05	.31	.000
	Error	3996	0.66			
Instructor Evaluation Item Sums	Delivery Format	1	56.87	10.34**	.001	.003
	Workload	1	0.15	0.03	.87	.000
	Interaction	1	5.21	0.95	.33	.000
	Error	3996	5.50			

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of workload and delivery format on the classroom application dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 7.86, p < .001$. There was a significant main effect of the delivery format on the reported application of the course to the respondent's classroom, $F(1, 3996) = 9.86, p = .002$,

partial $\eta^2 = .002$, demonstrating that online courses were reacted to slightly more favorably in terms of classroom application as can be seen in Tables 12 and 13. The main effect of workload was non-significant, $F(1, 3996) = 0.88, p = .35$, partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 1.25, p = .26$, partial $\eta^2 < .001$.

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of workload and delivery format on the “usefulness of text” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 3.31, p < .05$. There was a significant main effect of the delivery format on the reported application of the course to the respondent’s classroom, $F(1, 3996) = 23.85, p < .001$, partial $\eta^2 = .006$, demonstrating that online courses were reacted to slightly more favorably in terms of application of the course to the respondent’s classroom as can be seen in Tables 12 and 13. The main effect of workload was non-significant, $F(1, 3996) = 1.75, p = .19$, partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 0.06, p = .80$, partial $\eta^2 < .001$.

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of workload and delivery format on the “comparison with other education courses” dependent variable. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 9.61, p < .001$. Table 12 displays the means and standard deviations of the “comparison with other education courses” variable by delivery format for courses varying by workload. There was not a significant main effect of the delivery format on the reported comparison with other education courses, $F(1, 3996) = 1.39, p = .24$, partial $\eta^2 < .001$. The main effect of student interaction was non-significant, $F(1, 3996) = 0.01, p = .97$,

partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 1.05, p = .31$, partial $\eta^2 < .001$.

A 2 x 2 factorial analysis of variance (ANOVA) was used to examine the effects of the workload and delivery format on the sum of the instructor evaluation items. All assumptions of ANOVA were met, except for the assumptions of normality and homogeneity of variance, $F(3, 3996) = 15.70, p < .001$. There was a significant main effect of the delivery format on the sum of the instructor evaluation items, $F(1, 3996) = 10.34, p = .001$, partial $\eta^2 = .003$, demonstrating that online courses were reacted to more favorably in terms of the combined instructor evaluation items as can be seen in Tables 12 and 13. The main effect of workload was non-significant, $F(1, 3996) = 0.03, p = .87$, partial $\eta^2 < .001$. The interaction effect was also non-significant, $F(1, 3996) = 0.95, p = .33$, partial $\eta^2 < .001$.

The results show that the workload did not differ for the “comparison with other education courses,” “classroom application,” usefulness of text, and instructor evaluation variables. As the majority of dependent variables did not significantly differ by participant reactions in terms of workload, Hypothesis 7 was not supported.

Exploration of the delivery format research question reveals a significant main effect for the “classroom application,” usefulness of text, and instructor evaluation variables across all independent variables. In almost every circumstance, the online course reaction means were higher than those observed in face to face courses. The simple effects analyses of the comparisons between delivery format in the low student interaction group for classroom application, $F(1, 3996) = 0.02, p = .90$, and between delivery format in the procedural knowledge base for usefulness of text, $F(1, 3996) = 0.91, p = .34$, revealed the only

circumstances in which the face to face means were higher than the online means. These differences were not statistically significant.

Inclusion of Course Syllabi Characteristics in Multiple Regression

Multiple regression was utilized in order to examine the contributions of the various independent variables as predictors of the dependent variables. At each level of delivery format, a multiple regression model was constructed for each separate dependent variable using the following independent variables as predictors using a forced entry method: number of course objectives, objectives specificity levels, knowledge base, student interaction levels, and workload. The separately examined dependent variables were “comparison with other education courses,” “classroom application,” usefulness of text, and instructor evaluation.

The results of the regression analyses for online courses are presented in Table 14. All classical assumptions for regression analysis were met for each dependent variable except for the normal distribution of errors, determined by examination of the residuals plots. The regression models constructed for “comparison with other education courses,” $F(5, 1994) = 0.83, p = .53, R^2 = .002, \text{adjusted } R^2 < .001$; “classroom application,” $F(5, 1994) = 2.10, p = .063, R^2 = .005, \text{adjusted } R^2 = .003$; and the instructor evaluation items, $F(5, 1994) = 1.27, p = .28, R^2 = .003, \text{adjusted } R^2 = .001$, did not significantly predict their corresponding outcomes better than the mean and were thus a poor fit for the data. The usefulness of text variable was significantly predicted by its corresponding model, $F(5, 1994) = 6.96, p < .001, R^2 = .02, \text{adjusted } R^2 = .02$. Student interaction and knowledge base were determined to be significant predictors of participant reactions of this type, as indicated in Table 14. The cross-validity of this model was

assessed using Stein's adjusted R^2 formula from which a value of .01 was obtained, a value very similar to the observed R^2 of .02 and providing evidence for the model's generalization.

Table 14: Results of Multiple Regression Analysis for Online Courses

Dependent Variable	Independent Variable	<i>B</i>	<i>B SE</i>	β
Classroom Application	Number of Course Objectives	0.05	0.03	.05
	Specificity of Course Objectives	0.00	0.02	.00
	Knowledge Base	0.00	0.04	.00
	Student Interaction	0.03	0.04	.02
	Workload	0.04	0.05	.02
Usefulness of Text	Number of Course Objectives	0.02	0.03	.02
	Specificity of Course Objectives	0.04	0.03	.04
	Knowledge Base	-0.11	0.05	-.05*
	Student Interaction	0.21	0.04	.11***
	Workload	0.08	0.05	.04
Comparison with other Education Courses	Number of Course Objectives	0.03	0.03	.03
	Specificity of Course Objectives	0.01	0.02	.01
	Knowledge Base	0.00	0.04	.00
	Student Interaction	0.03	0.04	.02
	Workload	-0.04	0.05	-.03
Instructor Evaluation Items	Number of Course Objectives	0.00	0.07	.00
	Specificity of Course Objectives	-0.02	0.06	-.01
	Knowledge Base	-0.12	0.12	-.03
	Student Interaction	0.13	0.10	.03
	Workload	-0.11	0.12	-.03

