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Paul K. Roberts

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Date

ASYNCHRONOUS ELECTRONIC DISCUSSION BEST PRACTICE

IMPLEMENTATION

by

Paul K. Roberts

A dissertation

submitted in partial fulfillment of the requirements

for the degree of Doctor of Philosophy in Instructional Design

Idaho State University

April 2014

Committee Approval

To the Graduate Faculty:

The members of the committee appointed to examine the dissertation of Paul K. Roberts find

it satisfactory and recommend that it be accepted.

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August 1, 2012

Paul Roberts
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RE: Your application dated 7/31/2012 regarding study number 3774: Asynchronous Electronic Discussion Best Practice Implementation

Dear Mr. Roberts:

I agree that this study qualifies as exempt from review under the following guideline: 1. Research on educational practices in educational settings. This letter is your approval, please, keep this document in a safe place.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

You are granted permission to conduct your study effective immediately. The study is not subject to renewal.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Patricia Hunter (208-282-2179; fax 208-282-4529; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Phone: (208) 236-2714
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BYU
IDAHO

February 10, 2012

Dear Paul,

Your proposal to use human subjects from the BYU-Idaho student body for the study entitled *Asynchronous Electronic Discussion Best Practice Implementation* is approved for 12 months from the date of this letter. Please notify the IRB if you intend to make any significant modifications to the study's design or implementation.

Good luck with your study.

.

Regards,

Scott J. Bergstrom, Ph.D.
Chair, BYU-Idaho Institutional Review Board

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Abstract

The purposes of this study were to determine what asynchronous electronic discussion (AED) best practices were implemented by first semester online instructors and to determine if there was a difference in AED best practice implementation between AED best practice trained and untrained online instructors during their second semester of online instruction. A review of literature resulted in the identification of six AED best practices. The AED best practices were: the instructor provides clear expectations (An et al., 2009; Arbaugh, 2010; Beaudin, 1999; Dennen, 2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009); participants are assigned roles (Dixson et al., 2006; Schellens et al., 2005); group discussion size is between three and 12 participants (Bliss & Lawrence, 2009a; Roberts et al., 2006; Schellens & Valcke, 2006); both individual (Dixson et al., 2006) and group (Taylor, 2006) incentives exist for participation; discussion environments promote informal social interaction (Dixson et al., 2006); and instructors play a minor role in asynchronous electronic discussions (An et al., 2009; Arbaugh, 2010; 2003; Beaudin, 1999; Dennen, 2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009; Mazzolini & Maddison,). These AED best practices were operationalized using both the literature and an expert Delphi panel.

Subjects in this study consisted of 30 online instructors who were in their first two semesters teaching at the participating institution. The study used a quasi-experimental pretest-posttest control group design. Subjects were assigned to experimental and control

groups using a stratified random sampling procedure. The experimental group was trained on the six AED best practices. Data were gathered using the AED best practice rubric from the institution's learning management system after the online instructors completed teaching their courses. Instructor performance for both the experimental and control group was evaluated during their first semester of instruction. This served as the pretest. Instructor performance was again evaluated for both the experimental and control group during the second semester. This served as the posttest.

AED best practice behaviors in the control group were assessed for experience effect. AED best practice for behaviors were also compared between the experimental and control groups to assess the training effect. Instructor minimum participation rate compliance in the control group showed a significant increase between semester one and semester two of the study. Instructor compliance with the discussion group size was significantly higher in the experimental group when compared to the control group. Measures for instructor discussion best practices influenced by the participating institution remained unchanged for both the experimental and control groups. Findings in this study implied that the institution, course design, and ease of implementation influences instructor best practice use. They also implied that training on instructor discussion best practices can contribute to increased best practice compliance.

CHAPTER I

Introduction

Over the last several decades, distance-education evolved from mail correspondence courses to interactive, collaborative electronic environments as a result of new technologies (Nichols, 2003; Taylor, 2001). Technologies such as audio and video recording augmented the written text sent through the mail (Nichols, 2003). Then telephone and video conferencing technologies enhanced interaction in distance education (Nichols, 2003). Most recently, digital technologies, including computers and the Internet, led to the creation of interactive, collaborative electronic learning environments (Nichols, 2003). One of the tools in collaborative electronic learning environments, the asynchronous electronic discussion (AED), is the most common method used for online course interaction (Choudhry, 2009). It is considered key to providing peer and classroom interaction in lieu of the face-to-face classroom experience (Choudhry, 2009; Taylor, 2001) and is identified as best practice for online instruction (Bailey, 2008; Berry, 2007). Understanding the technological aspects of AED tools is essential to successful online instruction and effective AED use (Tillman, 2009). However, effectively using AEDs takes more than just understanding how to use the technology to post a discussion question (De Simone, 2006). It requires well thought out strategies tailored specifically to the use of AEDs, not instructional strategies borrowed from other teaching contexts (Dennen, 2005).

Effective use of the AED requires instructor understanding and skill (Dennen, 2005). Yet, attempts to identify a clear set of literature-based AED best practices have resulted in differing lists (Berry, 2008; Chou, 2012; Hew, Cheung & Ng, 2009; Thompson, 2006). Additionally, what AED best practices were found to exist may not always be used in instruction, since research based best practices rarely find their way into real world application on their own merit (Bero, Grilli, Grimshaw, Harvey, Oxman & Thomson, 1998). This perspective is supported by Hsieh (2010), who pointed out that there is a gap in our understanding of what online instructors are actually doing in discussion boards. This lack of clarity in identifying AED best practices and their potential inconsistent application in online courses (Bero et al., 1998; Dennen, 2005), contribute to the following problem.

Statement of the problem

Instructors generally perceive AEDs as useful, especially in relation to eliciting well thought out responses by students (Baglione & Nastanski, 2007; Greenlaw & DeLoach, 2003; Steinbronn, 2006). This perception is supported by researchers who concluded, the appropriate use of AEDs can influence the level of social interactions and thus increase learning motivation (Tao, 2009), learner satisfaction (Swan & Shih, 2005), and perceived learning (Kim, 2010) in an online environment. However, students generally perceive AEDs as not useful and would prefer to not use them when given an option (Frey, Faul, & Yankelov, 2003; Lee, Cheung, Lim, & Sia, 2006). One possible reason for this difference of opinion is authentic discussion may not be happening in AEDs (Gerbic, 2006). This may be due to the improper use of AEDs stifling authentic discussion (Swan & Shih, 2005; Tao, 2009). Dennen (2005) reminds us that authentic

discussion does not happen spontaneously and must be appropriately supported by the instructor. She also argued the current AED practices are often based on intuition, or effective techniques from other teaching contexts, and have little support in the literature for application to AEDs.

There have been at least four attempts to address Dennen's (2005) concerns and summarize best practices in the literature related to AEDs (Berry, 2008; Chou, 2012; Hew et al., 2009; Thompson, 2006). Chou (2012) categorized the literature into five factors that may have an effect on AEDs. Hew et al. (2009), identified 18 research based guidelines to address low student participation rates in AEDs. Thompson (2006) listed best practices that were found in research studies or recommended by experienced online instructors. Berry (2008) grouped best practices into six areas in his review of the AED literature, and called on educational leaders to implement them in online courses. Researchers agree that AED best practices should be supported by research (Berry, 2008; Hew et al., 2009); however, the researchers listed in this paragraph lack consistency between their own lists of AED best practices.

In addition to the need to accurately identify AED best practices, De Simone (2006) argued that instructors need time to both understand and develop the skills to use AEDs in an effective way. Thompson (2006) emphasized that new online instructors have a significant struggle in developing effective AED practice skills. He pointed out that by following best practices, new instructors can improve their skills in a shorter time.

Purpose of study

The purposes of this study were to determine what AED best practices were implemented by first semester online instructors and to determine if there was a

difference in AED best practice implementation between AED best practice trained and untrained online instructors during their second semester of online instruction. To fulfill these purposes, three steps were taken before the study could be done. First, the study built on the best practice summaries by Berry (2007), Chou (2012), Hew et al. (2009), and Thompson (2006). The literature was reviewed to identify the AED best practices shown to promote increased student motivation (Tao, 2009), knowledge attainment (Kim, 2010), or satisfaction (Swan & Shih, 2005). This was then examined in detail by an expert panel. Second, training was developed based on those AED best practices. And third, an instrument was developed and validated to measure AED best practice implementation by online instructors. The research questions below further address the purposes of this study.

Research questions

Hsieh (2010) pointed out a need for further observation of how online instructors use AEDs. The first research question explored what the AED best practice implementation looked like for first semester online instructors.

1. What is the AED best practice implementation profile for first semester online instructors at a private western undergraduate institution?

De Simone (2006) pointed out; instructors need time and experience to incorporate teaching knowledge into their teaching practice. However, teaching experience alone may not result in adequate AED best practice use since some AED practices are based on intuition and may distract from effective online discussions (Bailey, 2008; Dennen, 2005; De Simone, 2006). The second research question explored the effect of online instructor teaching experience on AED best practice implementation.

2. Is there a statistically significant difference in the AED best practice implementation profile for untrained instructors between the first and second semester of online teaching?

Amidst calls to train instructors on AED best practices (Bailey, 2008; Bero et al., 1998), the third research question addressed the effect of training on the instructor AED best practice implementation profile.

3. Is there a statistically significant difference in the AED best practice implementation profile between untrained instructors and those who receive specific training on AED best practice implementation?

Research design

To answer the research questions above, the research design for this study was a quasi-experimental pretest-posttest control group design as defined by Gall, Gall, and Borg (2003). The subjects in the study consisted of 29 online adjunct instructors who were teaching their first two semesters at the participating university. Those adjunct instructors retained for second semester instruction and who were assigned the same course as in their first semester, were randomly assigned to control and experimental groups. The experimental group received treatment specific to AED best practices implementation, while the control group did not receive this treatment.

This design allowed the researcher to control for individual differences; including subject area, course content, and initial instructor skill level when addressing the research questions. Figure 1 shows the full design of the study.

O_1	R	X	O_2
O_3	R		O_4

X experimental group treatment
O_1 experimental group pretest evaluation
O_3 control group pretest evaluation
O_2 experimental group posttest evaluation
O_4 control group posttest evaluation
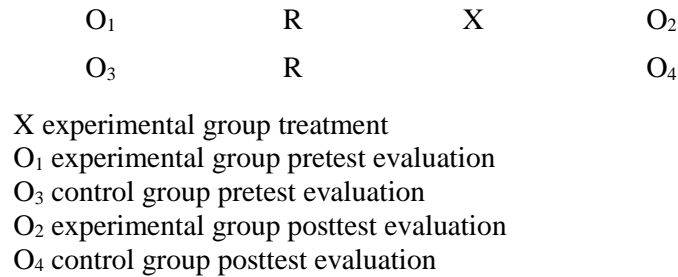
Figure 1. Research design for the AED best practice proposal.

Limitations. The limitations of a study identify potential weaknesses in the study (Creswell, 2003). These weaknesses are a result of the research design creating potential threats to internal validity (Gall et al., 2003). Five limitations were identified in this study. According to Gall et al. (2003), most threats to internal validity are avoided with the pretest posttest control group design that includes random assignment; however, they also identified four threats to internal validity that remain. These are experimental treatment diffusion, compensatory rivalry of the control group, resentful demoralization of the control group, compensatory equalization of treatment. One additional limitation was identified specific to this study. Each of these limitations is addressed below.

1. Experimental treatment diffusion (Gall et al., 2003) is defined as when the control group gains access to the treatment. It is most likely to occur if the experimental and control groups are in close proximity and the experimental group treatment is viewed as desirable (Gall et al. 2003). In this study, the treatment was not well known. However, the instructors had the potential for interacting with each other during the experiment. This limitation was addressed by the study in two ways. First, in the study design, the control group did not have access to the training during the experiment. Second, participants were asked not to share information about the training until the study was complete.

2. Compensatory rivalry of the control group occurs when the participants in the control group perceive they are in competition with the experimental group and, therefore, work to perform at a higher level (Gall et al., 2003). To address this threat, the participants in both the control and experimental groups were not informed to which group they were randomly assigned.

3. Resentful demoralization of the control group is when the control group becomes discouraged by the experimental group receiving a desirable treatment and, as a result, they perform at a lower level than they normally would (Gall et al., 2003). To address this limitation, the experimental and control groups were not informed to which group they were assigned.

4. Compensatory equalization of treatment occurs when the treatment is viewed as desirable and the control group is required to have a comparable treatment (Gall et al., 2003). This can result in altered control group scores (Gall et al., 2003). For this study, the treatment was not well known in the institution where the study took place and the administration did not require any compensatory treatment for the control group. This potential limitation did not apply to this study.

5. In addition to the above limitations, this study also had one additional limitation that impacted the internal validity of the study. At the time this study was designed, this participating institution had an unwritten policy for instructors to not modify any design elements or their courses. This policy influenced four of the nine variables measured in this study. To address this limitation, the variables influenced by the institution's policy were identified as the institution's

compliance with AED best practices and were examined separately from other variables in this study.

Delimitations. Creswell (2003) points out delimitations are important in defining the study as they establish the boundaries and narrow the focus of the study. They also impact the external validity of a study (Gall et al., 2003). The seven delimitations identified for this study were:

1. Pretest sensitization was identified by Gall et al. (2003) as a threat to external validity in a pretest posttest control group design. Gall et al. (2003) defined pretest sensitization as the pretest contributing to the experimental outcome. For this study, pretest sensitization was addressed by avoiding real-time observations. The pretest observations were only made on archived course data contained on the participating university's learning management system (LMS). Since the participants' performance was measured in this retroactive manner, the participants were not aware of when the pretest observations occurred. Therefore, participant performance during the pretest observations should not have impacted their posttest performance after treatment.

2. Posttest sensitization was identified by Gall et al. (2003) as a threat to external validity in a pretest posttest control group design. Posttest sensitization occurs when the posttest contributes to the experimental outcome by helping the subjects learn when taking the posttest. This threat to external validity was addressed in this study in two different ways. First, the participants were not informed of when the posttest observations were be made. Second, no real-time observations were

made in the study. The observations were made on archived courses contained on the participating university's LMS.

3. Measurement of dependent variable as defined by Gall et al. (2003) was also a threat to external validity. To address this, the researcher-designed instrument's validity and reliability were addressed before use. The instrument validity and reliability procedures are discussed more fully in the instrumentation section of chapter three.

4. This study was based on instructors at a single institution. Because of the institution's hiring and training procedures, course design and development procedures, and course modification policies, the findings of this study may not be applicable to other institutions. These policies and procedures are described fully in the "participants" and "learner characteristics" sections of Chapter III.

5. The target population for this study was instructors in their first two semesters of teaching in the participating university's online program. The results of this study may not be reliably generalized to online instructors with different teaching experience.

6. The number of instructors that participated in this study was small (N = 30). The results of this study may not be reliably generalized to large numbers of instructors.

7. The treatment in this study was designed to be brief, text-based training. The results of this study may not be reliably generalized to more extensive treatment methods.

Definitions of terms. The following terms used in this study require clarification.

Asynchronous electronic discussion (AED): Written communication between class

participants by posting comments electronically in a common place where others

in the class can view and respond to them (Kim & Wah, 2007; Choudhry, 2009).

AED best practices: For the purposes of this study, this is defined as AED practices that

are documented in research literature to promote increased motivation (Tao,

2009), knowledge attainment (Kim, 2010), or satisfaction (Swan & Shih, 2005)

on the part of the student.

AED best practice profile: For the purposes of this study, this is defined as a

measurement of instructor use of each of the AED best practices documented in

the research literature.

Computer-mediated communication (CMC): For the purposes of this study, CMC refers

to messaging between individuals or groups with the use of a computer as a

communication medium. This can be in the form of an email, blog, wiki or AED.

Deindividuation: A construct from social identity and deindividuation (SIDE) theory

where a person engaged in CMC lacks visual social cues normally present in face-

to-face interactions. He or she, as a result, is unable to identify with others as an

individual and the group identity development is facilitated (Liu & Burn, 2006).

Discussion board: For the purposes of this study a discussion board is the common

electronic location where individuals engaged in AEDs. Each participant posts

comments or answers to questions in this common location where all other

participants can see them and respond to them.

Distance-education: For the purposes of this study, any instruction that occurs outside of

 the face-to-face environment is considered Distance-education. Distance-

 education can be categorized into five different generations based on the

 technology used to facilitate learning and the learning tools enabled by that

 technology (Taylor, 2001). The five generations include the Correspondence

 Model, Telelearning Model, Multi-media Model, Flexible learning Model, and

 Intelligent Flexible Learning Model (Taylor, 2001).

E-learning: For this study, e-learning is defined as learning facilitated by the use of

 internet-based interactive learning tools including but not limited to learning

 management systems, AEDs, email, Wiki's, and Blogs.

Learning management system: An electronic platform designed to support instructor use

 of e-learning tools (Lewis et al., 2005). These vary from content delivery and

 grading tools to communication and interaction facilitation tools (Lewis et al.,

 2005).

Trained instructor: For the purposes of this study, a trained instructor is defined as an

 instructor who has completed the experimental group treatment.

Untrained instructor: For the purposed of this study, an untrained instructor is defined as

 an instructor that has not completed the experimental group treatment.

Significance of study

 The completing this study required the development of three items. First, a

concise list of research based AED best practices, examined by experts, was established.

Second, training on those research based AED best practices was created. Third, a

measurement instrument for assessing instructor AED best practice implementation was

created and validated. As a result, there were multiple contributions to the field, each of which are discussed below.

This study may have clarified what AED practices met the criteria of a best practice and created a foundation for advocating acceptance of a set of AED best practices as discussed by Berry (2008). To carry out this study, AED best practices were defined and the literature was reviewed to identify a set of AED best practices. Other researchers identified this need to clarify what practices were supported by the literature. Dennen (2005) and others (Berry, 2008; Hew et al., 2009) advocated for AED best practices to only include empirically supported practices. However, this still resulted in varying lists of best practices (Berry, 2008; Chou, 2012; Hew et al., 2009; Thompson, 2006). By defining AED best practices more specifically, this study created clearer criteria for inclusion of researched AED practice as AED best practices. This clarity may contribute to a generally accepted set of AED best practices in higher education.

This study may have contributed to understanding the practical worth of AED best practice training. De Simone (2006) identified the general need for instructor training to skillfully use AEDs. Thompson (2006) pointed out this need specifically for new online instructors. By comparing trained and untrained instructor AED best practice implementation, the practical worth of formalized AED best practice training was evaluated in this study. When trained instructors performed at a significantly higher level than untrained instructors, the benefits realized from the training may have justified the costs of AED best practice training.

This study may have contributed to the development of techniques for identifying specific training needs. By using an assessment instrument to systematically measure the

AED best practices of both trained and untrained instructors, this research may have contributed to understanding methods for more accurately identifying training needs. With this information, the training given to instructors could become more focused on individual need rather than general perception of training needs.

Lastly, this study created a tool for future research. Completing this study required the development and validation of an instrument for evaluating AED best practice implementation by instructors in online courses. This instrument addressed a need for systematic methods for evaluating online instruction as identified by Ternus, Palmer, and Faulk (2007) and as such may be used to conduct further research in AED best practice implementation.

CHAPTER II

Review of Literature

The purposes of this study were to determine what AED best practices were implemented by first semester online instructors and to determine if there was a difference in AED best practice implementation between AED best practice trained and untrained online instructors. To accomplish these purposes, the review of literature does four things. First this review of literature provides an overview of literature on distance education and e-learning that led to the use of AEDs. Second, learning theory is explored as it relates to identifying AED best practices for this study. Third, a review of literature on AED best practices is provided. Finally, literature related to faculty development as it related to online instruction is reviewed.

Distance-Education to E-learning

Distance-education has evolved with the technology available to assist in the process of learning (Taylor, 2001; Nichols, 2003). Lou, Bernard, and Abrami (2006) in their work on a meta-analysis of the use of media in undergraduate education identified five generations of distance-education. Nipper was credited by Nichols (2003) and Lou et al. (2006) for the identification of the first three generations of distance-education. Printing technology enabled the first generation. This resulted in correspondence courses where printed material was sent via the mail to students. The second generation was defined by the availability of audio and video educational material sent via the mail. The

third generation was characterized by the use of hypertext and the telephone as distance-education technology. The fourth generation was defined by the use of computers and the Internet (Taylor, 2001). The emergent, or fifth generation, was characterized by increased interactivity with computerized systems and decreased direct communication with the instructor (Taylor, 2001). Lou et al. (2006) observed the third through the fifth generations moved from instructor designed, non-interactive linear course material, toward increased student control, two-way communication, and opportunities for group interaction.

Taylor (2001) compared each of the five generations of distance-education and found differences included flexibility in time, place, and individual pace. He also evaluated the level of interactivity allowed in each generation. For example in the first generation which was characterized by printed material sent via the mail, there was high flexibility in terms of time, place, and pace, but low interactivity. The fourth generation on the other hand was characterized by Internet resources and computer-mediated communication where there was high flexibility for time, place, pace, and high interactivity as well. Taylor (2001) further pointed out that in addition to the Internet-based, fourth generation of distance-education being interactive, it was also more collaborative when compared to previous generations of distance-education. The difference between fourth generation computer-mediated interaction and the not yet mainstream fifth generation of distance-education was the use of automated responses to student actions. In this emerging fifth generation of distance-education, computers generate automated responses to student questions and needs, thus freeing human instructors to deal with uncommon or unique situations (Taylor, 2001). For example,

several researchers worked on developing computer programs designed to grade student term papers rather than the traditional instructor methods (Valenti, Neri, & Cucchiarelli, 2003). Others explored virtual reality gaming to provide interactivity and feedback for students (Virou & Katsionis, 2008). Taylor (2001) anticipated these types of computer generated response tools would increase the volume of students managed by a single instructor and reduce the cost of education for universities. Since the fifth generation of distance education is still emerging (Taylor, 2001), it is not considered further in this review of literature.

E-learning tools. Each generation of distance-learning relied on specific technologies (Taylor, 2001). The first three waves of distance-education were supported by the use of tools such as mail, telephone, and teleconferencing. The technologies that supported the development of the fourth generation were the Internet, and computer based interactive learning tools (Taylor, 2001). In fact, these tools define fourth generation of distance-education (Taylor, 2001), also known as e-learning (Nichols, 2003).

Learning management systems provided a platform for instructors to use e-learning tools that varied from content delivery and grading tools to communication and interaction facilitation tools (Lewis et al., 2005). The interactive e-learning tools supported by learning management systems of particular interest to this study were wiki's, web logs (blogs), and AED boards. They were important to this study because each of these e-learning tools assists in student expression and peer interaction (Parker & Chao, 2007; Taylor, 2001).

Wiki's are a collaborative learning tool embedded in learning management

systems (Parker & Chao, 2007). Parker and Chao (2007) reviewed the Wiki tool and made the following points summarized below:

- Wiki's are a useful tool because participants can quickly and simply make changes to a collaborative document online.

- Wiki's can be used as a source of information for students.

- Wiki's are especially suited for application in cooperative learning environments.

- Wiki's are suited for use in the constructivist paradigm of instruction since, when using a Wiki, learners construct both personal knowledge and group knowledge.

In spite of the usefulness of a Wiki in learning, Parker and Chao (2007) also argued Wiki's are not widely used in distance-education and have only recently begun to be studied in terms of different applications in online education.

Blogs are also a tool embedded in learning management systems but they differ from Wiki's in that they are designed to be more reflective (Parker & Chao, 2007). When using a Blog, a student writes down their thoughts or experiences where others can review them but not comment on them (Parker & Chao, 2007). West, Wright, Gabbitas, and Graham (2006) investigated Blog use and found students had difficulty continuing to be engaged in Blog writing through-out the semester. They also found students did not view Blogs as facilitating their interaction with other students. West et al. (2006) identified Blogs as being a novelty and emphasized that researchers need to get past this before meaningful work can be done in understanding the usefulness of the Blog in education.