Note: Comparison with other Education Courses and Instructor Evaluation models were found to be non-significant.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

The results of the regression analyses for face to face courses are presented in Table 15. All classical assumptions for regression analysis were met for each dependent variable except for the normal distribution of errors determined by examination of the residuals plots. The “classroom application” variable was significantly predicted by the model, $F(5, 1994) = 5.23, p < .001, R^2 = .013, \text{adjusted } R^2 = .010$. The knowledge base and course objectives specificity were determined to be significant predictors of participant reactions of this type, as indicated in Table 15. The cross-validity of this model was assessed using Stein’s adjusted R^2 formula from which a value of .008 was obtained, a value close to the observed R^2 of .013. The usefulness of text variable was also significantly predicted by its corresponding model, $F(5, 1994) = 22.16, p < .001, R^2 = .05, \text{adjusted } R^2 = .05$. The knowledge base, number of course objectives, and course objectives specificity were determined to be significant predictors of participant reactions of this type. The cross-validity of this model was assessed using Stein’s adjusted R^2 formula from which a value of .05 was obtained, a value very similar to the observed R^2 of .06. The “comparison with other education courses” variable was also significantly predicted by its corresponding model, $F(5, 1994) = 2.32, p < .05, R^2 = .006, \text{adjusted } R^2 = .003$. The knowledge base was determined to be a significant predictor of participant reactions of this type. The cross-validity of this model was assessed using Stein’s adjusted R^2 formula from which a value of .001 was obtained, a value close to the observed R^2 of .006. Lastly, the sum of the instruction evaluation items were also significantly predicted by its corresponding model, $F(5, 1995) = 2.97, p < .05, R^2 = .007, \text{adjusted } R^2 = .005$. The course objectives specificity and workload across delivery format were determined to be significant predictors of participant reactions of this type.

The cross-validity of this model was assessed using Stein's adjusted R^2 formula from which a value of .002 was obtained, a value close to the observed R^2 of .007.

Table 15: Results of Multiple Regression Analysis for Face to Face Courses

Dependent Variable	Independent Variable	<i>B</i>	<i>B SE</i>	β
Classroom Application	Number of Course Objectives	-0.01	0.03	-.01
	Specificity of Course Objectives	-0.05	0.03	-.05*
	Knowledge Base	0.17	0.04	.10***
	Student Interaction	-0.07	0.04	-.04
	Workload	0.06	0.03	.05
Usefulness of Text	Number of Course Objectives	-0.09	0.03	-.06**
	Specificity of Course Objectives	0.14	0.03	.10***
	Knowledge Base	0.34	0.05	.16***
	Student Interaction	-0.02	0.05	-.01
	Workload	-0.02	0.04	-.02
Comparison with other Education Courses	Number of Course Objectives	-0.04	0.03	-.04
	Specificity of Course Objectives	-0.03	0.03	-.03
	Knowledge Base	0.12	0.04	.07**
	Student Interaction	-0.02	0.04	-.01
	Workload	0.05	0.03	.04
Instructor Evaluation Items	Number of Course Objectives	-0.08	0.08	-.02
	Specificity of Course Objectives	-0.16	0.08	-.05*
	Knowledge Base	0.19	0.13	.04
	Student Interaction	-0.20	0.12	-.04
	Workload	0.22	0.09	.06*

Note: * $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

CHAPTER FOUR: DISCUSSION

Summary and Explanation of Results

The aspects of course syllabi were examined by delivery format to see if they varied in relation to participant reactions. Separate analyses were utilized to provide support or refutation for the outlined hypotheses and additional supplemental analyses were conducted to explore research questions that emerged as a result of the research and hypothesis testing. Although several relationships were observed, the effect sizes of these relationships were notably small. It should also be stressed that the participant reaction measures were the focal point of this study and they are not to be considered as adequate substitutes for gauging actual learning outcomes (Alliger et al., 1997). Hypothesis 1 was not supported as the participant reaction scores did not increase as the number of course objectives increased. Furthermore, participant reactions toward the usefulness of the textbook in their courses appeared to be the result of an interaction between delivery format and the number of course objectives. For the usefulness of text reactions within online courses, as the number of course objectives increases the participant reaction scores also increase providing partial support for Hypothesis 1. For these same reaction scores in face to face courses, the participant reactions initially increase somewhat as the number of course objectives enter the medium range. However, as the number of course objectives enter the high range; there is a drop-off in average usefulness of text scores. This interaction may suggest that as the number of course objectives increases to a certain point, the cognitive overload presented by the breadth of information to be retained or the targeted skill set to be developed may be a fulcrum at which differences between the text usefulness become apparent across delivery formats. This may be a function of the individuals' reliance on the text to complete these objectives: for online

environments it may be that the participants rely more on the textbook to complete the objectives as they may have more time and energy to allocate to this task (as they are not as bound by time constraints); those in the face to face courses, on the other hand, must stick to the activity intervals as outlined by the instructor and syllabus and as a result have less time to devote to controlled exploration of the textbook or may need to use it less. Related factors that differ between courses other than the number of course objectives may also be influencing participant reactions. Although we may expect students to be affected in terms of their “comparison to other education courses” reactions by differences in number of course objectives, the influence of this course facet on the classroom application, evaluations of instructor characteristics, and usefulness of text reactions may most likely be a function of factors that may suppress the effect of the number of course objectives. We might expect these to be facilitation-based (e.g. the importance of the instructor to fulfilling course objectives, the applicability of the content to be conveyed through accomplishing course objectives, and the usefulness of text to fulfilling course objectives) and to vary as a function of the qualitative elements of course outlines and requirements.

Hypothesis 2 was partially supported for the usefulness of text participant reaction as the participants reacted more favorably to courses with highly specific objectives. The specificity in objectives may have improved the communicative ability of the syllabi in terms of the learning and skill acquisition outcomes expected of the participants. In these situations, the textbook may appear to be more useful to the participants as they have a clearer direction as to what is expected of them and what they may use to achieve their objectives. Furthermore, as Noe and Colquitt (2002) postulated that the specificity of course objectives may help promote program

effectiveness, the results indicate that the communication of specific course objectives may be related to the usefulness of text reactions, which may in some form be examined to some degree as an indicator of effectiveness. However, contrary to these results, the instructor evaluation items surprisingly decreased in participant reaction means for both online and face to face courses. This result is surprising because one would expect the clear communication of course objectives on the syllabus to have a positive effect on reactions towards the instructor, as the syllabi can be postulated to exist as a contract and plan between the instructor and the student (Bers et al., 1996; McKeachie, 1978). Also, a more specific syllabus in terms of course objectives may decrease student anxiety and decrease the amount of repeated requests for clarification as is often the case for ambiguous course syllabi (Kearsley & Lynch, 1996). As the objectives curtail ambiguity, we would expect the participants to react more favorably to the instructor's preparation and organization and also to other characteristics of the instructor (as a clearer syllabus may more effectively communicate the instructor's "stance" on particular course characteristics). Perhaps the decrease in instructor evaluation reactions for course objectives specificity may be attributed to a communicated perception of the instructor; for example, the instructor may be perceived as "rigid" and "uncompromising" to some degree in setting direction to the course or as seeking to overload the students with too much information or too many objectives for one class. The "comparison with other education courses" reactions do not provide support for the second hypothesis for face to face courses. The dependent variables were all observed to be a function of the interaction between delivery format and the level of specificity of the course objectives. The face to face students perceived their course as being less comparable to other education courses they have taken for courses with higher levels of

objectives specificity. This relationship may be the result of a similar indication of the course as being inflexible and rigid. Perhaps courses with a more flexible (as opposed to specific) curriculum are rated better than other courses. This would be in opposition to the content of the literature, however, as students typically react negatively to ambiguously constructed courses (Kearsley & Lynch, 1996). An alternative explanation may be that the particular sample (comprised mostly of working professionals and adults) possess the maturity and conscientiousness to flourish within a more organically structured course. Neither the online nor the face to face students differed at different levels of course objectives specificity in terms of their reactions to the course's applicability to their own classrooms. This suggests that the specificity of course objectives may be unrelated to how one perceives the course in terms of application or practicality.

Hypothesis 3 was sufficiently supported as the majority of the online course participant reactions were higher than those reported in the face to face groups across knowledge base, as can be seen in Table 22. These results reflect those that have been observed in the literature (Kulik & Kulik, 1991; Paul, 2001) that favor online courses over face to face. This disparity may be a function of the participants' self selection into courses by delivery format based on whether or not the format is suitable to their own needs (Sitzmann et al., 2006). The participant reactions for "comparison with other education courses" did not vary by delivery format. This may be because participants differ in magnitude and variety in terms of their own exposure to other courses, regardless of delivery format. Lastly, the procedural knowledge group for the usefulness of text variable did not differ by delivery format. This mirrors to some degree the lack of difference in reactions and procedural-based course outcomes found in the Sitzmann et

al. (2006) analysis. Furthermore, the usefulness of text and “classroom application” items provided partial support for Hypothesis 4 as they were both a function of the interaction between the delivery format and the knowledge base of the course. In most cases, online courses scored higher than face to face courses in participant reactions for courses based on declarative knowledge. For the procedural based courses, the reaction scores tended to be very similar between online and face to face courses. This runs contrary to what was hypothesized, as procedural-based courses were expected to be reacted to more favorably for face to face courses due to the individualized level of feedback. However, the lack of random assignment and presence of self selection into the courses may account for these results as indicated by the observed reversal of declarative outcomes effect when accounting for research design (Sitzmann et al., 2006). Furthermore, the “comparison with other education courses” and instructor evaluation items did not differ across knowledge base or as a function of the interaction between delivery format and the knowledge base of the course. Instructor evaluation items may not have differed in terms of knowledge base as instructors for both courses with a declarative knowledge base and those with a procedural knowledge base may have been perceived as equally effective in conveying the appropriate types of knowledge. Although each course has a particular “base” upon which the lessons are founded, it is more accurate to say that each course may possess varying degrees of declarative and procedural knowledge. As a result, it’s a necessity for instructors to be adept in effectively conveying both types of knowledge and so the knowledge base of the course may not have as much of an impact on the instructor evaluation items.

Hypothesis 5 was not supported as the “comparison with other education courses,” “classroom application,” and instructor evaluation variables were not more positive for courses

with higher student interaction levels. This is an adventitious result, as Sitzmann et al. (2008) found that student interaction was the strongest predictor of participant reactions. It would follow that higher levels of student interaction would be associated with more positive participant reactions. Although student interaction levels may be facilitated through various course design aspects such as discussion forums and group projects; it may ultimately be up to a combination of the participants themselves (sociability, informal interactions, perceived cohesion, etc.) and the debate spurred by the course topics to produce substantial student interaction. Student interaction may thusly be a very difficult independent variable to operationalize, as its presence may vary even in courses designed to facilitate its presence. That having been said, partial support for Hypothesis 5 was obtained from the usefulness of text variable because a positive relationship between the levels of student interaction and the online participants' reactions were observed. As participants are interacting on the course forum or discussion board, they may need to refer to their textbooks more as a basis of the arguments they are presenting to the class. This increased utilization of the text may be indicative of the change in ratings of usefulness of text for online courses. The usefulness of text, "classroom application," and instructor evaluation participant reactions all varied as a function of the student interaction levels and delivery format. Perhaps in the online courses, this student interaction is integral to an elicitation of a positive reaction from the participants as the text becomes used more often and more ideas are exchanged (and thus new "tools" for each teacher to use within his/her classroom). These course elements may be taken for granted in a traditional classroom but may increase in importance and appreciation when taken online. This relationship may also be related to the permission of all students (especially those who may be adverse to public

speaking) to share their ideas with the class and facilitate discussion as a requirement. Lastly, the participant reactions were more positive for online courses than face to face courses for courses with high student interaction levels, thus failing to provide support for Hypothesis 6. Furthermore, the “comparison with other education courses” variable did not differ in terms of delivery format or student interaction levels. This may be because participants differ in magnitude and variety in terms of their own exposure to other courses, regardless of delivery format as previously mentioned.