Asynchronous electronic discussion (AED) is communication that occurs on a computer bulletin board where users posted comments are kept in order for others to

review and respond to (Choudhry, 2009). It is perhaps the most commonly used collaborative communication tool (Choudhry, 2009; Lewis et al., 2005). In fact, Taylor (2001) observed in the fourth generation of distance-education, interaction and collaboration were achieved mainly through the use of asynchronous discussion groups where students were required to communicate about specific learning content, and had the opportunity for social interactions. Lewis et al. (2005) found AEDs present in all the learning management systems reviewed in their study and Choudhry (2009) observed that AEDs were part of nearly every online course and were intended to mimic class discussion.

Choudhry (2009) argued there is little information as to why learning management systems include AEDs as part of their systems and why instructors choose to use AEDs as part of their online courses. It may be that instructors widely used the AED tool simply because it was widely included in learning management systems (Choudhry, 2009).

Asynchronous electronic discussion perception and use. Greenlaw and DeLoach (2003) asserted that the use of AEDs facilitates teaching by incorporating the benefits of both traditional writing assignments and in-class discussions. This positive view of the use of AED by faculty was also reflected in a study done by Steinbronn (2006). In her study on faculty technology use, she reported that 82 % of online faculty viewed AEDs as a somewhat, to very useful tool for instruction. Additionally, Berry (2007) argued there is a consensus for the AED being a necessary tool for knowledge attainment in online courses. In fact, in their review of learning management system features, Lewis et al. (2005) found the AED to be the only collaborative communication

or discussion feature to be present in all learning management systems studied.

On the other hand, in a study exploring voluntary use of the AED directed at customers sharing information, Lee et al. (2006) surveyed 104 college students, 94% of whom regularly used the Internet. They found 65% of students surveyed refused to participate in voluntary AEDs. One of the major reasons for not participating was the students saw no value in AEDs. Ogunleye (2010) observed that students were less likely to participate in AEDs if their participation was not linked to their grade, thus confirming the student dislike of AEDs. Furthermore, Frey et al. (2003) evaluated student ratings for 18 elements of online classes. Their analysis resulted in AEDs being ranked second to the last in usefulness, just above giving personal information.

While it appeared from the literature that the AED tool was not equally valued by students and faculty (Frey et al., 2003; Steinbronn, 2006), application of learning theory may illuminate the mechanisms of learning in the context of AEDs. It may also provide a foundation for identifying which AED practices facilitate learning.

Learning Theory

McLeod (2003) argued, when designing instruction, theory helps us to understand what drives learning. This understanding then informs the design of instruction to facilitate learning. He identified major learning theories and their approach to understanding learning. Behaviorism is valued for its focus on stimulus, response relationships and its emphasis on observable behaviors (McLeod, 2003). Cognitivism focuses more on what happens in the students head rather than the observed behaviors when explaining learning (McLeod, 2003). Constructivism approaches learning from the

perspective of what knowledge is created as a result of learning activities (McLeod, 2003).

Vygotsky (1978, p. 90) emphasized social interaction as the key learning activity where knowledge construction occurs. In his social learning theory, learning occurs in a social setting within a person's zone of proximal development. The zone of proximal development is the difference between what a learner can do independently and what a learner can do with assistance from others (Vygotsky, 1978, p. 86). In this zone of proximal development, a learner can learn with the guidance and support of others in the social group (Vygotsky, 1978, p. 86). In practice, Vygotsky's (1978) social learning theory supports the use of small groups of individuals interacting with each other to achieve a learning goal (Fung, 2004).

Researchers (Bailey, 2008; Bliss & Lawrence, 2009 a; Dixson, Kuhlhorst & Reiff, 2006; Fung, 2004; Rhodes, 2009) that studied online learning frequently reference Vygotsky's (1978) social learning theory to explain the need for student interaction in AEDs. However, theories, while they guide and assist, do not solve all instructional design problems (McLeod, 2003).

E-learning Theory. Technologies such as telephone, video, computers, and the Internet, necessitated the exploration of the nature of learning when using these media (Liu, 2002). This includes the development of new theories specific to these learning environments (Liu, 2002). The following paragraphs focus on the next generation of learning theory designed to explain learning dynamics in the context of e-learning. The e-learning theories covered include the periodic table model and SIDE theory as described by Liu and Burn (2006), information processing theory (Walther, 1992), media

richness theory (Daft & Lengel, 1983), social context cues theory (Spoull & Kiesler, 1986), and social presence theory as defined by Kim (2010).

Liu and Burn (2006) reviewed merits of multiple e-learning theories. Included in the review were the periodic table model and social identity and deindividuation (SIDE) theory which they categorized as task oriented models or theories. They described the periodic table as a two-dimensional model. In one dimension are inputs, processes and outputs. The other dimension includes people, purposes, links, and time. The factors in the different dimensions interact with each other and impact learning. While they applauded the model for its clarity and its multidimensional approach to understanding online teams, they critiqued the model for not addressing the relationships between the identified dimensions (Liu & Burn, 2006).

Liu and Burn (2006) explained SIDE theory the process by which a person develops a group identity in an electronic environment. This process occurs because the lack of visual contact and total physical isolation leads to deindividuation, or in other words, reduction in personal identity. This personal identity reduction creates an opportunity for social connection and group identity in computer-mediated communications. SIDE theory, in essence, explains how social connections develop in the absence of social cues such as speech and body language. Liu and Burn (2006) also critiqued SIDE theory for not having broad support in research.

Wather (1992) developed information processing theory to explain why different communication media impact communication differently. Liu (2002) categorized information processing theory as a social-emotional oriented model since it looks at the technology medium in terms of how fast it can transfer social-emotional information.

Some media, such as video conferencing, are able to transmit more social context information in a given period of time (i.e., dress, gender, nonverbal communication, speech, and writing) than others such as email (i.e., text) (Walther, 1992). However, given enough time, the slower media would eventually communicate social context adequately (Walther, 1992).

Daft and Lengel (1983) developed media richness theory in an effort to determine why some organization executives were well informed and others not. Media richness theory examines the capability of the medium to transmit the data required for the intended message to be understood. Daft and Lengel (1983) used this theory to rank different media in terms of capability to carry the most information. Face-to-face communication was ranked the highest followed by telephone communication, and then written communication.

Spoull and Kiesler (1986) argued different communication media impact the social context of communication and thus facilitate communication differently. Their social context cues theory explains this impact through evaluating three factors contributing to social context. They are participant perception of the context, cognitive-interpretation of messages sent, and communication behavior. These factors interact with three communication variables which results in the outcome of the communication attempt. The variables are geography, the organization under which the communication takes place, and the specific situation where the communication occurs. Based on their theory, Spoull and Kiesler (1986) argued the context is often lost with communication media such as email, since a person's gender, race, ager, appearance, or social status is not explicitly communicated.

Media/information richness theory and social context cues theory are categorized as task-oriented models because they evaluate the technology as either able to transmit adequate information to produce social learning or not (Liu, 2002). Like information processing theory, media/information richness theory and social context cues theory rate a technology medium in terms of how much social learning information can be transmitted. However, unlike information processing theory, they do not allow for time. The medium is either able to facilitate social learning activities or not.

While each of the above theories has their strengths, there are also weaknesses that are addressed by other theories (Liu 2002). For instance, Liu (2002) advocated combining task oriented theories with information processing theory to create a more holistic picture. This evolution was also evident with social presence theory. Kim (2010) described at least nine definition variations for social presence since its development in the 1970's. This variation led to mixed reviews in the literature as to social presence theory's effectiveness in explaining learning in the technology-mediated environment (Lowenthal, 2010). However, Lowenthal asserted that while different researchers may define social presence differently, it remains a key concept in online learning.

Social presence in asynchronous electronic discussion. Tu (2000) pointed out that social presence theory is important to understanding learning in the computer-mediated environment. Tu (2000) also linked Vygotsky's social learning theory with social presence theory by arguing there must be social interaction for social learning to take place. Tu (2000) further argued social presence development in computer-mediated communication requires interaction to take place on more than a superficial level; therefore, without social presence, social learning cannot take place. Interestingly,

students with high social presence value AED interactions while students with low social presence view them as not worth their time (Swan & Shih, 2005).

In Kim's (2010) review of the history and evolution of the definition of social presence, he found definitions ranging from single factor definitions to definitions including as many as six factors. Ultimately, Kim defined social presence as "the specific awareness of relations among the members in a mediated communication environment and the degree of proximity and affiliation formed through it" (Kim, 2010). He further found social presence to exist in online courses (Kim, 2010).

Other researchers found the level of social presence to vary throughout the semester (Weaver & Albion, 2005; Tao, 2009). When comparing AED content with fluctuations of social presence during the semester, Tao (2009) found social presence changed when the AED content changed. Tao (2009) concluded the content of the AED may explain this fluctuation of social presence during the semester. Swan and Shih (2005) argued instructors influence social presence development through their design of discussion questions and tasks, as well as their own participation in AEDs. Other researchers (Gunawardena & Zittle, 1997; Kim, 2010; Swan & Shih, 2005; Tao, 2009) identified additional factors correlated with social presence and online instruction, including learner motivation, learner satisfaction, and perceived learning. These findings may provide a platform for identifying AED best practices in the discussion board literature.

Tao (2009) studied the relationship between the level of social presence and student motivation in an online course with 74 college students. Social presence was measured three times during the semester, as was student motivation. Tao (2009) found a

high correlation between social presence and learner motivation (r = .60, p < .01).

Gunawardena and Zittle (1997) used questionnaires to examine 50 students in five different universities when they explored the correlation between social presence and learner satisfaction in text-based computer interactions. They found a strong correlation (r = .84, p =.001) between social presence and learner satisfaction.

Swan and Shih (2005) used both qualitative and quantitative methods to explore the development of social presence in four online graduate course discussions. As part of their findings, they reported a high correlation (r = .70, p < .005) between social presence and perceived learning.

Kim (2010), confirmed the findings of both Gunawardena and Zittle (1997), and Swan and Shih (2005) in work on developing an improved social presence instrument. He surveyed nearly 900 students in five cyber universities. In validating the social presence instrument, he also found positive correlations between social presence and learner satisfaction (r = .53, p< .01), and social presence and perceived learning (r = .60, p< .01).

Based on the above research, an AED best practice can be identified as a practice that has been shown in the literature to correlate with increased learner motivation (Tao, 2009), learner satisfaction (Kim, 2010; Gunawardena & Zittle, 1997) or perceived learning (Kim, 2010; Swan & Shih, 2005). The following section is an evaluation of research literature that makes such links.

Asynchronous Electronic Discussion Facilitation Best Practice

Appendix A shows a summary of the AED best practices, the literature-based definitions and the studies linking the best practice to increased learner motivation (Tao,

2009), learner satisfaction (Kim, 2010; Gunawardena & Zittle, 1997) or perceived

learning (Kim, 2010; Swan & Shih, 2005). Based on this summary, the literature can be

divided into six categories of AED best practice. The categories are (a) expectations, (b)

student roles, (c) group size, (d) incentives for performance, (e) informal social

interaction, and (f) instructor participation. Each of these categories is addressed below.

Expectations. Several researchers have explored the need for clear guidelines

and defined discussion activities (Dennen, 2005; Gilbert & Dabbagh, 2005; Ke, 2010).

Dennen (2005) examined the effect of activity design and facilitation style on the

dynamics of student participation in asynchronous discussions. A mixed research design

was used to compare nine different online courses using AEDs. They were compared on

instructor use of the AED tool and the discussion activity. She found courses in this

study to have high participation rates and high quality discussions. Each course also had

regular deadlines and clearly designed discussion activities. She concludes the clear

guidelines and providing the opportunity for unique responses contributed to high

participation rates.

Gilbert and Dabbagh (2005) came to a similar conclusion when they explored

what types of structure have a positive impact on AEDs. They studied the experience of

87 students enrolled in one course over four semesters using a case study design. They

found that evaluation rubrics and instructor guidelines positively impacted meaningful

discourse – defined as statements that demonstrate deep thinking and learning.

In addition, Ke (2010) concluded that multiple purpose discussion (i.e., content

evaluation, comprehension, and teamwork) promoted increased social interactions.

Using a mixed methods case study Ke (2010) attempted to understand the dynamics of

teaching and learning with nontraditional students (over 22 years of age or attending

school part time) in 10 different courses. The study consisted of examining the structure

of the online courses and surveying the participants. Sixteen of the participants were

interviewed at midterm and the end of the semester. Ke (2010) found multiple purpose

discussions (i.e., content evaluation, comprehension, and teamwork) promote increased

participation in AED social interactions.

     Student Role. Other researchers have investigated the roles of students and

instructors in creating a successful asynchronous discussion (Dixson et al., 2006; Hew et

al., 2009; Chan, Hew & Cheung, 2009). Dixson et al. (2006) attempted to address small

group discussion as a learning tool. More specifically, they investigated if a dominant

student emerged in an AED and how that dominance impacted the quality of the group

experience. They also explored the state of social messaging in an AED and how the

instructor influenced the discussion. Their study focused on the interactions of six groups

of four to six students during five asynchronous discussions in an online family

communication class. They collected a total of 20 group AED sessions and used

interaction-processing analysis to evaluate the AEDs. Thirteen of the sessions were

considered to have dominant members but the dominant member was not always the

same participant. They determined that having a dominant group member did result in

significantly higher group performance.

     Hew et al. (2009) reported two exploratory case studies in which they used peers

facilitators, rather than instructor facilitators. They used a survey, reflections from each

participant, and interviews to gather data. The survey results showed 49% of students

perceived they learned more as facilitators than as participants in AEDs. Additionally

62% of students reported they reflected more about other student ideas when taking on the facilitator role. Based on their findings they suggested student facilitators may produce more learning than when instructors facilitate AEDs.

Chan et al. (2009) examined the relationship between peer facilitation techniques and thread development in asynchronous online discussion through the analysis of 13 students in a graduate course using a case study research design. Thread analysis was used to evaluate student participation and content analysis was used to identify the student facilitation techniques used. The researchers found the use of facilitation techniques such as resolving and summarizing, tended to shorten discussion threads. However, the use of questioning techniques tended to lengthen discussion threads.

To explore the impact role assignments had on learning in an AED, Schellens, Van Keer, Valcke, and De Wever (2005) randomly assigned 286 students to 23 discussion groups. Some of the discussion groups had role assignments and some did not have role assignments. Discussion groups were given a problem to solve by applying theoretical concepts from the course material. Their posts were then coded, analyzed, and compared by the researchers. They found no statistically significant difference in knowledge construction between the assigned role groups and the control groups. However, they found students participating in the role assigned groups more often achieved the highest knowledge construction level as compared to other groups. They also found roles of theoretician, source searcher, and moderator either perform equal to or significantly lower than the control groups in knowledge construction. The role of summarizer was significantly higher than control groups in knowledge construction.

Group size. Bliss and Lawrence (2009 a) compared small group (2-5 students) AED with entire class discussion boards in terms of student participation, quantity of posts, quality of posts, thread length, and instructor presence. To do this they evaluated 6964 posts from 17 mathematics courses at the end of a 15-week semester using their multifactor discussion board metric. They found small group discussions resulted in significantly higher participation and quantity of posts. There was no difference between small groups and entire class discussions in instructor presence and thread length. Small groups message quality (number of educationally valuable talk (EVT) posts) was proportionally lower than entire class groups but the quantity of EVT post was higher in small group discussion boards. They concluded small group discussion is more effective over whole class discussion.

Roberts, Lowry, and Sweeney (2006) also found group size to be important and investigated methods to overcome the negative impact of increased group size. They explored the relationship between social presence and group size on the level of group member input. They studied 439 students in multiple sections of an information systems class. The students were divided into groups of three to six and worked together to evaluate multiple computer interfaces in one of three situations. They were face-to-face collaborative evaluation, face-to-face using *Collaboratus* (a collaboration software), and online using *Collaboratus*. Students were then evaluated using a survey. They found that increasing social presence with the use of collaborative software actually overcame the negative effect of increased group size on student perceived influence within the group.

Schellens and Valcke (2006) compared the number of posts for 300 students in

their investigation of the effects of group size on AED participation. Students in the

study participated in groups ranging from eight to 13 members. The researchers observed

the quantity of student posts increased as the group size decreased. They concluded that

smaller groups are more desirable than larger groups in AEDs. They also found that

groups larger than 12 created too much extraneous cognitive load and are therefore not

recommended for AEDs.

Incentives for performance. Taylor (2006) investigated the impact of different

types of incentives on accounting students sharing information in a computer-mediated

environment. She rewarded the 36 student volunteers financially for identifying errors on

accounting spreadsheets. The student financial incentives were organized three ways;

group incentives, piece-rate incentives, and competitive incentives. Using both

qualitative and quantitative analysis, she found group incentives to facilitate more

knowledge sharing among students than the other incentives.

Kelly (2010) performed a similar experiment using 220 students divided into

computer-mediated teams of three. They were asked to make an investment decision that

required information sharing. Each team was given either individual incentives or group

incentives to produce a quality decision. The results of the experiment showed group

incentive teams performed significantly better in information sharing and in the quality of

their decision.

Dixson et al. (2006) used individual incentives in their study exploring instructor

and student roles in AEDs. This study was already discussed previously in the role

assignment section of this chapter. However, in addition to role assignments, each

student was held accountable to participate on an individual basis. The researchers

concluded that individual participation requirements contribute to the individual student participating in a setting where roles are assigned to a few in the group.

As mentioned previously in this chapter, Gilbert and Dabbagh (2005) studied the experience of 87 students enrolled in one course over four semesters using a case study design. They used a rubric to evaluate student timely participation, demonstrations of knowledge, and following directions accurately. They found that individual evaluation rubrics significantly increased student participation.

Informal social interactions. Swan and Shih (2005) investigated factors that contribute to high social presence with four online courses using a survey and qualitative interviews. They observed that students with high social presence had high learner satisfaction. They also observed that these students with high satisfaction made informal posts by relating personal experience related to the discussion topic and reported appreciating informal personal posts by others in AED's.

According to Dixson et al. (2006), informal social posts are common in AED's. As part of their study, they measured the social nature of posts in small group AEDs. They found 19% of posts were of a social nature. Based on this finding, they suggest an informal environment should be established that promotes social messaging between students.

Instructor participation. When investigating the impact of the role of the instructor on AED, An, Shin, and Lim (2009) used three sections of the same 15-week course. Eight discussion assignments occurred in each section. There were between 18 and 20 students in each section. The instructor approached each class differently in their interaction with the students in the AEDs. In group one, the instructor responded to each

student's initial post and required them to respond to at least two other student posts. In

group, the instructor responded to each student's initial post but did not require the

student to respond to other posts. In group three, the instructor did not respond to

students' initial post but did require them to respond to at least two other student posts.

They found group two had minimal post as compared to groups one and three. They also

found that instructor high participation rates did not encourage student-to-student posts

and did not result in higher satisfaction on the part of the student.

Dixson et al. (2006) in their study of small groups also explored instructor

participation. They recommend instructors be minimally involved in the actual

discussions as instructor comments had no significant positive effect on student

performance in their study.

Mazzolini and Maddison (2003) investigated the student posting rates of 200

students related to instructor participation in AEDs. They also surveyed the same

students on their perception of the instructor enthusiasm, instructor expertise, usefulness

of the AED and the overall student satisfaction. They found high instructor participation

rates did not result in higher student participation rates. In courses with high instructor

participation, the student discussion thread length was shorter than with instructors who

had lower participation rates. The researchers also found student satisfaction was high

for instructors with high participation rates. They conclude instructors must find a

balance between participating too little and too much.

Arbaugh (2010), in a similar study of 46 online courses over a two-year period,

found as login intensity of the instructor increased, student perceived learning decreased.

However, he also found instructors that responded to students and communicated with

them had increased student satisfaction and perceived learning ratings. Arbaugh's (2010) conclusion was consistent with Mazzolini and Maddison's (2003) finding that an instructor must find a balance between too much and not enough participation.

Online Instructor Development

Bailey (2008) pointed out the need for instructor training to facilitate AED best practices implemented in online courses. The following is a review of the literature addressing the training of online faculty. In April of 2014 an exact phrase searches with the terms "online faculty training" and "training faculty to teach online" were conducted. The "online faculty training" search resulted in 104 articles published between 2006 and 2014. The "training faculty to teach online" search resulted in 19 articles published between 2006 and 2014. These articles were reviewed for relevance to training online instructors in the use of AEDs.

Two authors provided an overview of the literature as it relates to online instructor faculty development. Kang (2012) observed that the focus of the literature related to training online instructors has remained on issues (i.e., technology use) addressed up to 10 years ago. Wolf (2006) reported during that time frame that the literature contained little scholarly research on training instructors to teach online courses. However, some literature was reviewed that provides useful information related to instructor training.

Kang (2012) used a qualitative approach to investigate the experience seven faculty have participating in faculty development for online teaching. The author's analysis resulted in the observation that different definitions of quality training for an online instructor exist. These different definitions may have been due to differing

training goals. He concluded that all parties involved in training online instructors should

focus training goals on knowledge and skill transfer, removal of barriers to online

teaching, and facilitating the development of high quality online instructors.

     While Kang (2012) focused on successful training outcomes, Wolf (2006)

explored instructor training practices that contributed to successful outcomes. Wolf

(2006) examined a faculty training also using a qualitative method by interviewing

experts to determine what practices were most effective in training online instructors.

She concluded that successful training programs for online instructors had three

characteristics. First, the training programs were led by faculty trained to teach online.

Second, the instructors enrolled in the training program had the requisite computer skills

to complete the training, had technical support, and were motivated to teach online.

Third, the training was provided on the learning management system the instructors

would be using to teach their courses.

     Davis (2009) focused on the outcome of training for online instructors. He

conducted a qualitative study using four instructors to explore how instructor training

impacts online instructor practices. He observed two factors that influenced the results of

faculty training, and both of those were related to the individual instructor's knowledge

and skill. Findings included the observation that both computer skills and understanding

online pedagogies helped the faculty incorporate training material into their teaching

practices.

     Mier (2011) also focused on instructor training outcomes. He used a case study

method to examine the experience of seven online faculty after completing a faculty

training program. His study focused on the frequency with which the online instructors

implemented effective teaching practices and the barriers to implementing those practices. The study participants completed a survey and participated in phone interviews. When asked why training elements were not put into practice, the most common response was the lack of time.

Vaill and Testori (2012) looked at program level factors to define successful online instructor training. They examined the Bay Path College faculty development program for teaching online courses. They reported three components of the program that contributed to its success. Those components were an orientation to online teaching, mentoring, and ongoing support to the instructors teaching online. The orientation to online teaching included consultation with an instructional designer who addressed pedagogical issues with teaching online. The mentoring component involved assigning an experienced online instructor mentor to faculty in the faculty development course. The ongoing support was provided by the instructional designer who contacted instructors after the faculty development program was completed to offer consultation support.

Summary

While Berry (2008) found little literature on validating best practice standards in AED, they do exist (An et al., 2009; Arbaugh, 2010; Beaudin, 1999; Bliss & Lawrence, 2009 a; Dennen, 2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009; Mazzolini & Maddison, 2003; Roberts et al., 2006; Taylor, 2006). The best practices in the literature address (a) expectations (An et al., 2009; Arbaugh, 2010; Beaudin, 1999; Dennen, 2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009); (b) student roles (Dixson et al., 2006; Schellens et al., 2005); (c) group size (Bliss &

CHAPTER III

Method

The purposes of this study were to determine what AED best practices were implemented by first semester online instructors and to determine if there was a difference in AED best practice implementation between AED best practice trained and untrained online instructors during their second semester of online instruction. After reviewing the research questions and research design, this chapter addresses the participants in the study, the procedures of the study, and the development of the treatment for the study.

Research questions

The first research question explored what the AED best practice implementation looks like for first semester online instructors.

1. What is the AED best practice implementation profile for first semester online instructors at a private western undergraduate institution?

The second research question explored the effect of online instructor teaching experience on AED best practice implementation.

2. Is there a statistically significant difference in the AED best practice implementation profile for untrained instructors between the first and second semester of online teaching?