Hypothesis 7 was not supported as participants did not differ in terms of their reactions to courses with different workloads. This suggests that the workload may not be a factor as communicated by the course syllabi that may affect participant reactions towards various course aspects; although, one would expect the breadth of the course workload to impact comparisons with other courses, usefulness of text, and instructor evaluation items in particular. In terms of the information presented on the syllabi, it may be argued that not enough information was provided on the syllabi for the raters to adequately assess the amount of workload present in each course. This suggests that an alternative operationalization of workload would be required in this context and perhaps perception of workload would be more suitably treated as a dependent variable or item on the course evaluation form.

For the “classroom application,” usefulness of text, and instructor evaluation variables, online courses scored higher in terms of reaction averages than face to face courses in almost all circumstances. In comparison with the meta-analytic conclusions of the literature, the results reflect those that have been observed (Kulik & Kulik, 1991; Paul, 2001) in some circumstances; but also run contrary to the results of others (Sitzmann et al., 2006). The preference of online

courses may be a function of a lack of random assignment or the permission for participants to self select into courses by delivery format based on whether or not the format is suitable to their own needs (Sitzmann et al., 2006). The participant reactions for “comparison with other education courses” did not vary by delivery format. Participant reactions did not differ between online and face to face courses for the low student interaction group for classroom application, the procedural knowledge base group for usefulness of text, and all relationships observed for the “comparison with other education courses” reactions.

In the analysis of the potentiality of course syllabi aspects as predictors of the dependent variables, differential results were obtained between online and face to face courses. The results suggest that for online courses, there are only a handful of predictor variables and the course syllabi aspects for the most part do not predict the dependent variables. For online courses, courses with a declarative knowledge base tend to predict positive text usefulness reactions and student interaction levels were shown to be positive predictors of text usefulness reactions. On the other hand, there is a plethora of course characteristic predictor variables for face to face courses. This suggests that face to face courses may be more amenable to changes in levels of course aspects as communicated by the syllabi than online courses. For face to face courses, every course syllabi aspect except for student interaction operated as a predictor variable to one or more of the reaction measures. Specificity of course objectives operated as a positive predictor of text usefulness reactions and a negative predictor of the “classroom application” and instructor evaluation items. Workload was a positive predictor of the instructor evaluation items. Knowledge base was also a predictor of the several of the respondent reactions, with procedural-based courses reacted to more positively for these dependent variables except for the instructor

evaluation items. Lastly, the number of course objectives was a negative predictor of text usefulness. Interestingly, for both online and face to face courses, student interaction failed to be a predictor variable for any of the participant reaction terms contrary to Sitzmann et al.'s (2008) findings. This provides further evidence indicating that the student interaction may be in need of an expanded operationalization.

Implications of Findings

The analysis of how syllabi may potentially affect the participant reaction ratings of their courses and instructors is important as syllabi provide for a physical document outlining the plan of training or education and communicate the important aspects of the course the students should be aware of at the outset of their instruction. Examination of this relationship can aid organizations in the “market research” directives (Calder, 1995) of their course evaluation forms when training or education is considered as a product to market to potential clients. In doing so, they may be able to modify course characteristics or syllabi aspects in order to maximize course evaluation responses of varying dimensions. Furthermore, it may be that the course syllabi introduce and solidify an initial expectation of how the course is anticipated to run. Deviations from this expectation may provide a source of cognitive dissonance from which negative reaction ratings may be likely to follow. The results improve our understanding of the relationship between the course syllabi and the student reactions as three of the five course aspects were related to some of the course evaluation measures, providing some evidence that there may be a relationship. The syllabi aspects were also shown to differentially affect online and face to face courses, with face to face courses being more susceptible to changes in participant reactions as a function of course syllabi aspects. Furthermore, online courses appear

to be relatively resilient in terms of participant reactions to syllabi or independent variable differences in this sample. This may help improve our understanding of how objective course characteristics as communicated by the syllabi differentially affect the participants' reactions. This new finding also suggests that Sitzmann et al.'s (2008) call for future research examining the possible impact of objective course characteristics on participant reactions can be further explored within the framework of course syllabi.

With respect to theory, the results provide support for the rejection of the unidimensionality of course evaluation items (Morgan & Casper, 2000). These results may also provide grounds that fail to support Brown's (2005) supposition that participant reactions should be treated as an affect-driven overall score. The results of the factor analysis suggested an emergence of multiple course evaluation factors and the results of the hypothesis testing also revealed a variety of relationships that differed by participant reaction. In terms of the online versus face to face research question of participant reactions, the results supported past research (Kulik & Kulik, 1991; Paul, 2001) indicating that participants react more positively to online courses than face to face courses. The findings of this analysis may be possibly explained in terms of Clark's (1983; 1994) criticism of random assignment neglect apparent in most comparative research of delivery format; as participants may react more favorably to courses they had the choice of enrolling in. However, it may also be argued that this is an appropriate way to offer coursework as individuals assume the proper level of autonomy in designing and tailoring their own curriculum to suit their needs (granted that the curriculum falls within a certain realm of meeting quality standards). In terms of the hypotheses that were tested, the various courses examined were found to differ in terms of their participant reactions scores in

consideration of the different course syllabi elements. This finding is new to the literature, as previous examinations of course syllabi in the literature have been mostly limited to prescriptive explorations of syllabi functionality, deconstruction of the syllabus document, and specific reactions to the course syllabi themselves (Becker & Calhoun, 1999; Bers, Davis, & Taylor, 1996; Eberly, Newton, & Wiggins, 2001; Smith & Razzouk, 1993; Parkes & Harris, 2002). In terms of specific relationships between the syllabi aspects and participant reactions, there was no relationship between the course syllabi and the comparison with other education courses item, which may be a subjective item that may be subject to constraints of personal experience. The only noteworthy idiosyncrasy of this dependent variable existed in the interaction between the delivery format and the specificity of course objectives. Furthermore, the comparison of student interaction levels by delivery format for the “comparison with other education courses,” “classroom application,” and instructor evaluation variables as well as student interaction failing to appear as a predictor variable in the regression analyses was surprising. These results ran contrary to those of Sitzmann et al. (2008) in that student interaction was not the strongest predictor of participant reactions. As previously indicated, these results may be a product of an insufficient operationalization of student interaction. A stronger design may possibly endeavor to operationalize student interaction as a self-report or otherwise objectively measurable dependent variable for each class. The presence of a facilitating apparatus (i.e. forum usage, specific interactive requirements, etc.) within each course syllabus could then be coded for each course and the relationship may be observable by these alternative means. An understanding of the various objective course characteristics of syllabi and how they may impact various course evaluation dimensions may help organizational or educational analysts determine appropriate

changes to the courses in order to improve evaluation scores or to solidify expectations of what to expect from the evaluation scores to aid in their interpretation.

The results of this research suggest that teachers, instructors, and other individuals who may be involved in course development pay close attention to the construction of course syllabi and various course design aspects in anticipation of participant reactions to their courses. The course knowledge base, specificity of course objectives, and student interaction levels as factored into each course and communicated by the course syllabi all may have a slight form of impact on the way students perceive and react to the course. The course knowledge base may be related in some way to the course content, and may co-vary to an extent with the type of course being offered. Furthermore, the course objectives specificity may affect the participant reaction ratings to a small degree when considered in combination with the delivery format. Student interaction levels may also impact the usefulness of text ratings of participants to a small degree. As a result, it may be beneficial for stakeholders within the course development process to consider such factors during the design process, even though the impact of the aforementioned course aspects may not be of the highest salience. To slightly improve classroom application and text usefulness ratings, instructors of face-to-face courses with a chiefly declarative knowledge base may want to include some process-based instruction or activities for their students which they may in turn use in their own classrooms. Also, a slight improvement in text usefulness ratings may also be seen in developing courses with high levels of student interaction. In terms of course objectives specificity for face to face courses, a trade-off seems apparent in maximizing scores on instructor evaluation items or text usefulness ratings. Highly specific course objectives seem to promote more positive reactions towards the usefulness of text and lower ratings of the

instructor. However, it is not recommended to sacrifice the specificity of course objectives in order to maximize participant reactions towards their instructors. Instead, it could be of benefit for the instructor to link the lessons with the objectives while at the same time allowing for flexibility, discussion, and an organically structured class. This study replicates the findings of past research which indicate that online courses are rated higher than face-to-face courses in terms of participant reactions (not learning outcomes or quality), although the previous research is admittedly mixed. However, this study moves beyond the current literature on delivery format comparison to suggest that participant reactions may be a function of both the delivery format and course syllabi aspects. As a result, course development stakeholders need to be cognizant of the format for which they are teaching the course and the various aforementioned syllabi aspects. This is especially made apparent from the results of the multiple regression analyses in which reactions from both delivery formats were differentially affected by variety in the course syllabi aspects. It appears as if participant reactions are more sensitive to variations in course characteristics for face-to-face courses, and thus care should be taken in developing the course and its syllabus. On the other hand, online courses seem to be hardly affected by such variations in course aspects as communicated by the syllabi. This suggests that online course participant reaction ratings are made independently from what is communicated by the course syllabi and perhaps there are more salient constructs involved in participant perceptions of the course (e.g. the convenience for taking the course). As such, it may be that the development of the course syllabi for online courses is not as pressing as it would be in a face-to-face course for eliciting targeted participant reactions. This is not to say that the development of course syllabi are unimportant in online courses, rather, that they are just not as instrumental in association with

participant reaction scores as in face-to-face courses (or that other variables act as moderators). Course development stakeholders may also wish to modify their course evaluations in order to produce useful information. It would be of benefit for training/education institutions to ensure that they are eliciting as much helpful, relevant information from the student reactions as possible. This could be enacted by including items that assess the students' perceived levels of student interaction, workload, syllabus alignment with course occurrences, convenience, and student reasons for taking the course. Participant reactions may be more readily understandable in lieu of knowing why students sign up for particular courses. By encouraging the proper development of course syllabi and course evaluation forms, practitioners may be able to align the communication of course characteristics to participant reactions and thus be able to receive valuable information that can be used to improve course quality and contribute to students' perceived satisfaction.

Limitations

As the design utilized within this study was an ex post facto or comparative design, the interpretation of the results are limited (as inherent in comparative designs) in that a causal relationship may not be attributed to the observed relationships and must instead be considered presumed effects of the attribute independent variables. The lack of random assignment apparent in comparative designs of delivery format were also criticized by Clark (1983; 1994) in terms of the ability to draw conclusions on delivery format and its presumed effects on various course outcomes. Participants may choose online or face to face courses because they like them better or feel more comfortable taking them and may thus rate them more positively. It can be argued that there was not enough information on the syllabus to determine adequate levels of student

interaction or workload – an enhanced operationalization of both constructs is suggested (although high reliability was demonstrated) and warrants inclusion as a dependent variable and reaction item. There is also a tradeoff apparent in promoting an assurance of the anonymity for participants completing course evaluation forms in that no personally identifiable information may be collected. Furthermore, causality cannot be attributed because other extraneous variables to the study that were not possible to control for after-the-fact may have confounded the observed relationships between delivery format, syllabi attributes, and the participant reactions. The extraneous variables may have included in this instance learner characteristics (motivation, agreeableness, cognitive ability, anxiety, etc.) (Lockee et al., 1999; Sitzmann et al., 2008), instructor style/behavior (Bolliger & Martindale, 2004; Kraiger, 2002), length of course (Sitzmann et al., 2006), opportunities for practice and feedback, and use of technology. It may be that a combination of any amount of the aforementioned variables had an effect on those examined within the study, providing evidence for tertium quid, third-variable causation. This information provides evidence for the possible inclusion of items assessing levels of perception of these constructs on future course evaluation forms. In this sample, it would've been beneficial to verify the coalescence between the instructor behaviors and participant reactions to the instructors. The self-report of participants in terms of instructor characteristics may be different from what would be obtained in direct observation of trained assessors. In addition, extraneous environmental events may have occurred between the initial administration of the course syllabi and the completion of the participant course evaluation forms. These particular limitations solidify the assertion that course syllabi are not the only course elements that may have an impact on participant reactions and that other factors are likely involved. However, it is apparent