The third research question addressed the effect of training on the instructor AED best practice implementation profile.

3. Is there a statistically significant difference in the AED best practice implementation profile between untrained instructors and those who receive specific training on AED best practice implementation?

Research Design

To answer the research questions above, the research design for this study was a quasi-experimental pretest-posttest control group design as defined by Gall et al. (2003). This design allowed the researcher to control for individual differences; including subject area, course content and initial instructor skill level.

$$O_1 \qquad R \qquad X \qquad O_2$$
$$O_3 \qquad R \qquad \qquad O_4$$

X experimental group treatment
O_1 experimental group pretest evaluation
O_3 control group pretest evaluation
O_2 experimental group posttest evaluation
O_4 control group posttest evaluation
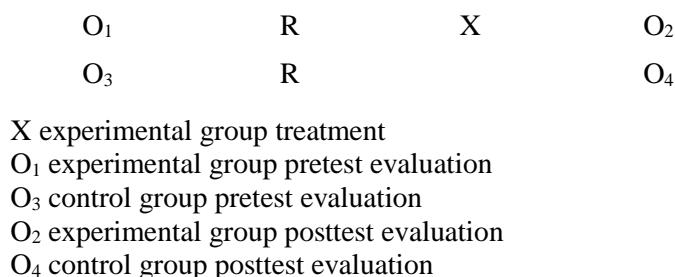
Figure 2. Research design for the AED best practice proposal (repeated).

The observations in this study were made using a researcher-designed instrument. The instrument was used to observe instructor AED practices in courses archived on the participating institution's learning management system (LMS). This forensic data gathering method was consistent with other researchers who investigated online instructor behaviors (Dennen, 2005; Ke, 2010; Mazzolini & Maddison, 2003) and had the advantage of not inadvertently influencing participant behavior in a natural instructional setting (Gall et al., 2003).

After receiving the standard institutional training for online instructors, all the study participants taught their first semester. All instructors retained by the institution who are also assigned to teach the same course as the first semester, were then randomly assigned to experimental and a control groups. Experimental group participants received the experiment treatment; a researcher-designed training in AED best practices. Then both the experimental group and control group participants taught their second semester at the participating institution.

Instructor behavior was observed twice during the semester by examining the archived course discussions. The observations took place in the fifth and ninth weeks of the first 14-week semester. These initial observations served as pretest data. Observation of instructor behavior during the second semester, after the treatment, also occurred twice by examining the archived course discussions. The second semester discussion observations took place in the fifth and ninth week of the second 14-week semester. These second semester observations served as posttest data.

Measurement of AED best practices twice during the semester addressed concerns in the literature about lean measurement in experimental design (Walther, 1995). Multiple measurements also created a foundation for resolving discrepancies in the literature related to instructional techniques changing and thus influencing AED participation (An et al., 2009; Tao, 2009). And, multiple measurements gave a more complete picture of best practice implementation in real instructional settings.

Participants

Participants in this study had at least a master's degree in their area of expertise. They taught a variety of course topics. They included but were not limited to Art,

Business, Biology, Technology, Humanities, and Religion. Participants met hiring criteria of the participating university. These criteria both screened for and trained for online teaching skills. The hiring criteria consisted of successfully completing an online screening course, completing the Online Instructor Certification Course (OICC), and meeting the university's personnel requirements such as department chair endorsement and contract requirements.

Study participants were contract hires at the participating university. Participation in the study was not part of their contract requirements. Therefore, participation in this study was voluntary for online instructors.

Procedures

Due to the variety of course topics, a stratified random sampling procedure was used to assign participants to control and experimental groups. Participants were randomly assigned to control and experimental groups, based on strata of similar course or college designation, before they taught for their second semester at the participating institution. The similar course or college designations were prioritized as follows: First, the same courses were randomly divided equally between the control and experimental groups. Second, if the first priority is not met, courses taught within the same academic department were randomly divided equally between the control and experimental groups. Third, if the above two conditions were not met, courses within the same academic college were randomly divided equally between the control and experimental groups. Fourth, courses that did not meet the third priority were randomly assigned to the control and experimental groups.

Once the participants were assigned to the control and experimental groups, the experimental group received AED best practice training during the first three weeks of their second semester of instruction. The control group received no training in addition to the OICC.

Prior to the study, instructor participants were given an informed consent statement. This informed them of the nature of the study as well as their rights to anonymity and to opt out of the study.

Once committing to the study, participants could be dropped for failing to teach their second semester beyond the scheduled observation periods, or starting but not completing the AED Best Practice Training. In both cases, the participants would not meet either control or experimental group criteria as they had either not completed the treatment or not produced archived data for the observation. To minimize the loss of participants due to not completing the training, the researcher sent email prompts to complete the AED best practice training at least once a week to those participants not making regular progress. See Appendix B for the email prompts.

Instruments. The instrument used in this study needed to measure instructor behaviors in relation to each of the AED best practices identified in the literature. Since the measurements were done on archived AED content, the instrument needed to also focus on evidence of instructor behaviors documented in discussion archives. See appendix C for the instrument.

A review of instruments used in the AED best practice literature resulted in no instrument that met the needs of the study. However, the literature did provide information that guided the development of the instrument for the study. Appendix D

summarizes the literature related to instruments used in AED best practice studies. The

summary includes the instruments used, context of each study, what was measured in

each study, the subjects of each study, and the findings of each study. Most of the studies

measured student's perceptions using surveys, content analysis, and frequency counts.

Since this study focused on the instructor use of AEDs, studies that measure instructor

behavior were of particular interest. Four studies include measures of instructors

(Arbaugh, 2010; Ke 2010; Dennen, 2005; Mazzolini & Maddison, 2010).

Three of these studies demonstrated use of course documents and archived AED

content as the basis of evaluating instructor behaviors (Dennen, 2005; Ke 2010;

Mazzolini & Maddison, 2010). Dennon (2005), and Mazzolini and Maddison (2010)

further demonstrated the value of counting instructor behaviors when assessing

discussion content. These methods of measurement were used as models in developing

the instrument for this study.

Instrument validity. Creswell (2003) described instrument content validity as the

instrument measuring what it is intended to measure. Gall et al. (2003) pointed out that

content validity should be determined by content experts who systematically and

thoroughly review the instrument. This section addresses the procedures to be used in the

study to establish evidence of content validity for the instrument.

As recommended by Grisham (2009), the initial instrument design was based on

the literature. The AED best practices identified from the literature were: the instructor

provides clear expectations (An et al., 2009; Arbaugh, 2010; Beaudin, 1999; Dennen,

2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009); participants are

assigned roles (Dixson et al., 2006; Schellens et al., 2005); group discussion size is

between three and 12 participants (Bliss & Lawrence, 2009 a; Roberts et al., 2006;

Schellens & Valcke, 2006); both individual (Dixson et al., 2006) and group (Taylor,

2006) incentives exist for participation; discussion environments promote informal social

interaction (Dixson et al., 2006); and instructors play a minor role in asynchronous

electronic discussions (An et al., 2009; Arbaugh, 2010; 2003; Beaudin, 1999; Dennen,

2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Hew et al., 2009; Mazzolini &

Maddison). Once the initial instrument design was created, the Delphi method (Grisham,

2009) was used to address the content validity of the instrument.

Hsu and Sanford (2007) point out; the Delphi method was commonly used for

gathering expert opinion and was designed to facilitate a detailed evaluation in a variety

of contexts. For the purposes of this study, a group of experts associated with the

participating institution evaluated the instrument for valid content and clarity.

Day and Bobeva (2005) pointed out, the Delphi panel should consist of

individuals with expert knowledge, motivation to participate, and the ability to make

judgments. They go on to recommend that Delphi panel experts should be directly

impacted by the research in order to increase motivation to participate throughout the

entire Delphi process. This was also supported by Paulsen (2002) who identified

instructor peers as being best at evaluating instructional materials, goals and course

organization. Day and Bobeva (2005) further recommended the Delphi panel should not

be homogeneous as there needs to be enough difference of background, experience, and

viewpoint to meet the objective of this method. To achieve this adequate diversity,

Grisham (2009) proposed using at least two categories of experts to achieve the

difference of opinion necessary for successful use of the Delphi method. These groups

should consist of a combination of impartial and invested expert participants (Grisham, 2009).

In this study, four online instructors and one online instructional designer were recruited to participate in the Delphi panel. The online instructors met Day and Bobeva's (2005) requirement that they be invested in the process, as the instrument could be used to evaluate their performance. However, no online instructors that participated in the Delphi panel were subjects in the study. The instructional designer was recruited since he fell into Grisham's (2009) impartial category but was still motivated to participate (Day & Bobeva, 2005). Instructional designers will not be evaluated by the instrument but they may use the instrument to evaluate online instructors.

The qualifications of the Delphi panel experts to make judgments (Day & Bobeva, 2005) were rooted not only in their role with online instruction at the participating institution, but their experience as well. The instructional designer had at least two years of experience designing online instruction. The online instructors recruited for the Delphi panel had a minimum of two years of experience teaching online courses and taught at least five courses during those two years. This strategy for identify experts was consistent with Ternus et al. (2007) who also identified experts based on years of experience in the area of investigation. Additionally, the online instructors recruited for the Delphi panel were recommended by administrators and their peers as outstanding online instructors.

Akins, Tolson, and Cole (2005) reported; there is no clear standard of the number of experts needed to produce reliable results using the Delphi method. A review of studies clearly showed this lack of standard. Grisham (2009) reported Delphi studies

using between 16 and 60 experts. Day and Bobeva (2005) reported literature using no fewer than seven experts to support their concern over the risk of experts dropping after each round of questioning. Ternus et al. (2007) used only three experts who were all invested in developing a common product in their study. The target number of experts for this study was five panelists, a number that followed the guidelines as used by Rowe and Wright (2001). This number reduced the likelihood of irrelevant conflict and information overload (Rowe & Wright, 2001). It also exceeded the minimum number used by Ternus et al. (2007) and allowed for some margin of safety if dropouts occur as discussed by Day and Bobeva (2005). The number of panelists that completed the Delphi panel process was four; one instructional designer and three online instructors. One additional instructor committed to participate but did not provide any input in the process.

The Delphi panel process took place over approximately eight weeks. It consisted of three rounds of reviews to operationalize the AED best practices identified in the literature. As identified previously, the list of AED best practice identified in the literature is in Appendix A. The Delphi panel made modifications to the literature-based AED best practice list that included subdivisions and clarifications. *Figure 3* shows each AED best practice with any significant modifications made to the literature-based definitions by the Delphi panel.

Best Practice	Measures	Delphi Panel Changes
Expectations	E-1 E-2	1. Created two sub measures. 2. Required presence of three criteria for each category.
Participant Roles	PR-1	1. Made roles use optional. 2. Required 100% compliance with role descriptions.
Discussion Group	DG-1	1. Narrowed best practice range to between 5 and 10 students per AED group. 2. Established compliance requirement of 100%
Incentives for Performance	IP-1 IP-2	1. Created two sub measures, One for group incentive, and one for individual incentives. 2. Defined methods for meeting sub measure criteria i.e., grade, rubric, written feedback.
Promotes Informal Social Interaction	PISI-1	1. Defined methods for meeting criteria i.e., invite, model, or identify.
Instruction Participation in Discussion	IPD-1 IPD-2	1. Created two sub measures, IPD-1 for minimum participation and IPD-2 for maximum participation. 2. Defined post ratios for instructor minimum and maximum participation.

Figure 3. Delphi panel changes to AED best practices in the literature.

While most of the AED best practices were operationalized by the Delphi panel by narrowing the defined criteria, the participant roles best practice became optional rather than required. The meant that instructors were only held accountable to meet the best practice standard of participant roles if they had role assignments present in the discussion. If role assignments were not present, instructors were not held accountable. The Delphi process resulted in nine definitions of AED best practice measures. Each of the AED best practices and the nine associated AED best practice measures are shown in *Figure 4*.

Best Practice	Measure	Delphi Definition
Expectations Best Practice	E-1	The expectations for the discussion assignment are clearly established as demonstrated by the presence of directions for the discussion (An, Shin, & Lim, 2009; Arbaugh, 2010; Beaudin, 1999; Dennen, 2005; Dixson, Kuhlhorst & Reiff, 2006; Gilbert & Dabbagh, 2005; Hew, Cheung and Ng, 2009; Ke 2010) that contain discussion deadlines, student participation requirements, and a discussion prompt.
	E-2	The expectations for the discussion assignment are clearly established as demonstrated by the instructor providing a rubric for students that contains grading criteria for timely contribution to the discussion, demonstration of knowledge, and compliance with posting protocols (Gilbert & Dabbagh, 2005).
Participant Roles Best Practice	PR-1	When roles are assigned in discussion boards, all roles are well-defined as demonstrated by the presence of a description for all (100%) roles assigned for each discussion (Dennen, 2005).
Discussion Group Size Best Practice	DG-1	Group size is between 5 and 10 participants (Bliss & Lawrence, 2009; Roberts et al., 2006; Schellens & Valcke, 2006) in 100% of groups within the discussion examined.
Incentives for Performance Best Practice	IP-1	There is evidence that all students (100%) were provided an individual incentive for discussion participation (Dixson et al. 2006) in the form of a grade, evaluation rubric, or written feedback in the discussion examined.
	IP-2	There is evidence that group-based incentives are present for the discussion examined (Taylor, 2006; Kelly, 2010). The group-based incentives include group grade, group rubric or written instructor feedback to the group.
Promotes Informal Social Interaction Best Practice	PISI-1	The instructor encourages informal social interaction in discussions (Swan & Shih, 2005). This is demonstrated by the instructor inviting students to share personal information, by the instructor modeling informal discussion, or by the instructor identifying student informal social interaction in writing within the discussion examined.
Instructor Participation in Discussion Best Practice	IPD-1	The instructor posts frequently enough that students perceive the instructor is interested in the discussion (An, et al., 2009, Ke, 2010; Mazzolini & Maddison, 2010) as demonstrated by an instructor to student posting ratio of no less than 1%.
	IPD-2	Instructor to student post ratio facilitates the discussion development (Bliss & Lawrence 2009; Mazzolini & Maddison, 2003) as demonstrated by no more than 20% of posts are made by the instructor.

Figure 4. Delphi panel definitions of AED best practice measures

Each of the operationalized definitions include what criteria the instructor must meet to achieve the best practice. The E-1, E-2, PR-1 and DG-1 measures require instructor action before the AED begins. The PISI-1, IPD-1 and IPD-2 measures require instructor action during the AED. The IPD-1 and IPD-2 measured require instructor actions either during or after the AED.

Instrument reliability. Gall et al. (2003) describe reliability in terms of the amount of measurement error in the instrument. All but one of the Delphi panel best practice operationalized definitions were simple counts of behaviors documented on the LMS. However, one of the best practice operationalized definitions required the categorization of the instructor's post content. This required multiple evaluators to read and categorize content in each instructor post. Since the instrument in this study was used by multiple evaluators to identify archived instructor behaviors in AED posts, reliability between different evaluators was established. Allen and Knight (2009) recommend establishing two dimensions of evaluator reliability; repeatability and reproducibility. To establish repeatability or intra-rater reliability, evaluators evaluated the same AED content at different times to determine if they gave the same rating. To gather evidence to support reproducibility or inter-rater reliability, multiple raters were given the same content and evaluated for consistency in rating.

The procedure for establishing the two dimensions of reliability was as follows. Initially, three student research assistants were trained on how to use the instrument. After the training, these evaluators were given six AED samples to evaluate. Their individual ratings were compared for inter-rater reliability of at least .80. After at least two weeks, evaluators were given a refresher training and another set of six AED samples

to evaluate. Three of the AED samples were the duplicates of the AED samples used in the inter-rater reliability test and three were new samples. The ratings of the duplicated AED samples were compared for each evaluator to establish an intra-rater reliability of no less than .80. When evaluating AEDs in the actual experiment, evaluators were given refresher training before each observation period to ensure the instrument continued to be used correctly.

Data collection. The data from the participating instructor's AEDs were archived on the university's LMS. As a result, the data did not have to be gathered in real time. Data from weeks five and nine of each semester were collected by the researcher from the university's LMS. Since there was no university requirement that all instructors must follow a specific schedule for starting and stopping AEDs, data collection contingencies were established.

For the purposes of this study, weeks five and nine started on Sunday and end on Saturday. Discussions that both began and ended within the defined weeks were targeted for data collection. However, if there were no discussions meeting the above criteria, the following rules were applied.

- If during the selected data collection time period, an AED started in a previous week but ended in the data collection week and no other AEDs were available during that week, that AED was used in the study.
- If during the selected data collection time period an AED ended and another AED began, the beginning AED was used for the study.
- If multiple AEDs began during the data collection period, the AED that began closest to the start of the week was used.

- Study participants who did not start or end an AED during any measurement period did not receive a score for that measurement period.

As data were collected, identifying information was removed to protect the participant's privacy. Hard copy instruments were kept in a locked filing cabinet in a locked room. They were destroyed once the data was created electronically. Electronic data generated for evaluation were password protected.

Data analysis. The first research question was addressed using descriptive statistics. A researcher-designed instrument (AED Best Practice Rubric) was used to assess the instructor's use of each of the six AED best practices. An AED best practice profile was then created. This profile outlined the use of AED best practices by the instructor participants.

The second research question was addressed by using a researcher-designed instrument (AED Best Practice Rubric) to create an AED best practice profile for each control group instructor. It was originally intended that the untrained instructor profile from the first semester would then be compared to the untrained instructor profile of the second semester using a repeated-measures ANOVA. However, the alternative nonparametric test was used since the data violated the assumption of normality required by the repeated-measures ANOVA. A chi-square test of goodness of fit was used to compare control group instructor behaviors between semester one and semester two of the study.

To address the third research question, AED best practice implementation of the experimental and control groups were compared using the data gathered with a researcher-designed instrument (AED Best Practice Rubric). It was originally intended to

compare the control group and the experimental group AED best practice profiles using a repeated-measures ANOVA. However, the data for this research question did not meet the normality assumption required by the repeated-measures ANOVA. A chi-square test of independence was used as a nonparametric alternative. This allowed the researcher to evaluate the AED best practice training effect and the experience effect of teaching one additional semester on AED best practice use.

Treatment Development

Since this study required the development of training on AED best practices, the ADDIE model was used to create the training. The ADDIE model is considered a generic model for the process of developing instructional material (Shelton & Saltsman, 2006). It consists of five phases: analyze, design, develop, implement, and evaluate (Allen, 2006). These phases were employed to develop an AED best practice training for online instructors.

Analyze Phase. The purpose of the analyze phase is to identify gap between where the learners are and where they need to be (Allen, 2006). Gagne, Wager, Golas, and Keller (2005), and others (Allen, 2006; Peterson, 2003; Wang & Hsu, 2009) identified several areas that are important in fulfilling the purpose of the analyze phase. They include (a) a need for instruction, (b) evaluating the target audience, (c) learner characteristics, (d) learning prerequisites and hierarchy, (e) learner influences, (f) learning environment, (g) outcomes, (h) delivery options, (i) learner constraints, (j) instructional differences, (k) pedagogical considerations, and (l) a time line for creating the training. Each of these elements is addressed below.

Need for instruction. The target problem for this study was that instructors perceive AEDs as useful (Baglione & Nastanski, 2007; Greenlaw & DeLoach, 2003; Steinbronn, 2006) but students generally perceive AEDs as not useful and would prefer to not use them when given an option (Frey et al., 2003; Lee et al., 2006). In the context of this target problem, the participating institution, sought online instructors with strong content area knowledge, but more importantly, strong online teaching skills. The participating institution also trained new instructors on the specific expectations it had related to online instruction through the OICC. However, the OICC had to following gaps related to AED best practices.

- In the OICC, half of the AED best practices were addressed indirectly in the broad context of an online course. For example the OICC addressed the AED best practice of defining roles but it addressed it in the context of general collaborative group assignments where students define their roles.

- The OICC did not address the use of roles in AEDs specifically. Most of the AED best practice areas identified in the OICC also lack examples of application. For instance, The OICC addressed the use of incentives for student performance but did not provide examples of those incentives.

- The OICC also did not prompt the participant to apply any of the AED best practices to a specific course to be taught by the participant.

Due to these identified gaps in the OICC, it was determined that instructors would benefit from training specifically designed to address AED best practices. For the OICC content see Appendix E.

The AED best practice training designed for this study addressed each of the OICC gaps by doing the following.

- The AED best practice training addressed each AED best practice defined by the Delphi panel in the context of an instructor engaging in an AED.

- The AED best practice training addressed each AED best practice defined by the Delphi panel with examples of application.

- The AED best practice training prompted the participants to apply each AED best practice to a specific course to be taught by the participant.

The OICC (standard institutional training) and the experimental group treatment (AED Best Practice Training) are compared below on four criteria. The criteria are (a) the presence of each of the AED best practices in the training content, (b) the presentation of the AED best practice in a context specific to AED use, (c) the presence of application examples for each of the AED best practices, and (d) the presence of prompts for the participant to apply the content to a course they are teaching or are planning to teach.

Table 1 provides a complete comparison of the OICC content with the AED best practice training content as they relate to the four comparison criteria.

Table 1. *Experimental Group Treatment (AED Best Practice Training)* and OICC *(Standard institutional training)* Comparison

Best Practice Category	Present in Training	AED Specific	Example of Application	Application prompt
OICC				
Expectations	x	x	x	
Participant Roles	x			
Discussion Group Size	x			
Incentives for Performance	x			
Informal Social Interactions	x	x		
Instructor Participation	x	x		
AED Best Practice Training				
Expectations	x	x	x	x
Participant Roles	x	x	x	x
Discussion Group Size	x	x	x	x
Incentives for Performance	x	x	x	x
Informal Social Interactions	x	x	x	x
Instructor Participation	x	x	x	x

Both the OICC and the AED best practice training address all six AED best practices identified in the literature. However, in the OICC, half of the AED best practices are addressed indirectly in the context of an online course. For example, the OICC addresses the AED best practice of defining roles but it addresses it in the context of general collaborative group assignments where students define their roles. It does not address the use of roles in AEDs. On the other hand, the participant roles section of the AED best practice training identifies the benefits of role assignments in AEDs, and establishes the standard that roles be well defined.

Most of the AED best practice areas identified in the OICC lack examples of application. For instance, The OICC addresses the use of incentives for student performance but does not provide examples of those incentives. The Incentives for

performance section of the AED best practice training identifies both individual based

incentives and group-based incentives as AED best practices, and gives examples for

both. The individual-based incentives examples focus on individual achievement such as

grades or instructor feedback to motivate students to participate. The group-based

incentive examples focus giving group grades or written feedback to the group.

The OICC also does not prompt the participant to apply any of the AED best practices to

a specific course to be taught by the participant. In contrast, the AED best practice

training prompts participants to create a plan for implementing each AED best practice in

a course to be taught. For additional comparison of the OICC and the training for this

study see Appendix F.

Target audience. To conduct the analysis of the target audience, the university

policies related to hiring online adjunct faculty were reviewed. They were discussed

previously in the participants section of this chapter. In summary, the target audience

was online instructors who had successfully completed an orientation and certification

course to teach online courses. They did this by demonstrating skill in engaging in an

online environment and using the technology necessary to fulfill their responsibilities.

Learner characteristics. When developing an online AED best practice training

it was assumed the participants had adequate skill to access and navigate the university

learning management system. These instructors were also well educated in their fields of

expertise in that they have at least a master's degree in their field of study.

The process the university followed for creating and modifying online courses

was also important to consider as it impacted the target audience of the training. The

online courses at the university were designed and developed using a team-based model

(see Appendix G). A team of fulltime faculty, with the assistance of an instructional designer, designed, developed, and piloted the course before it is turned over to adjunct faculty to teach. Adjunct faculty could request changes to the course design after it was developed but they did not make changes independently. The university's instruction development coordinator for online courses described the process of course modification to be similar to the team-based course development process outlined in Appendix G (M. Murdock, personal communication, November 21, 2011). Each online course at the institution had a course council made up of an online course lead instructor, which was one of the adjunct instructors teaching a section of the course, a fulltime faculty with expertise in the content area, and an instructional designer. The role of the online course lead instructor was to monitor concerns the other online instructors may have had with the course design and present those potential changes to the course council for evaluation and review. Administrators gave input to the course council via any one of the course council members. Depending on the scope of the changes, the course council may have made the corrections themselves or requested another team be created to modify the course.