that the course syllabus is a rarely modifiable (after the fact) document that students may refer to for information and forecasting throughout the course. To this extent, the syllabi may be considered somewhat resilient towards these extraneous environmental events as the syllabi for these courses were not altered while the course was in progress.

A limitation in regards to the course design can be observed through the attrition rates. Accounting for attrition, approximately 11.95% of the sample was trimmed. As this percentage is relatively small, the extent to which it may present a problem to the integrity of the research design is minimal. In consideration of the generalizability of the results of this analysis, the accessible population was representative of the theoretical population in terms of its geographical disbursement and the vast majority of respondents were teachers. Furthermore, the response rate was strongly indicative that attrition is most likely not an impactful factor. However, as the design utilized a convenience sample, the generalizability may be curtailed to some degree. In terms of the ecological generalizability, the support for validation of this type is sufficient. The classroom and online course evaluation administration conditions are all what one would expect when completing such evaluations. Also, the response rate was not differentially affected by membership to either of the delivery formats. However, as the length of the courses varied in terms of their pacing and allocation to specific instances of history, so may the ecological validity of the study be affected. The deletion of partial response cases could be a possible influence on the results. Roughly 8.08% of the total participants of the course were not included in the final dataset as a result of deletion of missing responses. This number is relatively low and is not expected to have a drastic effect on the quality of measurement of this study. Also, there may be evidence of a halo bias in course evaluation ratings within this particular sample

evidenced by the negatively skewed distributions of all of the dependent variables. However, these types of distributions are typical for course and instructor evaluations (Marsh & Roche, 1997).

In terms of statistical problems that were encountered, in all of the dependent variable distributions that were examined violations of normality and also of homogeneity of variance were observed for the analyses that involved factorial ANOVA and ANCOVA procedures. However, Field (2009) in his review of the evidence on the robustness of the ANOVA statistical procedure suggests that the F statistic is fairly robust in consideration of error rates only when the sample sizes are equal. Cook (1993) also re-affirmed the importance of relatively equivalent sample sizes to robust one-way ANOVA and ANCOVA procedures. As care was taken in assigning course syllabi characteristic variables based on group sizes, this condition is likely to be met and in these circumstances, the ANOVA can be considered to be robust. The only circumstance that demonstrated a possibility of non-equivalent groups was the workload independent variable. The results of this independent variable should be limited in its interpretation based on the violations of assumptions for the ANOVA test statistic and also for its non-equivalent group sizes. It is also important to note that the effect sizes of the majority of these relationships were notably small and the syllabi aspects never explained more than 2% of the variance in participant reaction scores. For the regression analyses, all assumptions for regression were met except for the assumption of normally distributed errors and the assumption of independence of errors (for face to face courses). However, violations of the assumption of normality in the linear regression statistic are generally robust even if the population distributions are skewed for very large samples and outside of the presence of major outliers

(Edgell & Noon, 1984; Hayes, 1996). The linear regression performed in this analysis can thusly be considered to be robust, although the assumptions that were violated may be suggestive of a limited generalization beyond the sample.

Directions for Future Research

There are several modalities for future exploration that have been raised as a result of the research conducted within this study. Future research should examine additional aspects of the course syllabi, especially differences between communicated syllabi aspects to determine if there are any discrepancies in reactions or learning outcomes from other samples. Future research should especially focus on how these differences in syllabi aspects affect online and face to face courses separately, as the results from this study suggest with added emphasis on determining why the courses of differing delivery formats appear to be affected differentially. This could possibly be explored through a more specific examination of the aspects of course objectives and knowledge bases and how they may differ in their actual instructor / student frequency of use, perceived course convenience, direct perceptions of students / research assistants, secondary, and other aspects that may alter the communication of syllabi aspects between online and face to face courses. Furthermore, an item may be introduced assessing the participants' perception of the content of the syllabus as an accurate representation of what has actually been observed within the course and additional items probing the extent and specificity of this disconfirmation may also be added. This can then be compared with the other course evaluation items that may indicate a form of cognitive dissonance inherent in a course that communicates plans and objectives for course content but fails to "follow through." This suggestion hearkens to the possibility of the syllabus as a document which may serve to manage student expectations of the

course content and may thusly have an impact upon the participants' reactions (Gould and Padavano, 2006). This alteration of measurement may provide for a way of examining how participants change in terms of their reactions to the course based on whether or not it met their expectations outlined by their syllabus. By framing the course syllabus in terms of delivery format differences and the fulfillment or disconfirmation of participant expectations and determining how the aforementioned affects participant reactions, the course developer or organization can alter its sense of flexibility and modality of education / training delivery in order to maximize positive participant reactions to the course. The Syllabus Analysis Instrument may also be modified and utilized to be applicable to other learning domains. By examining the outcomes/reactions relationships with objective course characteristics as communicated by the syllabus and assessed by an instrument which cross-validates the course content with national and international standards, the validity of evidence of the research design may be bolstered (Madson, Melchert, & Whipp, 2004). By further exploring the use of this analysis instrument, organizations and educational institutions may be provided with a method of assessment for determining how well syllabi utilized within their courses are meeting their constituent's standards for conveying relevant, appropriate information to their students. Next, learning outcomes of knowledge management and organizational learning systems as well as their users' reactions may be analyzed as they may present unique environments that may or not may differ from education or training as traditionally conceptualized. By examining how organizational incumbents react towards the systems that allow them to share knowledge or information, the organization may have a better idea of what to modify or improve so as to better facilitate the incentives for proper flow of information throughout the organization. Other directions for

future research may involve the analysis of syllabi for different types of courses. For example, examining courses with training that are very short in duration, open to a variety of users, and those that are expected to grant immediate usage of skills (Derouin, Fritzsche, & Salas, 2005). By examining the impact of syllabi from these types of training or education courses, the temporal distance between syllabi administration and course evaluation submission may be minimized thus also minimizing the potentiality for extraneous environmental events. Furthermore, to challenge Clark's (1983; 1994) criticism of not differentiating objective course characteristics between media or delivery formats, an analysis of immersive data visualization environments as a part of course curriculum may be examined. By examining the differences between courses offering this mode of exploratory learning, a difference may be found in sufficiently and accurately teaching students on particular topics that may benefit from data visualization practices (i.e. complex research methodology or courses on statistical analysis) that are unique to computer-assisted instruction and theoretically easily facilitated via online courses.

Future research on course syllabi and participant reactions should be focused mainly on the further analysis of objective course characteristics as communicated by course syllabi (specific reactions gauged towards course syllabi, frequency of usage, adherence, and referral, and out of class "exploration") and how they vary across delivery format. By further exploring aspects of the objective course characteristics as communicated by the syllabi, we may be able to understand how they contribute to the functionality and composition of the course in terms of both participant reactions and learning outcomes. Furthermore, the relationships between participant course expectations, objective syllabi aspects, and participant reactions should be examined. These relationships would be very helpful to examine as it may be that a major factor

in how participants react to the courses they have been enrolled in would be whether or not it met their expectations as the syllabi (when publicly available) provides a vehicle by which an organization can convey this information to potential participants. Additional directions may include the exploration of other training/education course types and the exploration of other methods of learning and understanding the information as objective course aspects. Such directions may provide fruitful for an organization or an educational institution in that they may be able to alter their syllabi or the rigidity of their course offerings in order to maximize participant reactions.

Conclusion

Course syllabi are an important area for research and explanation as they provide for a contract between the students and instructor/organization, an outline of the course characteristics and aspects that the student should be aware of, and communicate to the student explicitly what is expected of them. Furthermore, participant reactions are important as they are used by the organization in making decisions and for formative or summative assessment purposes of their training or education efforts. Exploration of the two course aspects may be beneficial in forging a convergence between a communicated elucidation of what is involved in taking the course and the participants' evaluative reactions towards other related aspects of the course. A complete understanding of the relationship between objective course characteristics and the participants' reactions to various course aspects may assist organizations and educational institutions in being able to improve their course evaluation processes to produce meaningful information and alter course characteristics to become more effectively aligned with the relevant market demands for information or skills. The results of this study illustrate how course syllabi may slightly impact

how participants react to various course aspects and further suggest that online and face to face courses may be affected differentially. Course development stakeholders are recommended to pay attention to this discrepancy and endeavor to develop quality syllabi that are aligned with their course evaluation forms and that clearly convey quality information to the students. This, in turn, can provide a way in which organizations can improve their training and education effectiveness by theoretically improving the affect and motivation of incumbents to become engaged as considerations have been made on the part of the organization to cater to the needs and preferences of the organization's constituents. Furthermore, in an industry in which training or education is offered as a product, improving aspects of the course design and bolstering participant reactions to the courses being offered improves the reputation of the organization and also theoretically may increase demand for courses that meet potential clients' needs.

APPENDIX A: FACE TO FACE COURSE EVALUTION FORM

Course Evaluation

Location: _____ Date: _____
Instructor: _____ Name (optional) _____

PART I The Course

Circle one:		Low			High
1.	Compared to other education courses you have taken, how would you rate	1	2	3	4 5
2.	Rate the usefulness of the text.	1	2	3	4 5
3.	Rate the usefulness of the student guide	1	2	3	4 5
4.	Rate the usefulness of the experiential activities.	1	2	3	4 5
5.	How well did this course apply to your classroom?	1	2	3	4 5

Comments: _____

PART II How would you rate your instructor in:

		Low			High
1.	Preparation/Organization	1	2	3	4 5
2.	Knowledge of subject	1	2	3	4 5
3.	Creation of a positive learning atmosphere	1	2	3	4 5
4.	Equal concern for theory and practice	1	2	3	4 5
5.	Effective classroom management skills	1	2	3	4 5

Comments: _____

Please complete both sides of this evaluation

PART III Please circle the answer that best describes your learning experience from this course.

	Low			High	
1. Define	1	2	3	4	5
2. Develop appropriate essential and unit questions	1	2	3	4	5
3. Understand the guidelines and procedures of a classroom	1	2	3	4	5
4. Demonstrate the ability to differentiate an assignment by product, process, and content	1	2	3	4	5
5. Develop a tiered assignment	1	2	3	4	5
6. Identify and group students by level of achievement, interest, and multiple intelligences	1	2	3	4	5
7. Develop and implement a differentiated unit for your classroom	1	2	3	4	5

Comments: _____

PART IV Help us serve you better!

	Poor			Excellent	
1. Rate the facilities overall	1	2	3	4	5

Include any specific comments here: _____

2. Would you be interested in having a course offered at your school? ___ Yes ___ No
If yes, name of school _____ Phone Number _____
Contact Person _____

3. Do you have any suggestions for possible class sites, i.e. hotels, conference centers, meeting rooms, private schools, community colleges, that would be well suited for classes and more convenient for you?