It is important to note that the instructors who participated in this study did not create the course they taught and they were not authorized to modify the course design. The participants in this training simply were hired to manage the online learning environment as the students learned the material. This ensured all sections of the online course had consistent content and structure. Asking or encouraging significant course changes as part of the AED best practice training was impractical.

The location and employment arrangements of the online instructors were also important to consider. Online instructors at the institution were teaching remotely from their homes or other locations and their employment at the participating institution was not a fulltime arrangement and was often their second job. Because of these circumstances, the AED best practice training must have accommodated a distance education format and take a minimal amount of time to complete.

Learning prerequisites and hierarchy. Learning prerequisites and learner hierarchy evaluations were based on the work of Keller (1987) and Ausubel (1963). Participants in this training module needed to have mastered the following skills: English proficiency, basic computer proficiency, and experience with online instruction.

In addition, a key prerequisite for participation in the AED best practice training was prior experience with online instruction and an impending opportunity to teach an online course. Not only did this create an opportunity for motivational attention (Keller, 1987), it provided an environment for meaningful learning (Ausubel, 1963) where the learner could relate the material to real life experiences. In this case, the real life experience was applying the training to the course they were teaching at the time of the training. In addition to the above prerequisites, participants progressed through a learning process to be successful in implementing best practice standards. Initially, participants needed to understand the need for exploring the best practices in discussion board management which was also consistent with Ausubel's (1963) meaningful learning concept. Once the need for further knowledge was established, participants were then shown the purpose of the identified AED best practice. Consistent with Keller's (1987) motivation concept of relevance, they were then shown how that relates to their practice

of discussion board management in their own courses. The participants were then motivated to learn the skills needed to implement the target AED best practice their course. See Appendix H for the learning hierarchy.

Learner influences. Learner influences and learning environment considerations were explored through anticipating what impact an additional training would have on the participants. Motivation was a significant issue for this population of instructor participants. The instructors were not paid to participate in this learning module since they were paid by the credit hour they taught at the participating institution. Accordingly, the structured portion of the AED best practice training was designed to not be too time consuming and it was divided into manageable segments. Timing was also important. The training was deployed when instructors were engaged in their courses, but not so late in the semester that they did not have time to implement what they learned. All of the training content was designed to relate directly to online instruction in the context of the participants' experience and needs in their courses (Keller, 1987).

Learning environment. Since the participants were not located in one place, an online version of the AED best practice training was embedded in the university learning management system. The participants needed access to an Internet capable computer and access to the university's learning management system, Brain Honey. In addition to the content of the training module, the learning management system provided a place for participants to respond to assignments in the training. Participants also had access to technical support available for both hardware and software through the university.

Outcomes. The outcomes of the AED best practice training identified in the analyze phase were directly linked to the research questions of the proposed study. The

general purpose or goal of this learning module was for the instructor participants to increase their implementation of AED best practices in the context of discussion board management. The overall goal for this learning module was:

> Training participants will implement asynchronous electronic discussion best practices throughout the semester at a higher rate than untrained participants as measured by a researcher-designed instrument.

If the training was successful, the experimental group participants would realize a significant difference in performance over the control group.

Delivery options. This learning module was designed for use in an online environment embedded within a learning management system. This learning management system included the ability to organize content and it provided a mechanism for assignment submission.

Learner constraints. The participants previously demonstrated their proficiency in using the university learning management system in the online instructor certification course. One noteworthy observation about learner constraints was instructor participants with more experience in online instruction may have had preconceived ideas about discussion board use and may have been less likely to learn, accept, and implement, best practices. In a sense, they may have been required to unlearn what they had been doing in practice. To target this particular learner constraint each portion of the AED best practice training was equipped with links to research articles supporting the practice to be learned.

Instructional differences. It was important to consider instructional differences in participants. It was anticipated that participants in the AED best practice training had a

variety of learning styles including verbal learning, visual learning, and experiential learning styles. The training design allowed the use of these learning styles to enhance the impact of the training.

Pedagogical considerations. Due to the context of the AED best practice training, the pedagogy used was compatible with a self-paced asynchronous environment. The training was delivered on the participating university's LMS. The content format was compatible with that platform. Instructions and content were clear and require minimal explanation in order to avoid any confusion. There was also a method for the participants to get answers to questions they may have during the training.

Timeline. In order to implement the AED best practice training before the start of the Winter 2013 semester, online instructors needed time to incorporate the standards into their instructional techniques (De Simone, 2006). The design and development phases were completed by August 2012 so the training could be pilot tested and modified. For a detailed time line see Appendix I.

Design Phase. The design phase of the ADDIE model is the planning phase of instructional development (Peterson, 2003). In this phase the instructional designer addresses issues such as strategies to target learning tasks, the flow of instruction and learning objectives (Wang & Hsu, 2009).

Learning task analysis. The task analysis was completed using both information from the assessment phase and learning theory to determine where the participants were functioning and what steps they needed to take to improved their functioning by the end of the training. Since the goal of the AED best practice training was for the participants to implement AED best practices, learning must have occurred at the application level of

Bloom's (1956) taxonomy. Therefore, participants must have completed the following

tasks to be successful. First they must have identified and defined each of the AED best

practice structures and best practice dynamics. Then, they must have observed examples

where the AED best practices were demonstrated appropriately and related real life

teaching experience (Ausubel, 1963). Lastly, they must have applied the AED best

practices to a teaching situation in their own class (Ausubel, 1963).

      Storyboard. To visualize the flow of these tasks, a storyboard was created. The

training developer used the storyboard as an aid in creating the training within the

university's learning management system. The storyboard was representative of both

navigation needs and content organization within learning management system.

Fundamentally, the design allowed participants to have access to each of the AED best

practices training modules and they were able to navigate feely between them. This

storyboard design allowed participants to take the training in small segments if needed. It

also took into account the structure of the LMS in which it was deployed. See Appendix

J for the storyboard outlining the AED best practice training.

      Objectives. The last key element of the design phase was the identification of

measurable objectives that supported the overall target outcomes of the training. Since

the outcomes of the AED best practice training target actual increased AED best practice

implementation levels, the objectives targeted observable steps to reach those outcomes.

The following sample learning objectives illustrate the link between specific tasks in the

learning module and the overall learning module outcomes. For a complete list of

training objectives see Appendix K.

1. Participants will identify how the participant role assignment best practice standard can be implemented in their course by answering the following question in writing. How can you create useful role assignments in your online class discussions?

2. Participants will identify how the promotion of informal social interaction best practice standard can be implemented in their course by answering the following question in writing. How can you create an environment that promotes informal social interaction in your online class discussions?

Each of the objectives targeted the participant's analysis of their own courses and how the specific AED best practice can be implemented or applied to those courses. Accomplishing the objectives created a platform for the participant to implement the AED best practices in their courses. It also increased the potential achievement of the training outcome to increase implementation of AED best practices in their courses.

Development Phase. The development phase consists of creating the learning module content and incorporates feedback from content matter experts in the creation process (Peterson, 2003; Wang & Hsu, 2009). Technical experts, content matter experts, and the instructional designer all participated in the actual creation of the training. Once the initial training was developed, it was evaluated and modified as discussed in the evaluation phase. Appendix L contains the content of the training designed for this study.

Implementation Phase. The implementation phase consists of actually using the learning module (Peterson, 2003; Wang & Hsu, 2009). Once the training was developed, reviewed by experts, and pilot tested, it was administered to the study participants. Implementation occurred within the first two weeks of a new semester.

Evaluation Phase. The evaluation phase of the ADDIE consisted of two forms of evaluation, formative and summative (Peterson, 2003; Wang & Hsu, 2009). Formative evaluation occurred throughout the design and implementation phases (Wang & Hsu, 2009). This study served as the summative evaluation of the training.

Content matter expert feedback was used for formative evaluation in the design and development of the AED best practices training. These experts were asked to evaluate both the content of the AED best practice training as it relates to AED best practices and the process participants must go through to complete the training. The content matter experts' recommendations were collected by the researcher and training developer. Adjustments to the training content and processes were then made before pilot testing which was the next round of formative evaluation.

The training was pilot tested before it is implemented with three online instructors who are not participating in the study. Feedback from participants was solicited using both a satisfaction survey and personal interviews. See Appendix M for the participant satisfaction survey. This survey addressed important issues identified in the analysis of the target participants needs. One such issue was the time requirements of the training itself. In the survey, the pilot test participants were asked if the time required to compete the training was reasonable. Other issues important to motivation were addressed in the survey such as how well the training kept the participants attention (Keller, 1987). In addition, the ease of access to the training was assessed. Lastly, the perceptions the participants had about the value of the training content was addressed in the satisfactions survey. This information was used to modify and improve the AED best practice

training. Improvements made target both the content and the design of the AED best

practices training to maximize its effectiveness in achieving the identified outcomes.

      Summative evaluation was performed using a researcher-designed instrument for

evaluating AED best practice implementation during the study. Details of the creation

and validation of this instrument were discussed previously in the instruments section of

this chapter. See the data analysis section in this chapter for detail on how the

effectiveness of the AED best practice training was evaluated.

CHAPTER IV

Results

The purposes of this study were to determine what AED best practices were implemented by first semester online instructors and to determine if there was a difference in AED best practice implementation between AED best practice trained and untrained online instructors during their second semester of online instruction. A review of literature resulted in the identification of six AED best practices. Each of these AED best practices were operationalized using both the literature and an expert Delphi panel. A training was then developed based on the target best practice behaviors identified by the Delphi panel. This training was given to new online instructors starting their second semester of instruction at the participating institution. The following research questions were addressed in this study.

Research Questions

The first research question explored what the AED best practice implementation looks like for first semester online instructors.

1. What is the AED best practice implementation profile for first semester online instructors at a private western undergraduate institution?

The second research question explored the effect of online instructor teaching experience on AED best practice implementation.

2. Is there a statistically significant difference in the AED best practice

implementation profile for untrained instructors between the first and second

semester of online teaching?

The third research question addressed the effect of training on the instructor AED

best practice implementation profile.

3. Is there a statistically significant difference in the AED best practice

implementation profile between untrained instructors and those who receive

specific training on AED best practice implementation?

Sample Description

To examine the research questions, newly hired online instructors were recruited

for the study and observations were made of their behavior during the first two semesters

of their online instruction. The study sample consisted of 31 first semester online

instructors at the participating institution. One instructor participant was removed from

the study because he started but did not complete the treatment. The net sample size was

30 participant instructors. This sample consisted of 20 (66.67%) male instructors and 10

(33.33%) female instructors. All instructors held at least a master's degree in their area

of instruction. Due to the variety of course topics, a stratified random assignment

procedure was used to assign participants to control and experimental groups.

Participants were randomly assigned to control and experimental groups based on the

strata of same course, academic department, or academic college designation. The

designations were prioritized as follows: First, the participants scheduled to teach the

same courses were randomly divided between the control and experimental groups.

Second, the participants scheduled to teach courses that were not duplicated by other

participants were randomly divided between control and experimental groups if the courses were within the same academic department. Third, if the above two conditions were not met, participants scheduled to teach courses within the same academic college were randomly divided between the control and experimental groups. Fourth, remaining participants whose course did not meet the first three criteria were randomly assigned to the control and experimental groups.

The strata for in this study were: American Foundations Course, Art Course, Family Course, Foundations Math Course, Math 100 Course, Medical Terminology Course, Pathway Life Skills Course, Business Department, Home and Family Department, Languages and International Studies Department, Math Department, Religion Department, and Language and Letters College. Table 2 shows the stratifications and the numbers of participants for each strata.

Table 2. *Sample Stratification*

Discipline	n
American Foundations Course	2
Art Course	1
Family Course	2
Foundations Math Course	2
Math 100 Course	2
Medical Terminology Course	2
Pathway Life Skills Course	4
Business Department	2
Home and Family Department	2
Languages and International Studies Department	2
Math Department	1
Religion Department	4
Language and Letters College	4

Note. N = 30 participants

The strata of Art Course and Math Department had the fewest participants with one; followed by Business Department, American Foundations Course, and Medical Terminology Course with two participants each. The Pathway Life Skills Course,

Religion Department, and Language and Letters College strata had the most participants of all the categories with four. Strata that did not result in equal distribution between control and experimental groups were the Art Course and Math Department.

Measures of AED Best Practice

As discussed in Chapter III, the six AED best practices were operationalized by a Delphi panel. In that process, additional sub measures were created for where such sub measures were necessary. As a result, there were nine AED best practice measures identified. To assist in the clarity of the text, *Figure 5* shows the Delphi panel AED best practice with the measure abbreviations and a summary definition of the best practice measure. This same abbreviation summary is also found in Appendix N.

Best Practice	Measures	Working Definition
Expectations Best Practice	E-1	Instructor provides clear discussion directions
	E-2	Instructor provides a clear discussion rubric
Participant Roles Best Practice	PR-1A	If present, Instructor describes roles assigned
	PR-1B	Instructor assigns roles
Discussion Group Size Best Practice	DG-1	Instructor organizes discussion group size between 5 and 10
Incentives for Performance Best Practice	IP-1	Instructor provides individual incentives
	IP-2	Instructor provides group incentives
Promotes Informal Social Interaction Best Practice	PISI-1	Instructor promotes informal social interactions
Instructor Participation in Discussion Best Practice	IPD-1	Instructor post are at least 1% of total
	IPD-2	Instructor post are no more that 20% of total

Figure 5. The AED best practice measure abbreviations and brief working definitions.

The results for the research questions were organized around each measurement for the AED best practices identified for this study. The AED best practice measures will be discussed further in the "Data Source" section of this chapter. Figure 6 show each best practice, the associated measures, and the type of data produced for each measure.

Best Practice	Measure	Data type
Expectations	E-1	% AED direction compliance
	E-2	% Grading Rubric compliance
Participant Roles	PR-1	% role description compliance
Discussion Group	DG-1	% group size between 5 and 10
Incentives for Performance	IP-1	% students given feedback
	IP-2	% student groups given feedback
Promotes Informal Social Interaction	PISI-1	% promoted informal social interaction
Instruction Participation in Discussion	IPD-1	% instructor/student posts
	IPD-2	% instructor/student posts

Figure 6. AED best practices, associated measures and the type of data gathered for each research question.

The AED best practices measured in the study were Expectations, Participant Roles, Discussion Group Size, Incentives for Performance, Promotes Informal Social Interaction, and Instructor Participation in Discussion. While each of these best practices were measured with at least one measure, some of these best practices were measured with two measures due to the way the Delphi panel defined each individual best practice.

The best practice measurements were Expectations One (E-1), Expectation Two (E-2), Participant Roles (PR-1), Discussion Group Size (DG-1), Incentives for Performance One (IP-1), Incentives for Performance Two (IP-2), Promotes Informal Social Interaction (PISI-1), Instructor Participation in Discussion One (IPD-1), and Instructor Participation in Discussion Two (IPD-2).

Institutional Policy Influence

As noted in chapter three, participants in this study did not create the courses they taught during this study. While participants in the study had the ability to edit the courses on the LMS, they were prohibited from doing so by the institution's policy. Significant

changes to the course could be made at the participant's request if approved by the course council for that particular course. For this reason, the study attempted to identify and focus on AED practices under the control of the instructor participant rather than the course council's design of the course in question.

Once the participants agreed to the study and allowed the researcher access to their courses, the extent to which the institution's policy impacted new online instructor behavior became more evident. It was found, for example, that different participants teaching the same course had identical elements such as discussion directions, rubrics, and grade book items. This discovery presented evidence of a much deeper level of external course control than was expected. The outcome of the institutional policy to not modify courses was that new instructors were strongly discouraged from making any changes, rather than only significant changes, to course elements. Because some of the course elements created by the course councils were also data sources for AED best practice measures, the institutional policy presented a confounding variable in the study for some of the AED best practice measures. The following addresses the impact of the institutional policy on the data sources for each of the AED best practice measures.

Data Sources

Overall, the sources of data for the AED best practice measures within each course were the instructor post content, post count summaries, discussion directions, discussion prompts, instructor notes, syllabus, grade book items, grade book grade assignment feature, grade book instructor feedback feature, grade book rubric feature, and the group assignment feature in the LMS. Since 40% (n = 12) of participants in the study taught the same course as at least one other participant, the data sources were

compared between matching courses. It was discovered that the discussion directions,

syllabus, and the grade book items were identical in each of the duplicated courses in the

study. It should be clarified that the grade book grade assignment feature, grade book

instructor feedback feature, and the grade book rubric feature as contained in the grade

book item were present or not present at the same level across the same courses, but there

were differences in how instructors used them in giving grades and feedback. Other data

sources used in the study were found to vary between duplicated courses such as

instructor post content, post count summaries, instructor notes and the group assignment

feature. This indicated individual instructor control of those variables. Based on the

above analysis, Figure 7 shows the data sources used to measure each AED best practice

area, if the instructor appeared to have the authorization to modify it without approval

from the course council, and if there was evidence of use in the AEDs examined.

Best Practice Measurement	Data Source	Instructor Change Authorized	Used in AEDs Examined
E-1	Discussion directions	No	Yes
	Discussion prompt	No	Yes
E-2	Syllabus	No	Yes
	Discussion directions	No	Yes
	Grade book rubric feature	No	Yes
PR-1	Syllabus	No	Yes
	Discussion directions	No	Yes
	Instructor notes	Yes	No
IP-1	Grade book items	No	Yes
	Grade book grade assignment feature	No	Yes
	Grade book instructor feedback feature	No	Yes
	Grade book rubric feature	No	Yes
	Instructor post content	Yes	Yes
IP-2	Grade book items	No	No
	Grade book grade assignment feature	No	No
	Grade book instructor feedback feature	No	No
	Grade book rubric feature	No	No
	Instructor post content	Yes	Yes
DG-1	Group assignment feature	Yes	Yes
	Instructor notes	Yes	Yes
	Instructor post content	Yes	Yes
PISI-1	Instructor post content	Yes	Yes
IPD-1	Post count summaries	Yes	Yes
IPD-2	Post count summaries	Yes	Yes

Figure 7. Instructor authority to make changes in study data source compared with the presence of evidence of the data source being use in the study.

The combination of instructors appearing to be authorized to make changes in the data source areas and those data sources actually being used in the AEDs examined impacted the interpretation of the data gathered. Below is a discussion of the integrity of

each data source in the context of the each AED best practice definition by the Delphi panel.

Instructors have at least one method for meeting all but the E-1 and E-2 best practice measures. However, the definition of each best practice also impacts the interpretation of the data source. To further explain the impact of the institutional confounding variable, each of the AED best practice definitions and data sources to measure the defined best practice are addressed below.

The Expectations Best Practice consisted of two measures (E-1 and E-2) and three criteria within each measure. The E-1 best practice measure required the presence of discussion deadlines, student participation requirements and a discussion prompt. The E-2 best practice measure required the presence of a rubric that contained an evaluation of student timely contribution to the discussion, demonstration of knowledge, and compliance with posting protocols. Due to the way the Delphi panel defined these measures, only those participants who met all of the criteria within the measurement were identified as compliant with the best practice standard. Figure 8 shows the expectations best practice measures and the Delphi panel definitions.

Best Practice Measurement	Delphi Panel Definition
E-1	The expectations for the discussion assignment are clearly established as demonstrated by the presence of directions for the discussion (An, Shin, & Lim, 2009; Arbaugh, 2010; Beaudin, 1999; Dennen, 2005; Dixson, Kuhlhorst & Reiff, 2006; Gilbert & Dabbagh, 2005; Hew, Cheung and Ng, 2009; Ke 2010) that contain discussion deadlines, student participation requirements, and a discussion prompt.
E-2	The expectations for the discussion assignment are clearly established as demonstrated by the instructor providing a rubric for students that contains grading criteria for timely contribution to the discussion, demonstration of knowledge, and compliance with posting protocols (Gilbert & Dabbagh, 2005).

Figure 8. Expectations best practice measures E-1 (clear expectations) and E-2 (clear rubric) with Delphi definitions.

To find evidence of E-1 compliance, it necessitated examination of discussion directions and discussion prompts. Since both sources of data for this best practice measure were not created by the instructor, and instructors were not authorized to modify them, the E-1 findings should be considered representative of a combination of course council's design, new online instructor's compliance with institutional policy, and new online instructors' best practice behaviors. This combination of factors will be referred to as the institution's compliance with the AED best practices.

The E-2 measure targeted discussion rubrics. A discussion rubric may be contained in the course syllabus, discussion directions, or in the course grade book item for the discussion examined. Since all of the sources of data for E-2 were not created by the instructor, nor were the instructors authorized to change them, E-2 should be considered as representative of the institution's compliance with the AED best practices.

The Participant Roles best practice was measured by the percentage of role descriptions present as compared to the number of roles assigned in a discussion. Figure 9 shows the measure for this best practice with the Delphi panel definition.

Best Practice Measurement	Delphi Panel Definition
PR-1	When roles are assigned in discussion boards, all roles are well-defined as demonstrated by the presence of a description for all (100%) roles assigned for each discussion (Dennen, 2005).

Figure 9. Participant Roles best practice measure PR-1 (role description present) with Delphi definition.

The Delphi panel defined use of participant roles as optional. However, if they were used, evidence of a role description for each assigned role in the discussion was required to meet the standard. The course syllabus, discussion directions, and instructor notes in each course were sources of data for the PR-1 measure. Two of the three possible sources of data were not created by the instructor, nor was the instructor authorized to modify them. The third source, instructor notes, were created by the instructor and the instructor was authorized to modify them. However, none of the participants in the study used the instructor notes to assign or describe roles for the AEDs examined. Therefore, the PR-1 measure should be considered as representative of the institution's compliance with the AED best practices.

The Incentives for Performance best practice consists of two measurement areas related to individual incentives (IP-1) and group incentives (IP-2). Figure 10 shows the Incentives for Performance best practice measures with the Delphi panel definitions.

Best Practice Measurement	Delphi Panel Definition
IP-1	There is evidence that all students (100%) were provided an individual incentive for discussion participation (Dixson et al., 2006) in the form of a grade, evaluation rubric, or written feedback in the discussion examined.
IP-2	There is evidence that group-based incentives are present for the discussion examined (Taylor, 2006; Kelly, 2010). The group-based incentives include group grade, group rubric or written instructor feedback to the group.

Figure 10. Incentives for Performance best practice measures IP-1 (individual incentives) and IP-2 (group incentives) with Delphi definitions.

The IP-1 measure required evidence that at least one of three methods was used in giving feedback to all students. Data sources for this measure were found in the grade book items, the grade book grade assignment feature, grade book instructor feedback feature, and the instructor post content for each discussion examined. The grade book item, the grade book grade assignment feature, and the grade book instructor feedback feature were not created or modified by the study participants and their presence may have affected study participant AED best practice behavior. Seven participants who did not meet the IP-1 standard during the first semester of the study, did not use any of the IP-1 methods outlined by the Delphi panel. An examination of those participants' courses revealed no grade book item, grade book grade assignment feature, or grade book instructor feedback feature present for the discussions examined during the first semester. The 22 participants who met the IP-1 standard during weeks five or nine of the first semester had a grade book item present for the discussion examined and met the IP-1 standard through the use of the grade assignment feature. This circumstance implied that participants with the appropriate pre-designed course structure were likely to attempt IP-1 methods while those who did not have the pre-designed course structure that supported

IP-1 methods did not attempt their use. As a result, the IP-1 measure should be

considered as reflective of the institution's compliance with this AED best practice.

The IP-2 measure also required evidence of at least one of the three methods used

for each of the groups in the discussion. The data sources required to analyze this

measure were the grade book items, the grade book grade assignment feature, the grade

book instructor feedback feature, the grade book rubric feature, and the instructor post

content for each AED examined. An examination of the participant's courses in this area

revealed none of the participants were given grade book items for group grades. This

resulted in no instructors having access to the grade book grade assignment feature, the

grade book instructor feedback feature, and the grade book rubric feature for giving

group feedback. The only available method for giving group feedback was instructor

AED posts. While this narrowed instructor options for meeting the IP-2 standard, some

of the participants did use instructor posts to provide group feedback. Since the course

council course design did not interfere with giving group feedback in instructor posts,

instructor posts can be considered as evidence of new online instructor AED best practice

behavior.

The Delphi panel definition of the Discussion Group Size best practice identified

a group size preference with an upper limit and a lower limit. Figure 11 shows this best

practice measure (DG-1) with the Delphi panel definition.

Best Practice Measurement	Delphi Panel Definition
DG-1	Group size is between 5 and 10 participants (Bliss & Lawrence, 2009; Roberts et al., 2006; Schellens & Valcke, 2006) in 100% of groups within the discussion examined.

Figure 11. Participant group size best practice measure, DG-1 (group size) with Delphi definition.

As a result of the Delphi panel definition, only those participants who had all group sizes in a discussion between five and 10 met the standard for the DG-1 measurement. Evidence for compliance with the DG-1 measure was found in the group assignment feature, instructor notes and the instructor post content in each AED examined. Group assignments could not be predetermined by course designers since each course had a unique number of students and the courses were designed before students were enrolled. As a result, all group sizes found in the discussions examined were determined by the participants in the study and can be interpreted as reflective of new instructor behavior.

The Delphi panel definition of the Promotes Informal Social Interactions best practice had one measure. Figure 12 shows this best practice measure (PISI-1) with the Delphi panel definition.

Best Practice Measurement	Delphi Panel Definition
PISI-1	The instructor encourages informal social interaction in discussions (Swan & Shih, 2005). This is demonstrated by the instructor inviting students to share personal information, by the instructor modeling informal discussion, or by the instructor identifying student informal social interaction in writing within the discussion examined.

Figure 12. Promotes Informal Social Interaction best practice measure (PISI-1) with Delphi definition.

Participants who demonstrated at least one of the three Delphi panel defined behaviors in the discussion examined met the standard for the Promotes Informal Social Interaction best practice. Instructor post content was the only source of evidence for this AED best practice. Since the participants created their own post content, the PISI-1 measure can be considered as representative of new online instructor behavior.

The Instructor Participation in Discussion best practice consisted of two

measures. Figure 13 shows both measures with the Delphi panel definitions.

Best Practice Measurement	Delphi Panel Definition
IPD-1	The instructor posts frequently enough that students perceive the instructor is interested in the discussion (An, et al., 2009, Ke, 2010; Mazzolini & Maddison, 2010) as demonstrated by an instructor to student posting ratio of no less than 1%.
IPD-2	Instructor to student post ratio facilitates the discussion development (Bliss & Lawrence 2009; Mazzolini & Maddison, 2003) as demonstrated by no more than 20% of posts are made by the instructor.

Figure 13. Instructor Participation in Discussion best practice measures IPD-1 (instructor minimum participation) and IPD-2 (instructor maximum participation) with Delphi definitions.

The IPD-1 measure addressed the lower limit of instructor participation in an

AED (1%). To meet the 1% minimum participation rate, the participants must have a

student to instructor posting ratio of one instructor post for every 100 student posts. The

IPD-2 measure addressed the upper limit of instructor participation in an AED (20%). To

meet the 20% maximum participation rate, the participants must have a student to

instructor posting ratio of one instructor post for every five student posts.

For both the IPD-1 and the IPD-2 best practice measures, the participants may

have chosen to organize students into multiple groups for the AED examined in the

study. In the event that multiple groups were organized by the instructor, the total

number of student posts for all the groups in an AED and the total number of instructor

posts in all groups in an AED were used to calculate the ratios. The data source for both

of these best practice measures was the post count summaries contained in each AED.

The instructor posts were created by the individual instructors; therefore, both IPD-1 and

IPD-2 can be considered as representative of new online instructor behaviors.

Data Interpretation

The best practice measures that were influenced by the institution's policy were E-1, E-2, PR-1, and IP-1. The data resulting from these measures could not be interpreted as being dependent only on the newly hired online instructors. However, rather than discarding these data, they were viewed as indicative of combination of course council's design, new online instructor's compliance with institutional policy, and new online instructors' best practice behaviors. As a result, the data can be interpreted as the institution's compliance with AED best practices rather than the course councils' compliance or the instructors' compliance alone. These best practices will be addressed separately from this perspective in each research question. This approach was taken as it may inform the AED practices at the participating institution as well as at institutions with similar course development and implementation strategies.

The AED best practice measures not influenced by the institution's policy were IP-2, DG-1, PISI-1, IPD-1, and IPD-2. The data from these measures could be interpreted as dependent only on newly hired online instructors. These AED best practice measures were used to answer the study research questions.

Research Question One Results

Research question one addressed the baseline profile of online instructors during their first semester of instruction. Data to address this question were gathered using the AED Best Practice Rubric during week five and week nine of the first semester of instruction for all participants.

To meet the criteria for inclusion in the study, an AED must have either started or ended during the weeks examined. One instructor participant started only one AED as a

course introduction and question/answer forum, and did not close it until the end of the

semester. Since the discussion did not start or end during the weeks examined, it was not

included in the study. A total of 29 out of 30 instructor participants had AED's during

weeks five and nine in the first semester of instruction.

Institution Measures for Research Question One. Since E-1, E-2, PR-1, and

IP-1 were influenced by institutional policies, they were considered separately from other

measures when addressing research question one. They were also interpreted as the

institution's compliance with the AED best practices.

E-1 addressed the clarity of discussion directions. Participants who met this best

practice standard demonstrated use of discussion deadlines, student participation

requirements, and a discussion prompt in the discussion. E-2 addressed the clarity of

discussion grading rubrics. To meet this standard, evidence of a rubric that had grading

criteria for student timely contribution to the discussion, student demonstration of

knowledge, and student compliance with posting protocols must have been present for

the discussion examined. Table *3* shows the percent of discussions that met E-1 and E-2

standard in the first semester during weeks five and nine. An overall semester one

compliance rate is also present.

Table 3. *Expectations (E-1 & E-2) Best Practices Semester One Institution Compliance Rate*

Expectations Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
E-1	82.8	82.8	82.8	29
E-2	37.9	37.9	37.9	29

The majority (82.8 %) of AED directions met full criteria for the E-1 measure during both measurement weeks. This indicated a routine use of clear discussion directions by the institution during the first semester.

On the other hand, nearly two thirds (62.1%) of participants' AEDs did not meet the criteria for E-2 during weeks five and nine in the first semester. This implied a preference to not use rubrics on the part of the institution. Of the 13 (44.8%) participants who had AED rubrics present during the first semester, eleven met the E-2 standard. All of the AED rubrics that met the standard in week five also met the E-2 standard in week nine. This implied that when AED rubrics were provided by the institution, they were likely to meet the E-2 best practice standard during both measurement periods. The lack of variation between weeks five and nine implied that when new instructors were given structure for AEDs in the course design, they did not modify it.

The PR-1 best practice measure addressed the presence of role descriptions for roles assigned in the AED. The Delphi panel definition of the PR-1 best practice did not require roles to be present in the AED examined. If roles were present, however, the Delphi panel definition required role descriptions to be present for each role assigned. To accurately represent observations in this best practice area, the subcategories of PR-1A and PR-1B were created. The PR-1A subcategory is the compliance rate when roles are present. The PR-1B subcategory is the use rate of roles in all of the AEDs examined.

It should be noted that the overwhelming majority (86.2%) of AEDs examined in the first semester did not use role assignments at all. Table 4 shows the number of AEDs that did not contain role assignments, the number that contained participant role

assignments, the roles assignment use rate, and the percent of those with role assignments that met the PR-1 standard.

Table 4. *Participant Roles Best Practices (PR-1A & PR-1 B) Semester One Institution Compliance Rate*

Participant Roles Best Practice (PR-1)	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
Role not present	25	25	25	29
Role present	4	4	4	29
Role use rate (PR-1B)	13.7%	13.7%	13.7%	29
Compliance rate (PR-1A)	100%	100%	100%	29

While it was possible for the instructor to assign roles using the instructor notes feature for the AED assignments, an examination of each of the participants who used role assignments revealed that the role assignments and role descriptions were contained in the discussion directions, which were created by the course council. Examination of the individual courses revealed the same four courses met PR-1 standard in each measurement period. The findings for PR-1 indicated a low preference of the institution to use roles in AEDs and no use of roles by participants when institutional support was not provided. However, when roles were used, they were used consistent with AED best practices.

IP-1 addressed individual incentives. Participants who met the IP-1 best practice demonstrated giving grades for the discussion, using an evaluation rubric, or giving written feedback for the discussion. Since the institution provided some of the participants with a grade book item and others not, each of those conditions was examined separately. Table 5 shows the IP-1 compliance rate for all participants, for only those participants with a grade book item designed into the course by the institution, and those without a grade book item present for the AEDs examined.

Table 5. *Individual Incentives for Performance (IP-1) Best Practice Semester One Instructor Compliance Rate*

Incentives for Performance Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
IP-1 (All participants)	65.5	65.5	62.1	29
IP-1 (Grade book item)	86.4	86.4	81.8	22
IP-1 (No grade book item)	0.0	0.0	0.0	7

The IP-1 semester compliance rates were lower than the week five and week nine compliance rates. Analysis of individual participant data revealed one participant met the IP-1 standard in week five but did not meet criteria in week nine. Another participant did not meet the standard in week five but met it in week nine. This resulted in a lower semester compliance rate with 18 participants meeting criteria for both weeks five and nine during semester one.

When participants were provided with a grade book item by the institution, there was a high likelihood of them meeting the IP-1 standard as demonstrated by 81.8% of those with a grade book item meeting the IP-1 Standard for the semester. Further examination of the four individual participants, with grade book items, that did not meet the IP-1 standard revealed that they made efforts to provide feedback to students using the grade book. They gave grades to between 93% and 97.71% of students but fell short of the 100% threshold required by the Delphi panel definition of IP-1 compliance.

Nearly a quarter of participants (24.1%) were not provided with grade book items by the institution for the AEDs examined. Those participants not provide with a grade book item did not meet the IP-1 standard at all during the first semester. This implied that institution design of the course had a profound effect on instructor behaviors for the IP-1 measure.

Institution AED Best Practice Profile for Research Question One. Since E-1,

E-2, PR-1, and IP-1 results appeared to be influenced by the institution's course design,

they were addressed separately from the AED best practice profile for research question

one. *Figure 14* shows the profile of first semester online instructors as they were

influenced by the institution's course design.
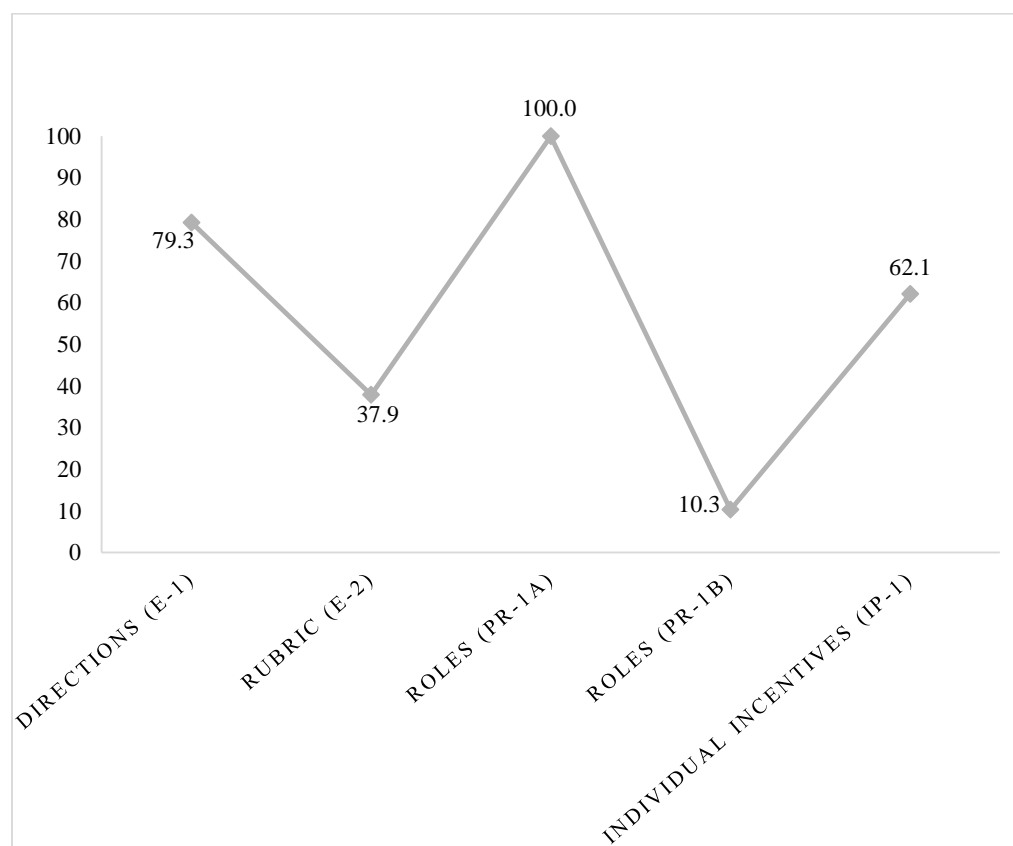
Figure 14. Institution compliance rate profile for the first semester of the study (N = 29). The E-1, E-2, and IP-1 profile points are the compliance rates for AEDs in

semester one. Since the participant roles best practice, PR-1, had a high compliance rate

but few role assignments were actually used, it was divided into the subcategories of PR-

1A and PR-1B for the institution's AED best practice profile. The PR-1A profile point is

the compliance rate according to the Delphi panel definition of the standard. The PR-1B

profile point is the percent of participants who had role assignments in their courses. Only three of the 29 participant AEDs contained roles assignments and all of those met the PR-1A criteria. This indicated the use of roles was not widely practiced by course councils in designing the course but when they were used, they met the participant roles, best practice, PR-1A.

The profile also shows that the institution did employ the use of AED directions frequently but tended to not design rubrics for evaluating student performance in AEDs. When new instructor were provided with a grade book item for the AEDs examined they were highly likely to use them and meet the standard for IP-1. However when they were not provided with a method for efficiently giving feedback to students, new online instructors did not meet the IP-1 standard. The implication of the impact course design has on new instructor AED best practice behavior will be further addressed in Chapter V.

Participant Measures for Research Question One. The IP-2, DG-1, PISI-1, IPD-1, and IPD-2 measures represent instructor behavior not influenced by the institution's policy to not change course elements. The IP-2 measure addressed group incentives for performance. Participants who met the IP-2 best practice measures demonstrated giving written feedback to discussion groups in the instructor AED posts. Table 6 shows the IP-2 measure and the percent of compliance during weeks five and nine, and the overall semester compliance rate.

Table 6. Group I*ncentives for Performance (IP-2) Best Practice Semester One Instructor Compliance Rate*

Incentives for Performance Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
IP-2	3.4	6.9	3.4	29

The data revealed only one participant met the IP-2 standard during both weeks five and nine the first semester. This low compliance rate indicated first semester instructors were not likely to give group feedback in AED posts.

The DG-1 measure addressed discussion group size being between 5 and 10 students. Table 7 shows the group size measure with the compliance rates for weeks five and nine, and the overall all compliance rate for semester one.

Table 7. *Discussion Group Size Best Practices (DG-1) Semester One instructor Compliance Rate*

Expectations Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
DG-1	27.6	27.6	20.7	29

The semester compliance rate appeared lower than expected since each week the compliance rate was higher than the semester compliance rate. Examination of the individual cases revealed that two participants met the DG-1 standard in week five but not week nine. Two other participants did not meet the DG-1 standard in week five but did meet the standard in week nine. As a result, eight participants met the DG-1 standard in weeks five and nine, but only six participants met the standard for the whole semester. This resulted in a lower overall semester compliance rate of 20.7%. This implied first semester instructors were largely not compliant with the discussion group size AED best practice.

The PISI-1 measure addressed instructor promotion of informal social interactions. Instructor comments were downloaded from the participating institution's learning management system and coded for each of the three behaviors identified in the Delphi panel definition of PISI-1. The coding was done by a team of three research assistants. The research assistants were trained to identify instructor posts that met the

PISI-1 standard until they achieved an inter-rater reliability of .929. Table 8 shows the compliance rates for weeks five and nine with the overall semester compliance rate.

Table 8. *Promotes Informal Social Interactions (PISI-1) Best Practice Semester One Instructor Compliance Rate*

Promotes Informal Social Interactions Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
PISI-1	13.8	17.2	6.9	29

The overall semester one compliance rate was lower than the individual week five and week nine compliance rates. An examination of the individual participant data revealed that only two participants met the PISI-1 standard during both weeks in semester one. Five other participants met the standard during one of the weeks but not the other. This resulted in 20 (69 %) participants not using any methods of meeting PISI-1 during their first semester.

The IPD-1 and IPD-2 measures address the instructor's participation level in the AED. The IPD-1 measure addressed the lower limit of instructor participation in an AED (1%). The IPD-2 measure addressed the upper limit of instructor participation in an AED (20%). These standards were measured by calculating the percentage instructor posts out of the total volume of posts in each discussion examined. Table 9 shows the compliance rates for both IPD-1 and IPD-2 during week five and nine with the overall semester one compliance rate.

Table 9. *Instructor Participation in Discussion (IPD-1 & IPD-2) Best Practice Semester One Instructor Compliance Rate*

Instructor Participation in Discussion Best Practice	Semester 1 Week 5	Semester 1 Week 9	Semester 1	N
IPD-1	65.5	58.6	48.3	29
IPD-2	82.8	96.6	82.8	29

Individual participant data revealed that only participants who did not post in the discussion examined failed to meet IPD-1 (minimum level participation) in week five and week nine. There were five participants who met the standard in week five but not in week nine. There were an additional three participants who did not meet the IPD-1 standard in week five but met it in week nine which resulted in a lower overall semester compliance rate. Further examination of each individual instructor's rate of participation in AEDs indicated that 12 of the 29 instructors in the study did not participate in any of the AEDs examined during the first semester of instruction.

Of those that did not meet IPD-2 (maximum level participation) standard, only one did not meet the standard over both discussions examined. Examination of individual participant data revealed those participants who did not meet IPD-2 requirements were involved in AEDs with between 12 and 31 student posts. They did not make more posts than other participants, but the students made fewer posts in the AEDs examined. This will be discussed further in Chapter V.

AED Best Practice Profile for Research Question One. To address research question one, the AED Best Practice Rubric data for each of the AED best practice measures were used to evaluate instructor compliance with the operationalized AED best practice standards identified by the Delphi panel. The IP-2, DG-1, PISI-1, IPD-1 and IPD-2 measures were representative of new online instructor behavior. Figure 15 shows the profile of first semester online instructors in meeting AED best practices. Each of the profile data points is the percent of instructor participants who were compliant with each of the identified best practice measures over the first semester of instruction.
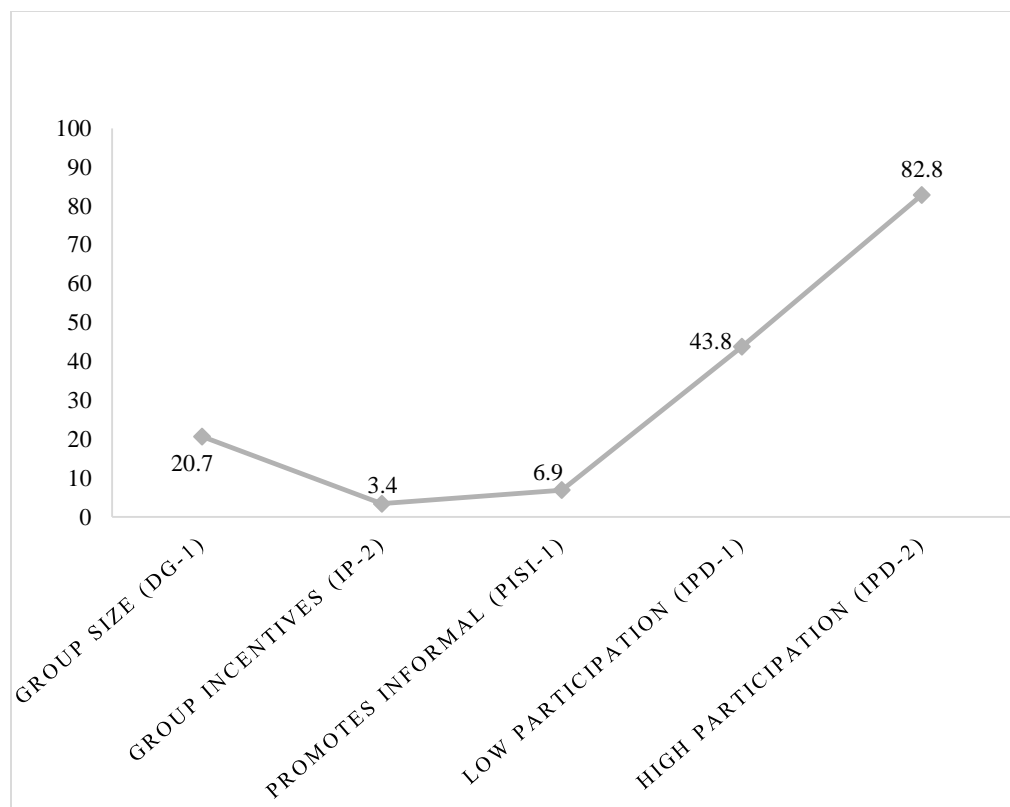
Figure 15. First semester AED best practice profile for first semester online instructors (N = 29).

The lowest rates of meeting best practice standards were in the use of group incentives, promoting informal communication, and discussion group size. Participation at the minimum level in AEDs was mixed as just under half met the best practice standard. The area of highest performance was not participating too much in discussions.

Research Question Two Results

Research question two addressed the experience effect on new online instructor practices between the first and second semesters. To explore this question, the control group was not trained in AED best practices and their performance was compared over two semesters. Each of the best practice measures were taken for the control group during weeks five and nine of both semesters one and two of the study. The intent of this study was to use repeated-measures ANOVA to analyze differences between the control

group's first and second semester performance for each of the best practice measures. However, the data gathered for all of the best practice measures did not meet the normality assumption. Transformations to correct for the violation of the normality assumption were attempted using the natural log, square root, and reciprocal transformations but were not successful. See Appendix O for the SPSS normality tests for each AED best practice measure. Due to the low numbers of participants in this study it was felt the normality assumption violation could not be ignored.

As a result, a chi-square test of goodness of fit was used to compare semester two best practice compliance with the baseline of compliance in semester one. Since it was possible for a participant to be compliant with each best practice during one of the measurement weeks but not the other for each semester, instructor performance was categorized into full, partial, and no compliance with each best practice measure. While actual counts were used in the chi-square test, percentages were used to report the results below. For readability chi-square tables are only shown in the text for significant results. See Appendix P for the SPSS chi-square outputs for research question two.

Institutional Measures for Research Question Two. Since E-1, E-2, PR-1, and IP-1 were influenced by institutional policies, they were considered separately from other measures when addressing research question two. Since research question two addressed the experience effect on AED best practices, the above measures were considered in assessing the teaching experience effect over two semesters on the institutions compliance with AED best practices.