4. Would you like to be on our E-mail mailing list? If yes, enter email address _____

APPENDIX B: ONLINE COURSE EVALUATION FORM

1 2 3 4 5
Please choose one:

7. Overall rating of this course

1 2 3 4 5
Please choose one:

Other (please specify)



8. Please rate your instructor's preparation/organization.

1 2 3 4 5
Please choose one:

9. Please rate your instructor's knowledge of the subject.

1 2 3 4 5
Please choose one:

10. Please rate your instructor's creation of a positive learning atmosphere.

1 2 3 4 5
Please choose one:

11. How would you rate your instructor's concern for an equal balance of theory and practice?

1 2 3 4 5
Please choose one:

12. Please rate your instructor's accessibility/responsiveness.

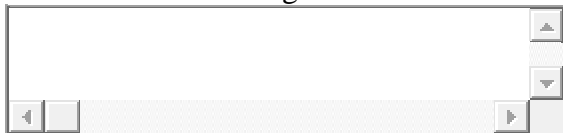
Please choose one: 1 2 3 4 5

13. Please rate your instructor's warmth/rapport.

Please choose one: 1 2 3 4 5

Comments: 

14. What are the strengths of this course and online delivery?



15. What are the weaknesses of this course and online delivery?



16. What would you change about the course?



17. Any other comments about the online course experience?



18. Would you take another course online? If so, why?

19. Please describe the results you experienced personally and professionally in this course.

20. How many years have you been teaching?

21. How many years have you been teaching with technology?

22. Prior to this course how many hours per week did you spend on the Internet?

23. Would you recommend this course to others?

APPENDIX C: SYLLABUS RATING GUIDE

Syllabus Rating Guide

Before you begin: Find a quiet area and a computer with Microsoft Office (Word and Excel) capabilities. Ensure that you minimize the amount of interaction you have with others while completing this task. Please also refrain from surfing the web or utilizing the internet. This task is expected to take approximately 3 hours but may be more or less depending on your individual pace.

Begin by typing your name on the Excel Spreadsheet where it is marked “Your Name.” Open the Excel file and indicate your Name, Sex, and Age in the top row.

This analysis will require the rating of each course syllabi including the quality of conveyed information and course requirements. You will record the ratings of elements of the course syllabi on the included Excel spreadsheet. The course syllabi can be found within the syllabi folder and are marked 1 through 58. Specific rating instructions are found within this document. When you are finished with the task, e-mail the spreadsheet to _____.

The aspects of focus within this analysis are the *course descriptions*, *course objectives*, *course outline*, *grading*, and *student requirements*.

1. Course Objectives:

This section consists of a focus on the course objectives or goals students are expected to achieve. The course objectives will be examined across two dimensions: Specificity and Knowledge Base. The Knowledge Base for each course syllabus will first be nominally categorized as either Declarative or Procedural. Next, the course objectives will be rated from 3 to 1 for Specificity.

Knowledge Base – Task 1: Indicate the type of knowledge base (declarative or procedural) the course appears to possess based on the course objectives.

- **Declarative Knowledge**
 - Knowing the descriptive content or context; more simply, the “what”
 - EXAMPLE: Semantic facts, principles, theories, or ideas ($2+2=4$); or the context of events (July 4th is Independence Day in the USA)
- **Procedural Knowledge**
 - Knowing “how” something is done or the underlying process in completing a task or duty.
 - EXAMPLE: Learning how to fish, roller skate, to write, to develop a lesson plan.

Specificity – Task 2: Provide a global rating (3 to 1) for the course objectives’ specificity.

- Considered to be **specific (3)** when the objectives

- Frame results in terms of knowledge, attitude, skills, aspirations (desire to engage in a particular practice), or behaviors.
- Are written in terms of learner performance.
- The expected change in knowledge or behavior is stated.
- EXAMPLE: “The participant will create a lesson plan covering the content area for an interactive biology lab experiment.” or “The participant will investigate and evaluate how systems thinking theory and constructivist teaching practices influence the identification of essential learning within schools.”
- Considered to be **somewhat specific (2)** when the objectives
 - Frame results in terms of knowledge, attitude, skills, aspirations (desire to engage in a particular practice), or behaviors *to some extent*.
 - Written in terms of learner performance, but may also contain elements of instructor or peer performance.
 - The expected change in knowledge or behavior is stated, but may be somewhat ambiguous or unclear.
 - EXAMPLE: “The participant with his/her classmates will create a lesson plan so that they may learn.” or “The student will pass the test to demonstrate understanding.”
- Considered to be **not specific (1)** when the objectives
 - Does not frame results in terms of knowledge, attitude, skills, aspirations (desire to engage in a particular practice) , or behaviors
 - Are written in terms of instructor or peer performance, as opposed to learner performance.
 - The expected change in knowledge or behavior is ambiguous.
 - EXAMPLES: “The instructor will provide a lesson on the proper socialization of transferred teens” or “The participant will develop adequate skills” or “The student will pass the test.”

2. Other Sections For Consideration

Course description, course outline, grading, and student requirements

Student Interaction - Task 3: Provide a global rating (3 to 1) for the course’s amount of student interaction.

- The level of student interaction can be considered **substantial (3)** when
 - Multiple opportunities for group interaction are provided
 - Participants collaborate with one another in goal-directed projects
 - Participants interact through class participation and knowledge sharing
 - Group interactive course elements are embedded within assessments of student performance (i.e. grading)
- The level of student interaction can be considered **sufficient (2)** when
 - Some opportunities for group interaction are provided
 - Course is based on some adequate level of collaboration.

- Group interactive course elements are sometimes embedded within assessments of student performance (i.e. grading)
- The level of student interaction can be considered **deficient (1)** when
 - Little opportunities for group interaction are provided
 - Course is based on individual and instructor-directed study.
 - Group interactive course elements are not often embedded within assessments of student performance (i.e. grading)

Workload - Task 4: Provide a global rating (3 to 1) for the course's workload.

- The workload can be considered **substantial (3)** when
 - The assigned work can be perceived at a high level of difficulty.
 - The breadth of the workload covered is extensive and large.
 - There is an extensive time investment outside of class.
- The workload can be considered **sufficient (2)** when
 - The assigned work can be perceived at a moderate level of difficulty.
 - The breadth of the workload covered is manageable and moderate.
 - There is a manageable time investment outside of class.
- The workload can be considered **deficient (1)** when
 - The assigned work can be perceived at a low level of difficulty.
 - The breadth of the workload covered is narrow and lacking.
 - There is a minimal time investment outside of class.

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