The E-1 measure addressed the presence of clear directions for the AEDs examined. Teaching experience from semester one to semester two had no effect on E-1

compliance in the control group during that time period. Figure 16 shows the control

group E-1 measures during each of the measurement periods.
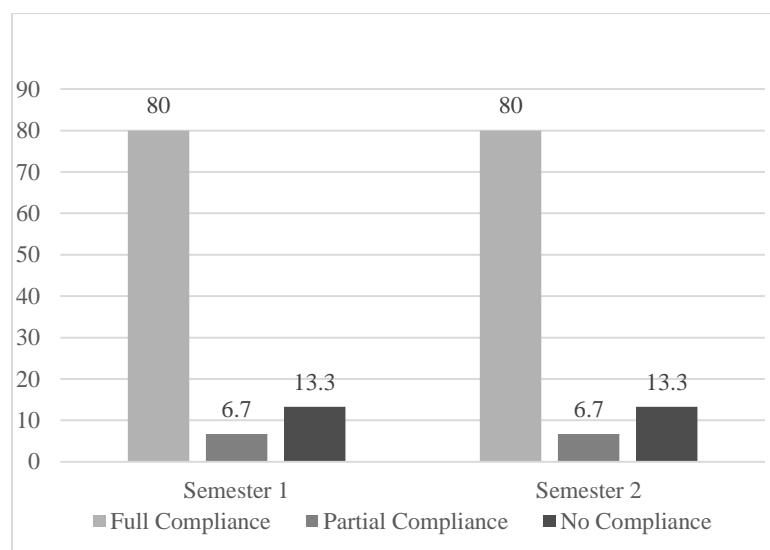
Figure 16. Control group (n = 15) E-1 (clear directions) compliance rate with experience.

Since there was no change in compliance observed between semesters, no

statistical comparison was appropriate. This finding indicated no change in course design

by the course councils between semester one and two and a high level of compliance with

the institution's policy by control group participants.

The relationship between experience teaching over two semesters and E-2

compliance was not significant χ^2 (1, n = 15) = .28, p = .598. Figure 17 shows the

control group E-2 measures during each of the measurement periods.
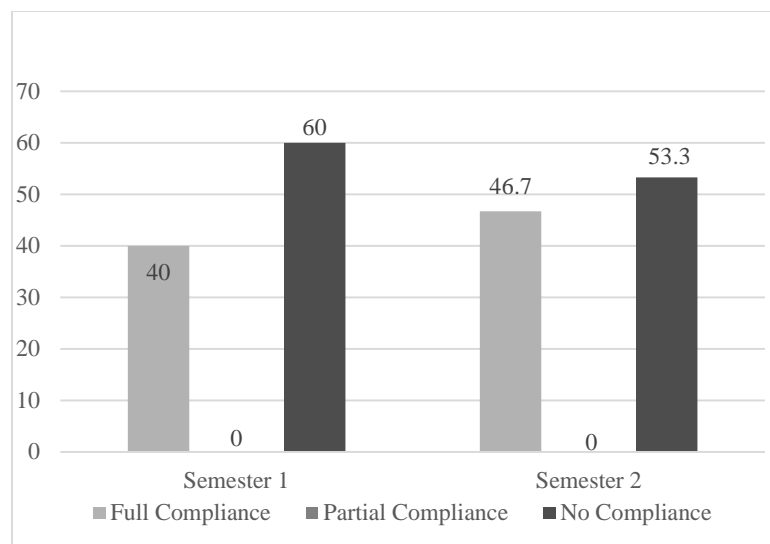
Figure 17. Control group (n = 15) E-2 (Clear Rubric) compliance rate with experience.

Data indicated that participants' AED rubrics either fully met or did not meet this standard. There were no AED rubrics that met partial compliance during either semester. There was one course that was not compliant with the E-2 standard in the first semester but became compliant with the E-2 standard in the second semester. Upon further examination of the course in question, it was determined that the course council made the rubric change, not the instructor.

The Participant Roles best practice, PR-1, addressed the presence of role descriptions in the AEDs examined. According to the Delphi panel definition of PR-1, only those AEDs with student role assignments were evaluated for the presence of role descriptions to determine compliance with the PR-1 best practice. However, this approach left out how often role assignments were used in the AEDs examined. For this reason, these results will be reported in two subcategories of the PR-1 best practice standard. The IP-1A subcategory is the rate of compliance with the participant roles best practice when roles were used as defined by the Delphi panel. The PR-1B subcategory is the role use rate for all of the AEDs examined in the study.

Only one control group participant had role assignments placed in the course during semester one and semester two. Role descriptions were present for each role assigned. This resulted in a control group compliance rate for PR-1A of 100% for both semesters. Since only one course in the control group containing any roles and no change in compliance occurred between semesters, no statistical comparison was appropriate.

The role use rate, PR-1B, for the control group also remained unchanged between semester one and semester two in the study. Figure 18 shows the percent of courses in the control group that used role assignments in semester one and semester two.
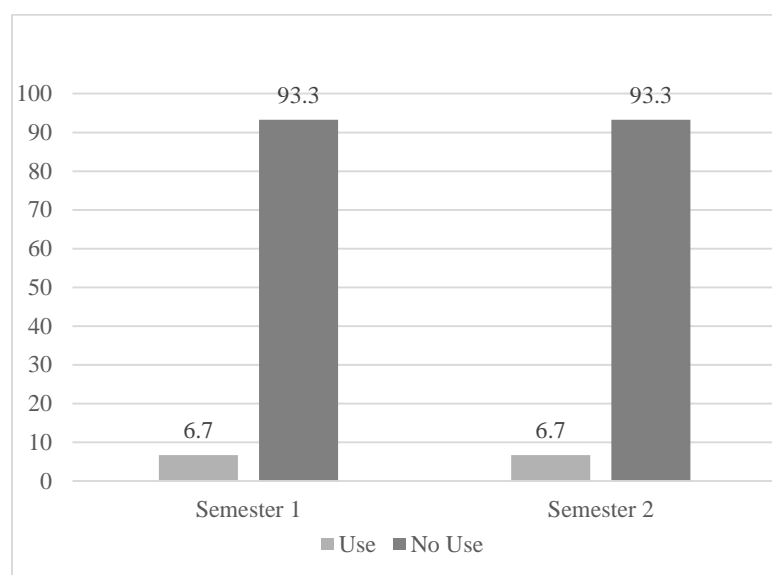
Figure 18. Control group (n = 15) PR-1B (roles used) use rate with experience.

The use rate for role assignments, PR-1B was only 6.67% for both semesters. This finding reflected that only one of the 15 control group participants had role assignments in the AEDs examined. This indicated a low preference on the part of course designers to use role assignments in AEDs and a high level of compliance with the institution's policy to not change course elements on the part of control group participants.

The relationship between experience teaching over two semesters and IP-1

compliance was not significant χ^2 (2, n = 15) = 1.11, p = .574. Figure 19 shows the

control group IP-1 measures during each of the measurement periods.
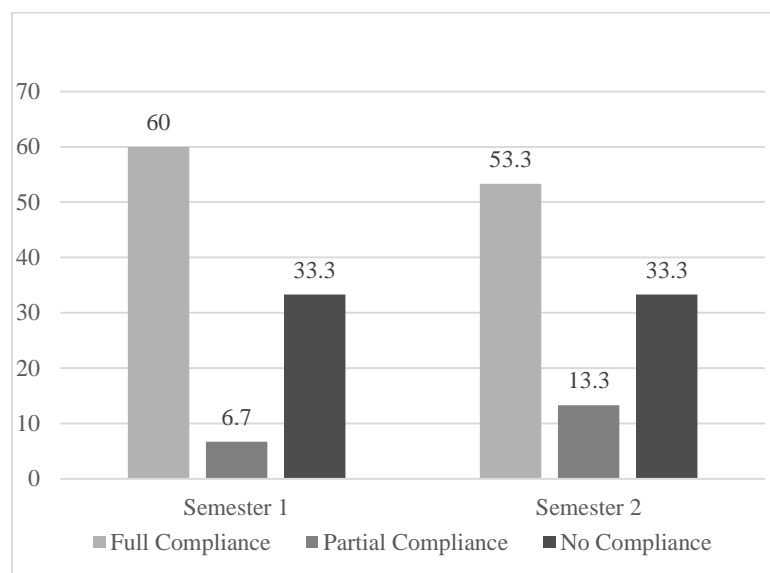

Figure 19. Control group (n = 15) IP-1 (individual incentives) compliance rate with experience.

The no compliance rate (33.3%) remained unchanged between semesters. This

finding was consistent with the institution not providing a grade book item for some

instructors. The only change observed between semester one and semester two was that

one participant with a grade book item moved from full compliance in semester one to

partial compliance in semester two. Further examination of that individual participant's

performance revealed that they did not give grades to all of the students during the

second semester. As a result, they did not meet compliance with the IP-1 standard.

The use of grades appeared to be the preferred method of providing individual

incentives while the grade book rubric feature and grade book instructor feedback feature

were used occasionally. Of those participants who met IP-1 standard, all (100%) met the

standard through use of grades alone or with grades and another method. It appeared

written feedback using the grade book instructor feedback feature was generally not given to students who got full credit or no credit for the discussions examined. Written feedback was generally given to those students who had some points taken off in the discussion examined. The feedback was an explanation of why the points were not earned.

Institution AED Best Practice Profile for Research Question Two. Since E-1, E-2, PR-1, and IP-1 results appeared to be influenced by the institution's compliance with AED best practices, they were addressed separately in the AED best practice profile. Figure 20 shows the teaching experience effect over two semesters on the profile of first and second semester online instructors as they were influenced by the institution's course design.
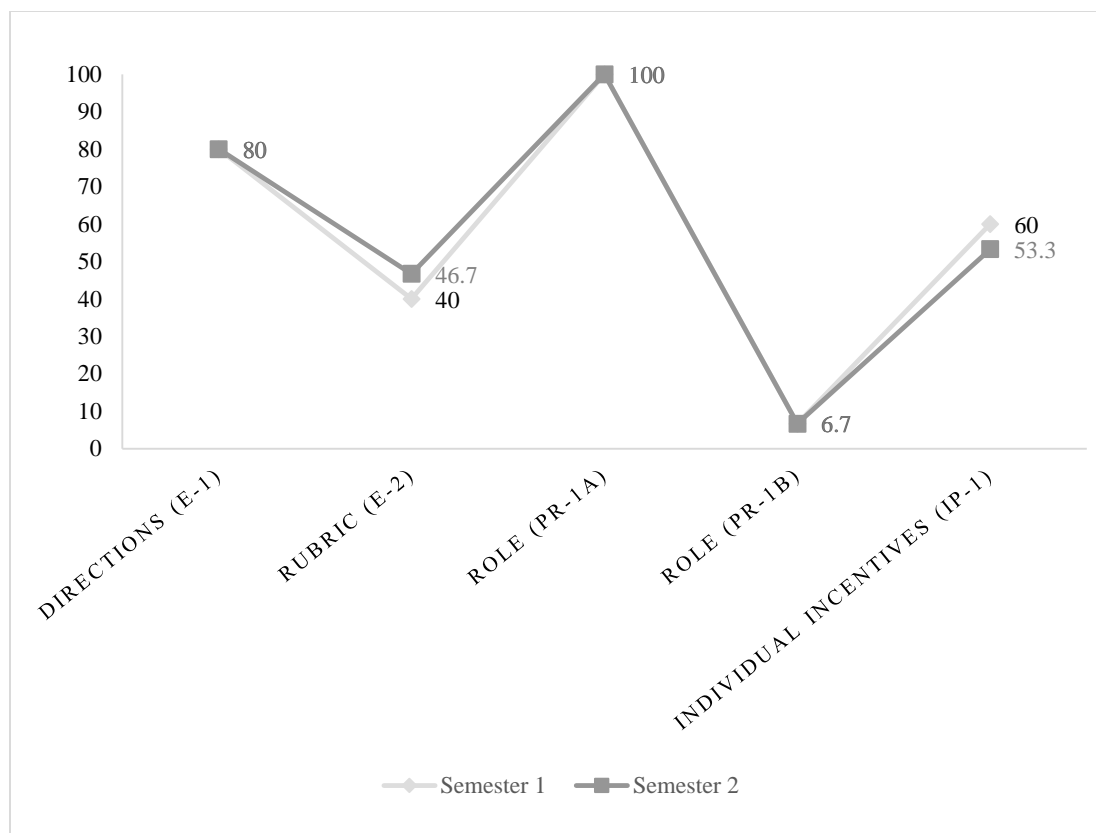
Figure 20. Control group (n = 15) compliance rate with experience and institution influence.

        Since the participant roles best practice, PR-1, had a high compliance rate but few role assignments were actually used, it was divided into two sub categories of PR-1A and PR-1B for the AED best practice profile. The PR-1A profile point is the compliance rate according to the Delphi panel definition of the standard. The PR-1B profile point is the percent of participants who had role assignments in their courses.

        The data indicated little change in the AED best practice profile with teaching experience over two semesters in institution influenced best practices. The implication of the impact the institution had on the new instructor AED best practice profile over two semesters will be further addressed in Chapter V.

Participant Measures for Research Question Two. The relationship between teaching experience over two semesters and DG-1 compliance was not significant χ^2 (1, n = 15) = 1.67, p = .197. Figure 21 shows the control group DG-1 measures during each of the measurement periods.
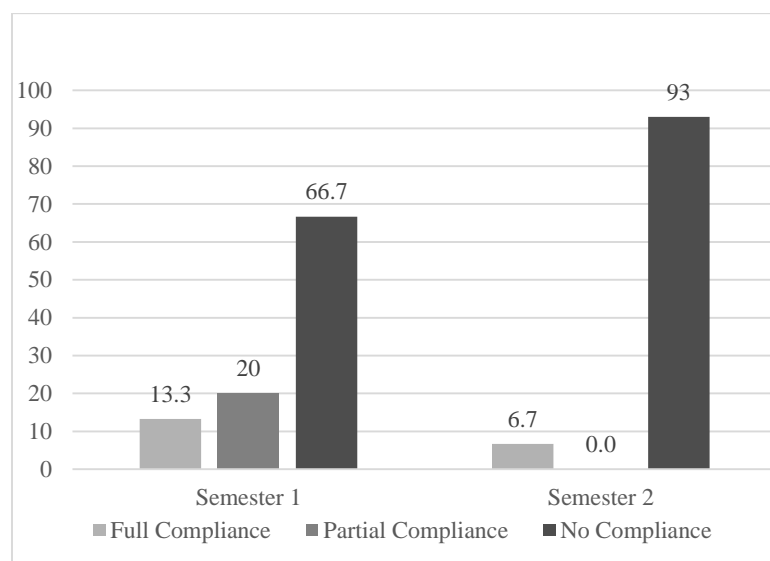

Figure 21. Control group (n = 15) DG-1 (discussion group size) compliance rate with experience.

It should also be noted that of the 193 discussions organized by the control group instructors over the two semesters, 85 did not meet group size standard. Of those discussions that did not meet group size standard, 25 (29.1%) were whole class discussions where there appeared to be no attempt to divide the class into smaller groups.

Participants who met the incentives for group performance best practice, IP-2, demonstrated giving written feedback to discussion groups in the instructor posts. Each of the control group participant's AED posts were examined for evidence of group feedback. Four of the participants (26.7%) demonstrated evidence of IP-2 (group incentives) compliance during at least one of the measurement periods. The first participant, demonstrated full compliance in the first semester but only partial compliance

in the second semester. The second participant demonstrated no compliance in the first

semester, but demonstrated full compliance in the second semester. The third participant

demonstrated partial compliance in the first semester but no compliance in the second

semester. The fourth participant demonstrated partial compliance in the second semester

only. Due to the small number of participants who attempted to meet the IP-2 standard,

no statistical analysis was conducted for the IP-2 best practice standard.

Participants who were compliant with the Promotes Informal Social Interaction

best practice, PISI-1, either invited, identified or modeled informal social interaction in

their AED posts. A team of three research assistants, with an inter-rater reliability of

.929, coded control group AED posts for evidence of the above behaviors for both

semester one and semester two. The relationship between experience teaching over two

semesters and, PISI-1 compliance was not significant χ^2 (1, n = 15) = 1.667, p = .197.

Figure 22 shows the control group PISI-1 measures during each of the measurement

periods.
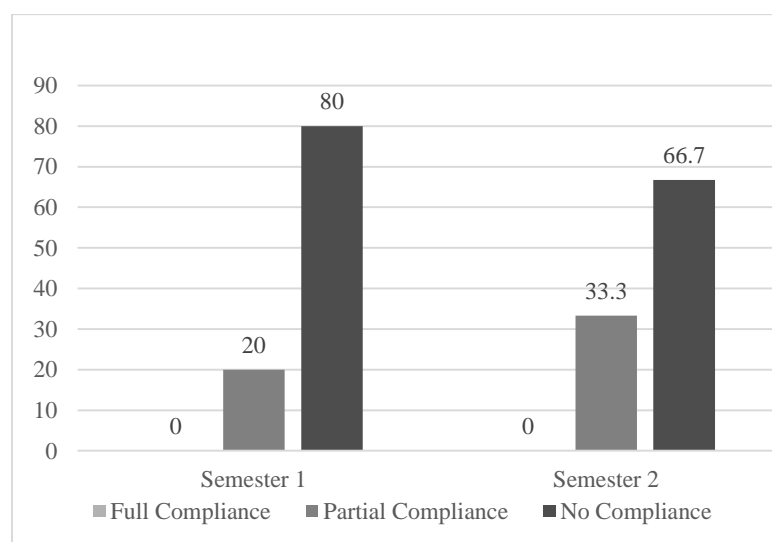
Figure 22. Control group (n = 15) PISI-1 (promotes informal social interaction)
compliance rate with experience.

None of the participants in the control group were fully compliant with the PISI-1

standard. Seven of the control group participants did demonstrate partial compliance by

having at least one comment that promoted informal social interaction during either

semester one or semester two.

The relationship between experience over two semesters and instructor low

participation rate compliance, IPD-1, was significant χ^2 (2, n = 15) = 7.92, p = .019. The

chi-square table containing the observed and expected values is shown in Table 10.

Table 10. *Control Group Chi-Square Goodness of Fit Expected and Observed Values for*
the Maximum Instructor Participation Measure (IPD-1) In the Second Semester of the
Study

Best Practice	Compliance	Observed Frequency	Expected Frequency
Instructor participates in discussion, IPD-1	NONE	3	4.0
	PARTIAL	2	6.0
	FULL	10	5.0
	Total	15	15

Since one cell frequency was less than five, Fisher's exact test was used to confirm the

significance, p = .018. Figure 23 shows the control group IPD-1 measures during each of

the measurement periods.
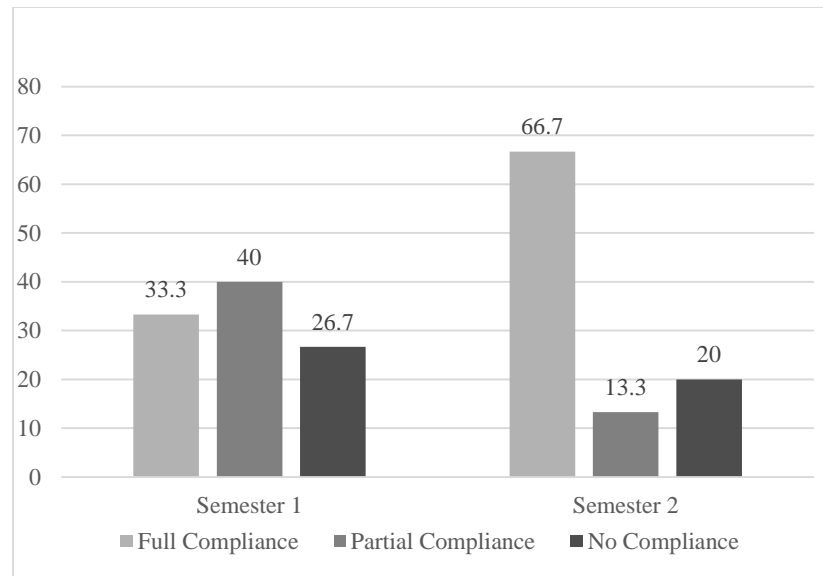
Figure 23. Control group (n = 15) IPD-1 (minimum participation) compliance rate with experience.

It appeared that with teaching experience over two semesters, new instructors were more likely to participate at the minimum level required to be in compliance with the IPD-1 measure. This was reflected in the 33.3% more participants who met full compliance criteria in semester two and a reduction of 6.7% of participants not meeting any compliance criteria in semester two. This will be more fully discussed in Chapter V.

The IPD-2 control group compliance rate remained unchanged between semester one and semester two of the study. Since there was no change in compliance observed between semesters, no statistical comparison was appropriate. Figure 24 shows the control group IP-1 measures during each of the measurement periods.
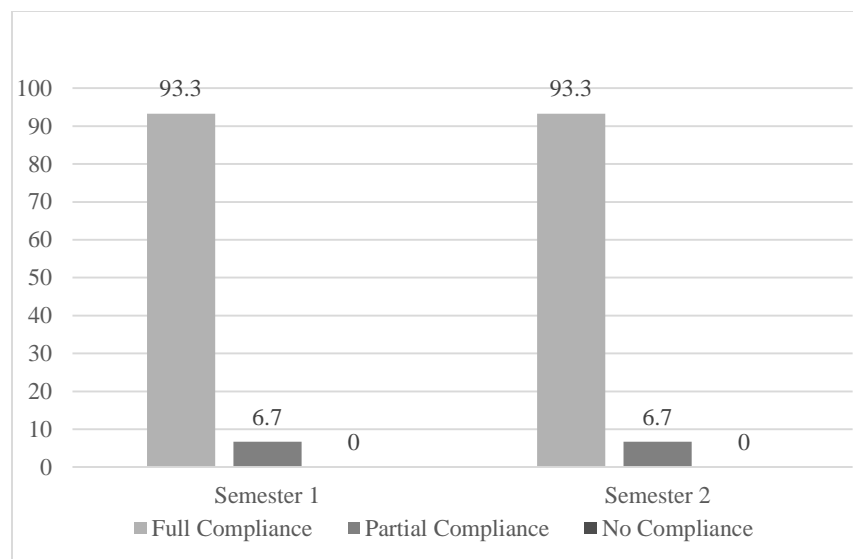
Figure 24. Control group (n = 15) IPD-2 (maximum participation) compliance rate with experience.

It appeared the majority of control group participants consistently met the IPD-2 measurement requirements. The same participant that was partially compliant in semester one was also partially complaint in semester two of the study. None of the participants fell into the no compliance category during both semesters. This indicated participating over 20% of the time in a discussion occurred infrequently in the control group.

Experience Effect on the AED Best Practice Profile. To address research question two, each of the AED best practice measures were compared with teaching experience over two semesters. The IP-2, DG-1, PISI-1, IPD-1 and IPD-2 measures were representative of new online instructor behavior. Figure 25 shows the profile of the control group for the first and second semester of the study. Each of the profile data points is the percent of instructor participants who were compliant with each of the identified best practice measures over the first semester of instruction.
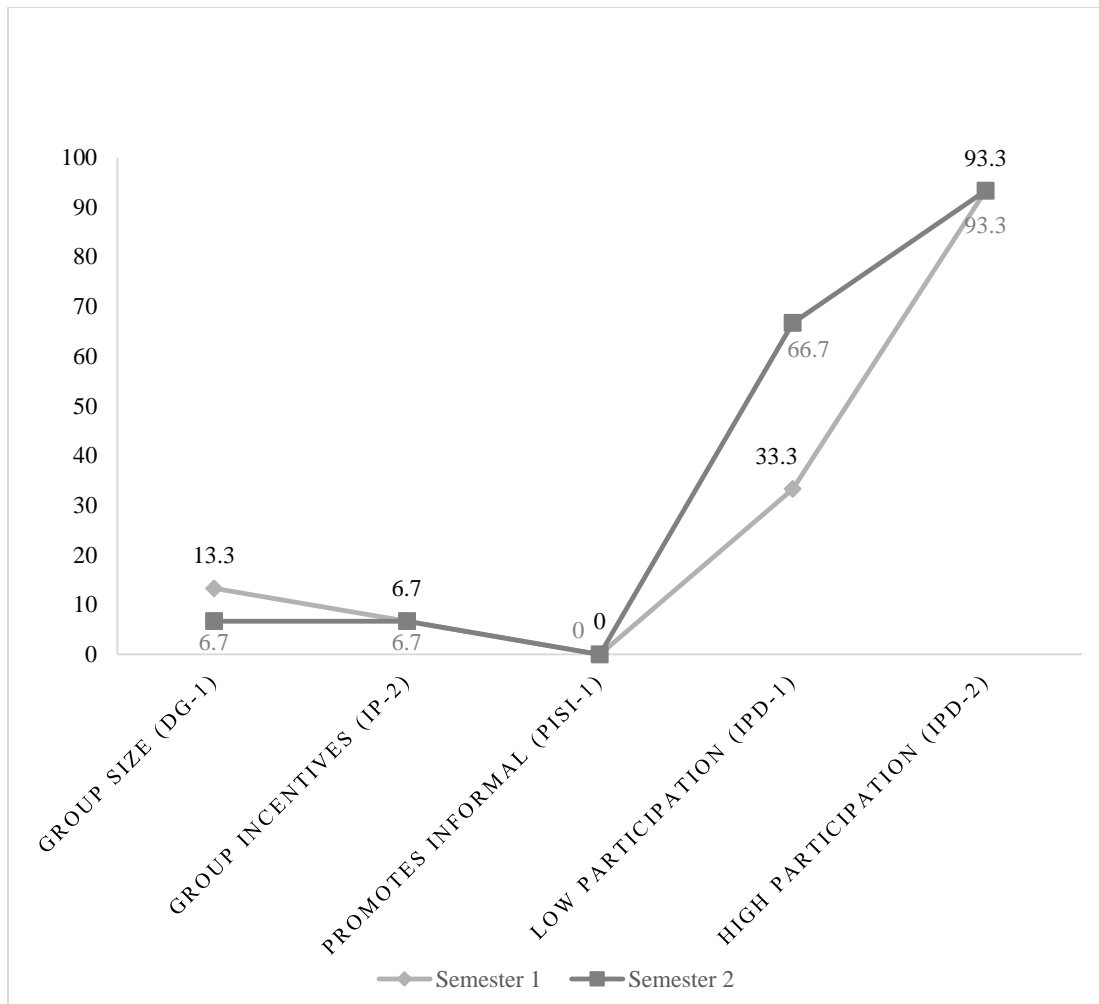
Figure 25. Best practice profile of control group participants (n = 15) for semester one and semester two of the study.

Analysis of all but one of the AED best practice measures in the above section resulted in no significant difference in instructor behavior with teaching experience over two semesters. These finding are consistent with researchers who assert that teaching experience alone does not result in adequate best practice use (Bailey, 2008; Dennen, 2005; De Simone, 2006). However, instructor participation in discussions at the minimum level showed a significant teaching experience effect that was not consistent with previous literature (Bailey, 2008; Dennen, 2005; De Simone, 2006).

Research Question Three Results

Research question three addressed the treatment effect of the AED best practice training on new online instructor practices. To explore this question, each of the AED best practice measures were compared between the experimental and control groups.

The original intent of this study was to use repeated-measures ANOVA to analyze differences between the experimental group and control group performance for each of the best practice measures over two semesters. However, the data gathered for each of the best practice measures did not meet the normality assumption. Transformations to correct for the violation of the normality assumption were attempted using the natural log, square root, and reciprocal transformations but were not successful. See Appendix Q for the SPSS normality tests for each AED best practice measure. Due to the low numbers of participants in this study it was felt the normality assumption violation could not be ignored.

As a result, a chi-square test of independence was used to compare the control group with the experimental group AED best practice compliance during semester two of the study. Since the AED best practice behaviors were measured for the experimental and control groups during week five and nine of semester two of the study, it was possible for a participant to be compliant with each best practice during one of the measurement weeks but not the other during semester two of the study. To account for this in the chi-square test of independence, instructor performance was categorized into full compliance, partial compliance, and no compliance with each best practice measure.

To establish a baseline for the experimental and control groups' performance when addressing research question three, Each AED best practice measure was compared

using the chi-square test of independence. No statistically significant difference was found between the experimental and control groups for any of the AED best practice measures during semester one of the study. Thus any statistically significant difference between the experimental group and the control group during the second semester can be attributed to the treatment effect overcoming any experience effect. For readability chi-square tables are only shown in the text for significant results. See Appendix R for the SPSS chi-square outputs for research question three.

Institutional Measures for Research Question Three. Since E-1, E-2, PR-1, and IP-1 were influenced by the institutional policy that prohibits online instructors from changing their course, these best practice measures were considered separately from other measures when addressing research question three. To realize any training effect, the training must have been strong enough to overcome both barriers to participant best practice implementation and the impact of the institution's policy to not modify parts of their courses.

To examine the treatment effect for the E-1 measure, the proportion of participants in both the experimental and control groups that met full compliance, partial compliance, and no compliance requirements were compared using data from the second semester of the study. A chi-square test of independence revealed the relationship between treatment and E-1 compliance was not significant χ^2 (2, n = 29) = 1.21, p = .55. Figure 26 shows the experimental and control group E-1 measures for semester two.
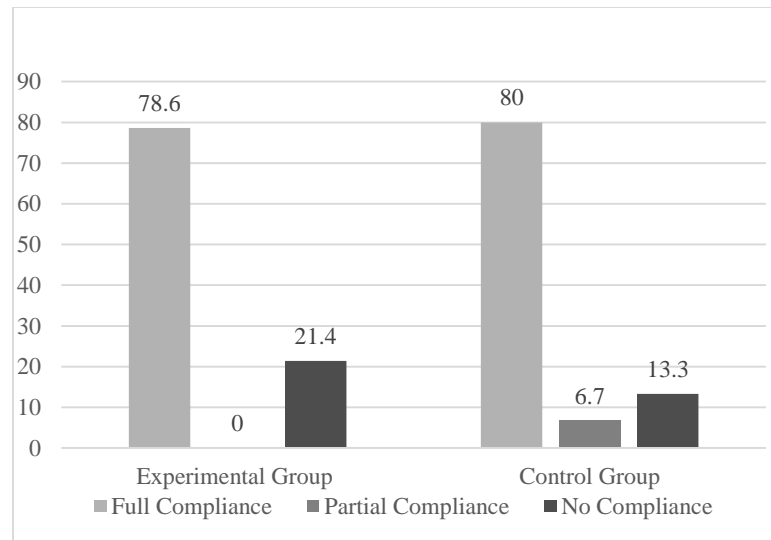
Figure 26. Experimental (n = 14) and control group (n = 15) E-1 (clear directions) second semester compliance rates.

Further examination of experimental group first semester performance revealed no change in compliance between semester one and semester two. This finding implied that either the training had no effect or the institutional policy counteracted any potential training effect in the E-1 measurement.

The E-2 standard addressed the presence of a grading rubric for the AEDs examined in both the trained and untrained groups. The treatment effect was assessed by comparing the proportions of E-2 compliance rates between the experimental and control group participants for the second semester in the study. The chi-square test of independence revealed the relationship between training and E-2 compliance was not significant χ^2 (1, n = 29) = .32, p = .450. Figure 27 shows the experimental group and control group E-2 measures during each of the measurement periods.
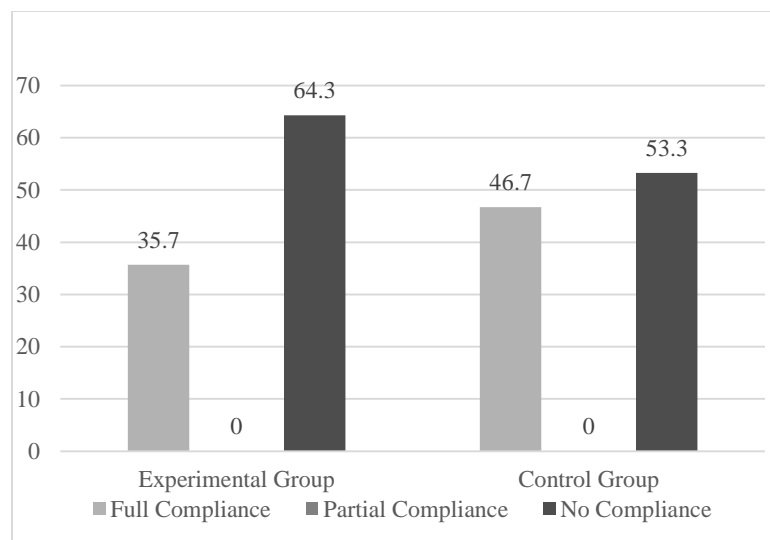
Figure 27. Experimental (n = 14) and control group (n = 15) E-2 (clear rubric) second semester compliance.

Examination of the experimental group individual participant data revealed the

same participants who did not meet the E-2 standard in semester one also did not meet

the E-2 standard in semester two. This finding implied the training either had no effect or

that the institutional policy cancelled out any potential treatment effect in the E-2

measurement.

The Delphi panel definition of the Participant Roles best practice, PR-1,

addressed the presence of role descriptions when a role assignment was present. As

explained previously, this definition did not address how often role assignments were

used in the AEDs examined. As a result, two subcategories were used to report findings

in this area. The IP-1A subcategory is the rate of compliance with the participant roles

best practice as defined by the Delphi panel. The PR-1B subcategory is the role use rate

for the AEDs examined in the study. Two experimental group participants and one

control group participant had role assignments present in the second semester. Role

descriptions were present for each case. This resulted in a PR-1A compliance rate of

100% for both experimental and control groups. Since there was no variation between groups, statistical analysis was not attempted.

The relationship between treatment and use of role assignments, PR-1B, was not significant χ^2 (1, n = 29) = 1.33, p = .249. *Figure 28* shows the percent of courses in the experimental group and the control group that used role assignments in semester two of the study.
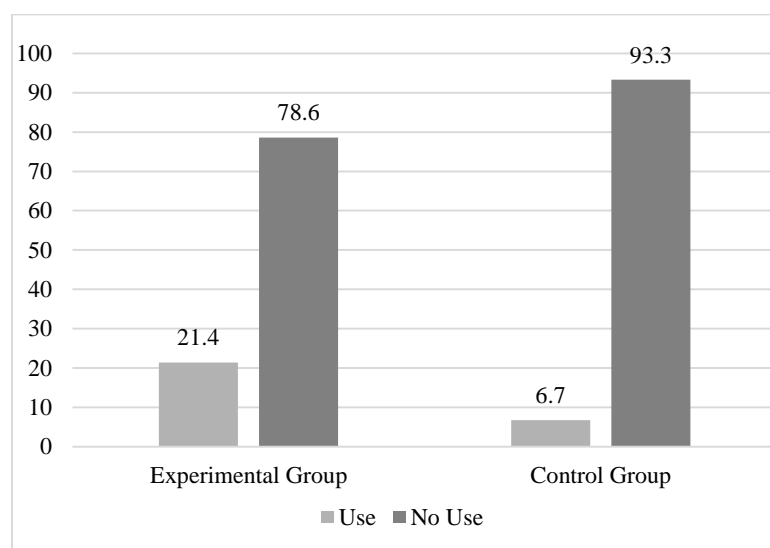
Figure 28. Experimental (n = 14) and control group (n = 15) PR-1B (roles used) use rate.

Most participants (78.6% and 93.3%) in the control and experimental groups did not use role assignments during the second semester of the study. Examination of the experimental group individual participant data revealed the same participants who had role assignments in semester one of the study also had role assignments in semester two of the study. This finding implied the institutional policy cancelled out any potential treatment effect in the IP-1B measurement or that the training had no effect.

The IP-1 best practice addressed instructors providing incentives for student performance. To address differences between the experimental and control groups in this area, compliance rates were compared between groups during the second semester of this

study. A chi-square test of independence showed the relationship between training and

IP-1 compliance was not significant χ^2 (2, n = 29) = 2.94, p = .230. *Figure 29* shows the

experimental and control group IP-1 measures for semester two.
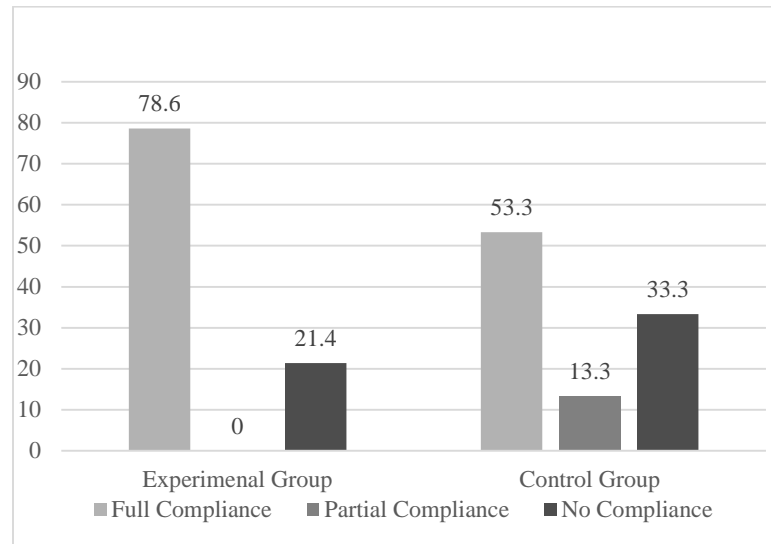
Figure 29. Experimental (n = 14) and control group (n = 15) IP-1 (individual incentives)

compliance rate.

More than three quarters (78.6%) of experimental group participants met the IP-1

standard as compared to just over half (53.5%) of the control group participants.

Additional examination of the experimental group performance between semesters one

and two revealed the number of participants in full compliance with IP-1 went from nine

to 11. During the same period, the number of participants who met full compliance

criteria dropped from nine to eight in the control group. These variations occurred only

in courses provided with a grade book item for the discussions examined. In courses

where no grade book item was provided, there was no variation in IP-1 compliance

between semesters for either the experimental or control groups. The implications of

these findings will be discussed further in Chapter V.

Institution AED Best Practice Profile for Research Question Three. Since E-1, E-2, PR-1, and IP-1 results appeared to be influenced by the institution's compliance with AED best practices, they were addressed separately in the AED best practice profile. Figure 30 shows the treatment effect on the profile of first and second semester online instructors as they were influenced by the institution's course design.

Figure 30. Experimental group (n = 14) and control group (n = 15) second semester institution influenced compliance rate.

The data indicated no significant differences between control and experimental group behavior for E-1, E-2, PR-1A, PR-1B and IP-1. This finding indicated the training effect was not strong enough to overcome both the barriers to participant implementation of the training and the impact of the institution's policy to not modify specific parts of online courses. The implication of the institution's policy on training instructors in AED best practices will be further addressed in Chapter V.

Participant Measures for Research Question Three. The DG-1 standard addressed the use of AED group sizes between five and 10 students. A chi-square test of independence revealed the relationship between training and DG-1 compliance was significant χ^2 (2, n = 29) = 8.74, p = .013. Table 11 shows the chi-square test of independence expected and observed counts for the experimental and control groups in semester two of the study.

Table 11. Experimental and Control Group Chi-Square Test of Independence Expected and Observed Counts for the Discussion Group Size Measure (DG-1) In the Second Semester of the Study

DG-1 Compliance	Observed and Expected Counts	Control Group	Experimental Group	Total
None	Observed Count	14	6	20
	Expected Count	10.3	9.7	20
Partial	Observed Count	0	2	2
	Expected Count	1	1	2
Full	Observed Count	1	6	7
	Expected Count	3.6	3.4	7
Total	Observed Count	15	14	29
	Expected Count	15	14	29

Four cells had expected counts of less than five. Fisher's exact test, p = .010, confirmed the significant relationship. The effect size was large V = .55. Figure 31 shows the experimental and control group DG-1 compliance rate during the second semester of the study.
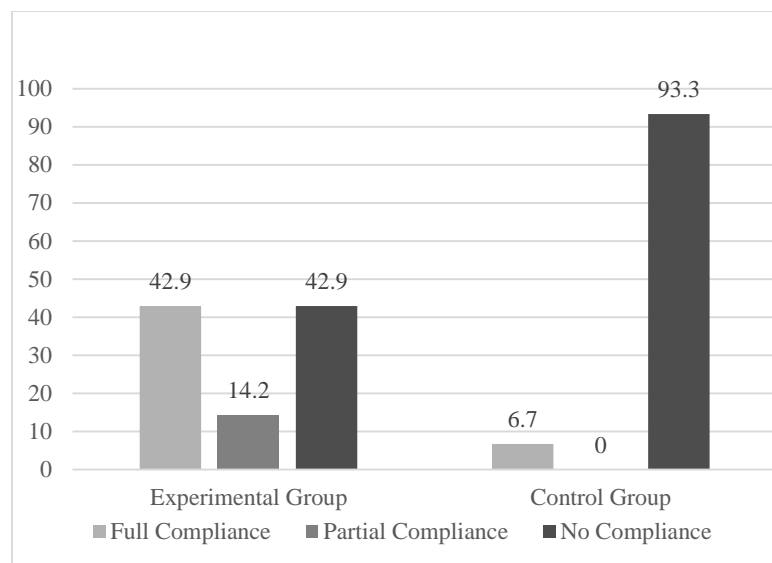
Figure 31. Experimental (n = 14) and control group (n = 15) DG-1 (discussion group size) second semester compliance.

The data show that the majority (93.3%) of second semester control group participants did not meet the DG-1 standard while nearly half (42.9%) of experimental group participants met the DG-1 standard after training. This finding indicated the training had a positive effect on second semester instructors creating AED groups composed of five to 10 students. The increased DG-1 compliance will be discussed further in Chapter V.

The IP-2 measure addressed the presence of group feedback in instructor posts for the AEDs examined. A chi-square test of independence revealed there was no significant training effect on IP-2 compliance χ^2 (2, n = 29) = 3.13, p = .210. *Figure 32* shows the IP-2 compliance rates for the experimental and control groups during the second semester for the study.
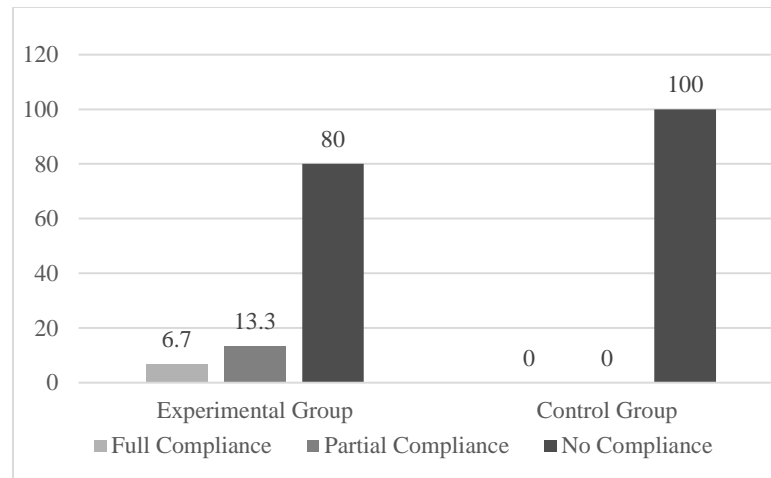
Figure 32. Experimental (n = 14) and control group (n = 15) IP-2 (group incentives) second semester compliance.

None of the control group participants attempted to engage in group feedback via instructor posts in any of the AEDs examined in the study. Only three experimental group participants attempted IP-2 compliance in the second semester. These findings implied written feedback for groups in the instructor's AED posts was not a preferred method for group feedback and the training effect was not strong enough to overcome the lack of preference.

The PISI-1 best practice measure addressed the instructor promoting informal social interaction. Both control and experimental group instructor AED posts for the second semester of the study were downloaded from the institution's LMS. A team of three research assistants with an inter-rater reliability of .929 coded the instructor participant posts for evidence of PISI-1 compliance. A chi-square test of independence revealed the relationship .between training and PISI-1 compliance was not significant χ^2 (2, n = 29) = 4.31, p = .146. *Figure 33* shows the experimental and control group PISI-1 measures during each of the measurement periods.
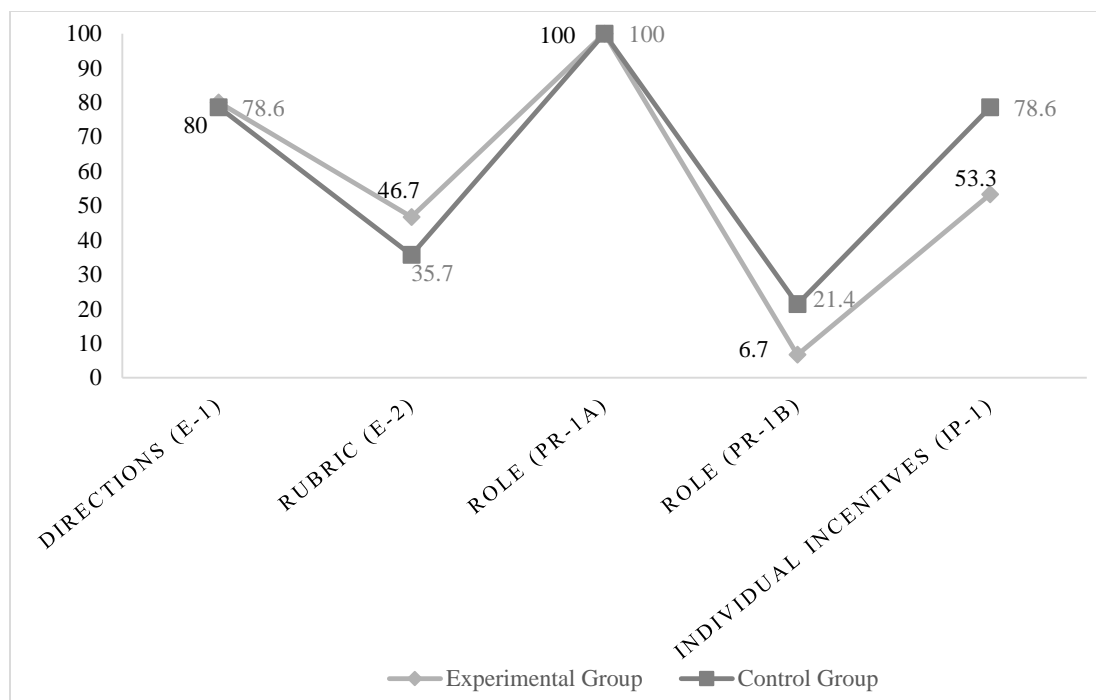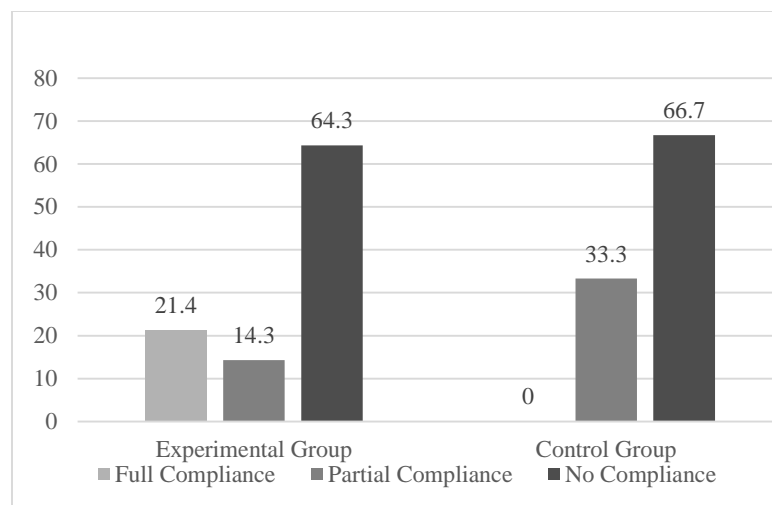
Figure 33. Experimental (n = 14) and control group (n = 15) PISI- 1 (promotes informal social interaction) second semester compliance.

None of the control group participants were fully compliant with PISI-1 during the second semester while three of the experimental group participants were fully compliant during the same semester. However, individual participant data revealed that two of those three experimental group participants were also fully compliant with PISI-1 requirements in semester one as well. This indicated little change in PISI-1 behavior for the experimental group between the first and second semester.

The IPD-1 best practice measure addressed the minimum level of instructor participation (no less than 1% of posts) in the AEDs examined. A chi-square test of independence was used to evaluate the relationship between training and IPD-1 compliance which was not significant χ^2 (2, n = 29) = .97, p = .608. *Figure 34* shows the experimental and control group IP-1 measures during semester two.
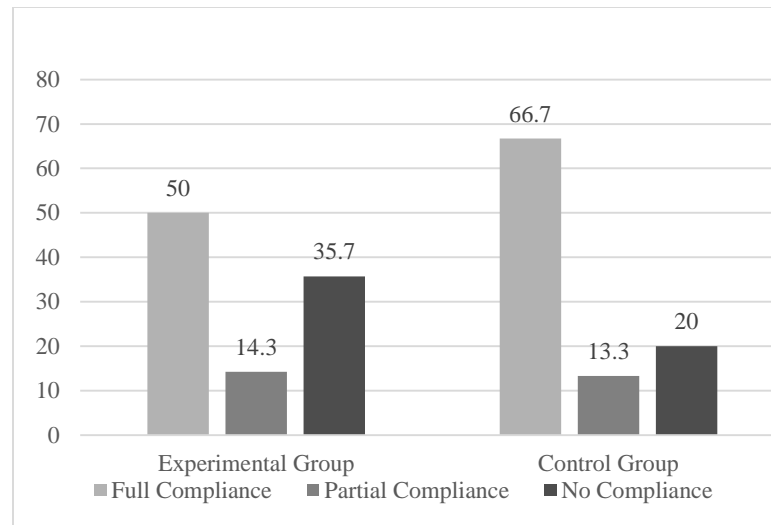
Figure 34. Experimental (n = 14) and control group (n = 15) IPD-1 (minimum participation) second semester compliance.

Only half of the experimental group participants were fully compliant during the second semester while nearly two thirds of the control group participants were fully compliant during the same measurement period. This finding indicated that the treatment did not enhance compliance in instructor AED participation at the minimum level as compared to teaching experience alone.

The IPD-2 measure addressed the maximum level (no more than 20% of posts) of instructor participation in the AED's examined. A chi-square test of independence revealed the relationship between training and IPD-2 compliance was not significant χ^2 (1, n = 29) = 1.03, p = .311. *Figure 35* shows the experimental and control group IPD-1 compliance rates during semester two of the study.
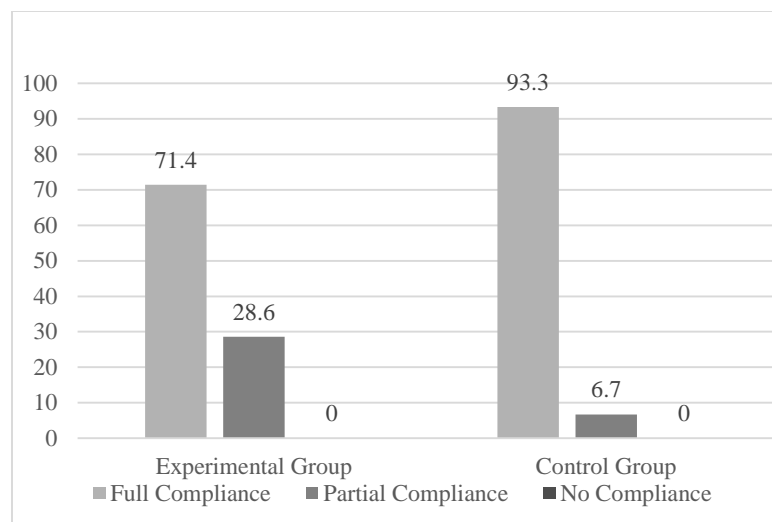
Figure 35. Experimental (n = 14) and control group (n = 15) IPD-2 (maximum participation) second semester compliance.

It appeared the majority of both experimental and control group participants consistently met the IPD-2 measurement requirements. None of the participants fell into the no compliance category during semester two. Four experimental group participants met the IPD-2 standard for one of the measurement weeks in the second semester but not the other. Likewise, only one control group participants met the IPD-2 standard during one of the two measurement weeks in the second semester. This indicated participating over 20% of the time was not a consistent behavior in both the control and experimental groups.

Treatment Effect on the Best Practice Profile. To address research question three, the IP-2, DG-1, PISI-1, IPD-1 and IPD-2 measures were compared between the experimental and control groups during the second semester of the study. These measures were representative of new online instructor behavior and were not influenced by the institution's policy for instructors to not change some parts of their online course. Figure 36 shows the profile of the experimental and control groups for semester two of

the study. Each profile data point represents the percent of instructor participants who

were compliant with each of the identified best practice measures.
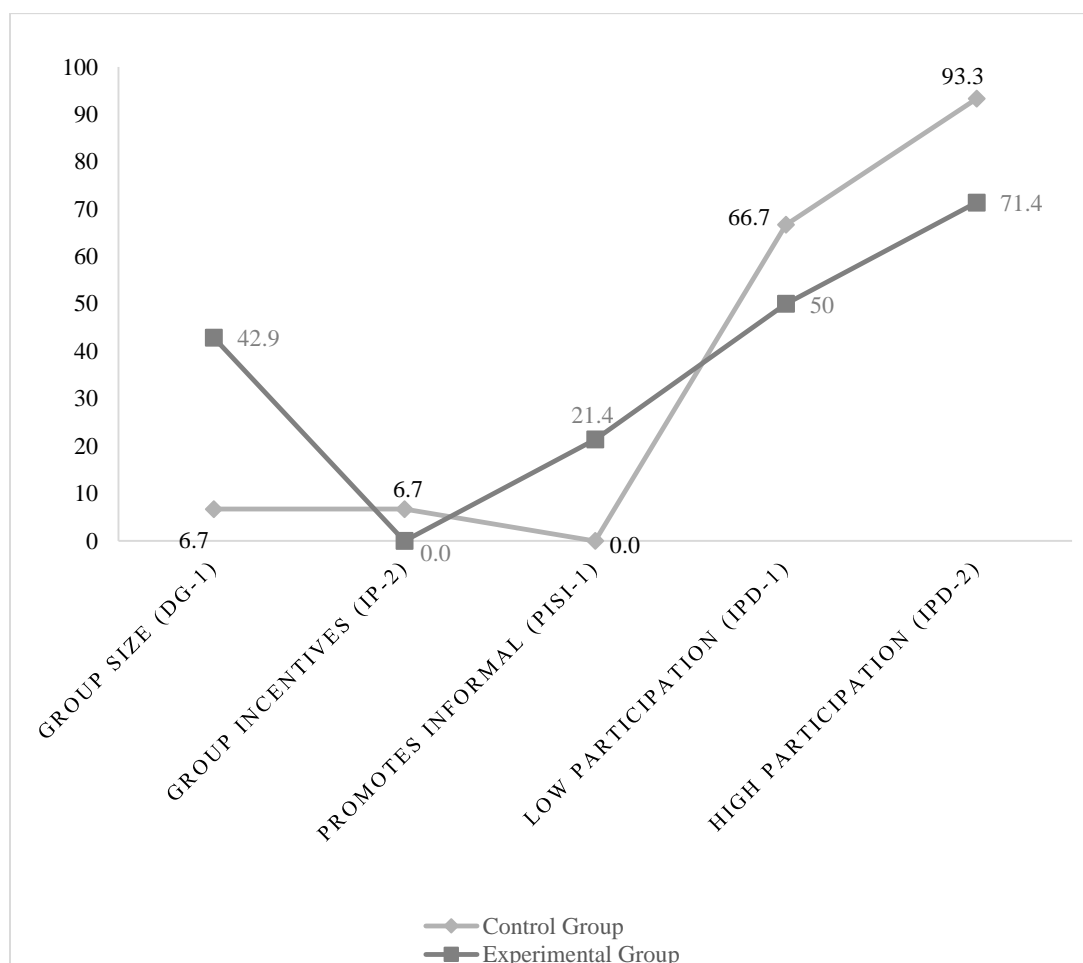
Figure 36. Best practice profile of experimental (n = 14) and control group (n = 15)
group participants for semester two.

The training effect was significant in the area of discussion group size, DG-1.

The training effect did not overcome the experience teaching effect in any of the other

AED best practice areas. Implications of these findings will be discussed further in

Chapter V.

Summary

This study addressed three research questions, each examining a number of best

practices. The results for each research question were divided into two categories. The

first category was the institution influenced best practice measures for each research question. The E-1, E-2, PR-1, and IP-1 AED best practice measures were influenced by institutional policies. Because of this, they were interpreted as the institution's compliance with the AED best practices and were considered separately from other measures when addressing each research question. The second category was the study participant's best practice measures for each research question. The IP-2, DG-1, PISI-1, IPD-1, and IPD-2 measures represent instructor behavior not influenced by institutional policies.

The first research question addressed first semester instructor AED best practice behavior.

1. What is the AED best practice implementation profile for first semester online instructors at a private western undergraduate institution?

The research question one results for the institution influenced measures showed varying compliance rates between measures. The E-1 (82.8%), PR-1A (100%), and IP-1 (62.1%) measures had the highest compliance rates while the E-2 (37.9%), and the PR-1B (10.3%) measures had the lowest compliance rates. The research question one results for the measures not influenced by the institution also showed varying compliance rates. The IPD-2 (82.8%) and IPD-1 (43.8%) measures had the highest compliance rates while the DG-1 (20.7%), IP-2 (3.4%), and PISI-1 (6.9%) measures had the lowest compliance rates.

The second research question explored the effect of online instructor teaching experience on AED best practice implementation.

2. Is there a statistically significant difference in the AED best practice

implementation profile for untrained instructors between the first and second

semester of online teaching?

A chi-square test of goodness of fit was used to compare semester two best

practice compliance with the baseline compliance in semester one. No statistically

significant difference was observed between semester one and semester two for any of

the institution influenced measures. There was one statistically significant finding for the

participant measure IPD-1, which indicated instructors participated in AEDs above the

minimum level more often during their second semester of teaching.

The third research question addressed the effect of training on the instructor AED

best practice implementation profile.

3. Is there a statistically significant difference in the AED best practice

implementation profile between untrained instructors and those who receive

specific training on AED best practice implementation?

A chi-square test of independence was used to compare the control group with the

experimental group AED best practice compliance during semester two of the study.

Examination of the institution influenced measures resulted in no statistically significant

differences between the experimental and control groups. Examination of the participant

measures, measures not influenced by the institution policy, resulted in a statistically

significant finding for DG-1. This indicated study participants were more likely to use

discussion group sizes being between five and 10 students if they took part in the

training.

CHAPTER V

Conclusions

The purposes of this study were to determine what AED best practices were implemented by first semester online instructors and to determine if there was a difference in AED best practice implementation between AED best practice trained and untrained online instructors during their second semester of online instruction. A review of literature resulted in the identification of six AED best practices. Each of these AED best practices were operationalized using both the literature and an expert Delphi panel to create an instrument for measuring AED best practices. Training was then developed based on the target best practice behaviors identified by the Delphi panel. This training was given to new online instructors starting their second semester of instruction at the participating institution. The following research questions were addressed in this study.

Research Questions

The first research question explored what the AED best practice implementation looks like for first semester online instructors.

> 1. What is the AED best practice implementation profile for first semester online instructors at a private western undergraduate institution?

The second research question explored the effect of online instructor teaching experience on AED best practice implementation.

2. Is there a statistically significant difference in the AED best practice
implementation profile for untrained instructors between the first and second
semester of online teaching?

The third research question addressed the effect of training on the instructor AED best practice implementation profile.

3. Is there a statistically significant difference in the AED best practice
implementation profile between untrained instructors and those who receive
specific training on AED best practice implementation?

Institutional Policy Influence

As noted in chapter three, participants in this study did not create the courses they taught during this study. While participants in the study had the ability to edit the courses on the participating institution's LMS, they were prohibited from doing so by the institution's policy. Significant changes to the course could be made at the participant's request if approved by the course council for that particular course. For this reason, the study attempted to identify and focus on AED practices under the control of the instructor participants rather than the course council's design of the course in question. However, when data were gathered using the AED Best Practice Rubric, it was discovered that the E-1, E-2, PR-1, and IP-1 best practice measures were influenced by the participating institution's policy regarding course modifications. The impact of the participating institution's policy was that data for the E-1, E-2, PR-1, and IP-1 AED best practice measures were produced through a combination of course designers, participant behaviors and participant compliance with the institution's policy to not change the course. This resulted in data for the E-1, E-2, PR-1, and IP-1 AED best practice

measures being interpreted as the institution's compliance with AED best practices and will be referred to as the institution's compliance throughout this chapter. The institution's compliance will be addressed separately in each research question.

Research Question One Conclusions

Research question one addressed the baseline profile of online instructors during their first semester of instruction. Data to address this question were gathered using the AED Best Practice Rubric during week five and week nine of the first semester of instruction for all participants in the study.

Institution measure conclusions for research question one. In areas where the first semester online instructor's AED best practice profile was influenced by the institution's policy, the mean AED best practice compliance rate was higher than the new online instructor's mean compliance rate for AED best practices not influenced by the institution's policy. *Figure 37* shows both the institution's compliance best practice profile and the first semester online instructor's best practice profile.
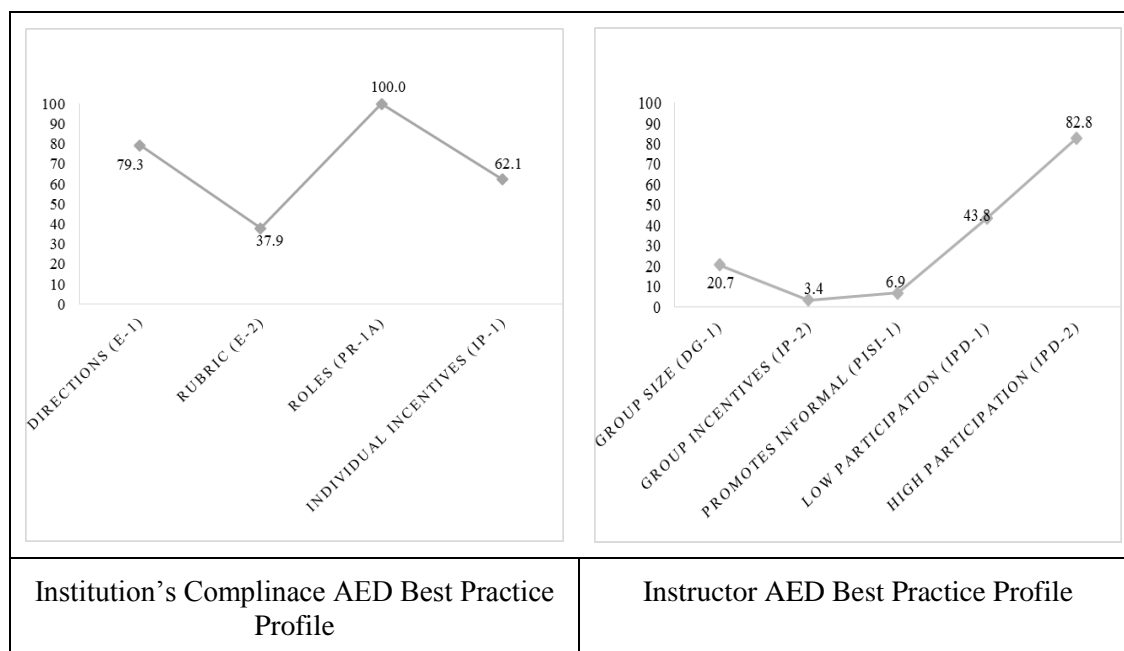
Figure 37. Institution's complinace and instructor AED best practice profile for the first semester in the study (N = 29).

Three of the institution's AED best practice compliance rates were above 60% with the fourth and lowest compliance rate at 37.9%. Only one of the instructor's AED best practice compliance rates was above 60% with lowest two being below 10%. The mean compliance rate for the instructor AED best practice measures DG-1, IP-2, PISI-1, IPD-1 and IPD-2 was 31.56%. The mean compliance rate of the institution influenced AED best practice measures E-1, E-2, PR-1A and IP-1 was 69.83%. This implied that where AED best practices were literally built into the courses at an institutional level, it had a positive effect on AED best practice use by new online instructors.

However, predesigned courses could also limit AED best practice implementation. Compliance with the PR-1A best practice required providing role descriptions whenever discussion roles were assigned. As pointed out in Chapter IV, only four instructors used assigned roles. Those four instructors all met the PR-1A standard by having role descriptions in the discussion directions when role assignments

were used in the AED. The other 25 instructors could have assigned roles and provided role descriptions in the instructor notes feature in the LMS, but none of them did during the first semester. This indicated that when supported by the course design, role assignments were used and the PR-1A best practice was met. However, when the PR-1A best practice was not supported by the course design, new online instructors did not attempt to include role assignments in the AEDs examined.

Examination of the IP-1 best practice revealed similar results. The IP-1 best practice required instructors to give feedback to 100% of students on their performance in the AED. In the IP-1 best practice, nearly a quarter of participants (24.1%) were not provided with grade book items by the institution for the AEDs examined. Of those seven instructors not provided with a grade book item, not one met the IP-1 standard at either measurement point during the first semester. In theory, those instructors not provided with a grade book item could have given written feedback to each student. Instructors could have accomplished this by posting written feedback in the AED for each student but none of the instructors did so.

In contrast, of the 22 instructors that were provided with a grade book item, 18 (81.8%) met the IP-1 standard by giving a grade to every student for the discussions examined. Inclusion of a grade book item by course designers appeared to make the difference between no compliance and 81.8% compliance. In cases where there was no grade book item provide by course designers, the course design appeared to inhibit instructor AED best practice implementation. In cases where the course designers provided grade book items, it appeared the course design enhanced AED best practice

implementation. It may have been that the presence of a grade book item implied an expectation for the instructors to use it.

Even though the IP-1 AED best practice implementation increased when a grade book item was provided, there were still four instructors that were provided with a grade book item but did not give grades to all of the students for the AED's examined. Two of those four instructors gave grades to all but one student in the AED examined. Another instructor gave grades to all but three students. The last instructor failed to give grades to four of the students in the AED examined. This discovery led to the question why did those four instructors fail to give grades to all of the students? The first measurement period was during week 5 of the semester. It was possible that the students not given grades dropped the class but were not removed from the system at the point of the first measurement period and therefore the instructor did not bother to give them a grade. It may have also been that there was an instructor error in that they simply missed giving a grade to one or two students.

Further examination of the institution's LMS revealed that the second explanation was likely the case. When an instructor logs into the LMS, a home page window opens. Among other navigation and information options, a dashboard appears that provides a list of assignments to be graded. Those assignments are organized by assignment title and date submitted. The dashboard also provides the student name. The most streamlined way to enter grades for those assignments is to use the dashboard to access the assignments. A brief informal poll of this researcher's colleagues reveled the dashboard was also the most frequently used method for entering grades on the LMS. This was because the dashboard lists all assignments for a course that have not been graded in

chronological order. And, once the instructor enters a grade, the LMS synchronizes the grade in the course grade book and drops the student off from the dashboard list for that particular assignment. By using the dashboard, the instructor can easily know what assignments have been waiting the longest to be graded. They can also see the volume of grading that needs to be done for the entire class rather than just one assignment at a time.

The participating institution's LMS dashboard had a flaw that interfered with the instructor assigning grades to all students in a discussion. For example, when the instructor engaged in the AED grading task, the LMS provided the instructor with a list of all the students that needed an AED graded on a dashboard feature. When an instructor selected a student from the list, the LMS opened up a new window that contained the AED posts by the student, and several command options for the instructor to choose from. Those options included submit score, excuse, allow retry, or continue later. If the instructor selected the "continue later" option, the item was dropped off the dashboard list of students needing grades and it did not reappear when the system was accessed later. To discover the missing grade, the instructor would have had to open up the course grade book containing all students' grades and notice one of the students' grades was missing. Since the LMS default setting excluded missing grades when calculating student performance in the course, students may not have noticed the missing grade either as it would not have adversely impacted their overall grade. This discovery indicated that in addition to course design, the LMS design also had an impact on AED best practice implementation.

The LMS may have also influenced course designer preferences. As previously discussed in Chapter III, the online courses at the participating institution were designed

and developed by a design team made up of an instructional designer and full time faculty with experience in teaching the course at the institution. Once the course was designed and developed, it was turned over to a contract adjunct instructor to teach. When examining AED best practices that could be designed into the course, it was observed that they were not all equally used. Those that appeared less favored by designers included the E-2 AED best practice, which required the presence of performance rubrics. The E-2 AED best practice was only met 37.9% of the time. All but one of the 12 instructors that had a performance rubric present met the E-2 AED best practice standard. It may have been that the low compliance rate with E-2 was because the designers were not aware of or did not understand the benefits of rubrics in AEDs. It could also be that the designers lacked the skills necessary to develop rubrics. These possible explanations will be discussed further in the recommendations for research section of this chapter.

The low compliance rates in the institution's measures may also have been due to a simple preference on the part of the course designers. A potential example of designer preference was with the PR-1A best practice, which required participant role descriptions to be present when role assignments were used. The designers that used participant roles met the PR-1A best practice 100% of the time. But, only four (13.8%) instructors in the study had roles designed into the AEDs examined. This observation indicated there was a preference on the part of designers not to use roles in AEDs. This preference was also reflected in the Delphi panel definition of the PR-1A best practice for the participating institution. The Delphi panel modified the original language of the PR-1A definition with the phrase "When roles are assigned;" thus making role use optional in AEDs. Both

these facts may be evidence of a lack of understanding of the value of role assignments in AEDs on the part of the designers and the Delphi panel.

While instructors in the study were restricted from modifying design features in their courses by the institution's policy, they all had the computer authorization to do so. However, none of the instructors modified the design features between week five and week nine in the first semester. There were several possible explanations for this observation. It may have been that the instructors were complying with the institution's policy in order to maintain employment. It may also have been that due to the course being designed for them, the instructors did not have enough of a sense of ownership of the course to modify it. And, it may also have been that the instructors lacked the technical skill to modify course elements in the institution's LMS.

Participant measure conclusions for research question one. Three of the five AED best practice profile measures (IP-2, PISI-1, DG-1, IPD-1, & IPD-2) had less than a 25% compliance rate for new online instructors. The new instructor AED best practice profile was consistent with Bero et al. (1998) who found that best practices rarely find their way to real world application on their own merit. This low compliance rate finding also supported Berry's (2008) identification of the need to train instructors in AED best practices.

Two of the five AED best practice profile measures had compliance rates above 40%. A review of the nature of each of the AED best practices revealed a possible explanation of why some were used less frequently and others used more frequently. It may have been that the effort required to meet the standard influenced the new online instructor's compliance. The AED best practices that required less active repetitive effort

on the part of the instructor had higher compliance rates. For example, IPD-2 had a

compliance rate of 82.8%. According to the Delphi panel definition of the IPD-2 best

practice, participant posts must have been less than 20% of the total posts in the AED

examined. This meant that participants could do nothing and still meet the criteria.

However, to be compliant with the DG-1 standard, participants must have actively

organized the students into groups with between 5 and 10 students. This could be done

using the LMS before the start of each discussion. Table 12 shows the AED best practice

standard, the compliance rate, and the type of effort on the part of the instructors required

to meet the standard.

Table 12. Instructor Effort for AED Best Practice Compliance

AED Best Practice	Compliance Rate	Type of Effort	Effort Description	N
IP-2	3.4%	Active multiple times	Give written performance feedback to each group	29
PISI-1	6.9%	Active multiple times	Give written encouragement for informal social interaction	29
DG-1	20.7%	Active one time	Assign students to groups	29
IPD-1	43.8%	Active frequency varies	Make at least 1% of discussion posts	29
IPD-2	82.8%	Passive	Don't make too many posts	29

Those AED best practices that required active and repetitive efforts had

compliance rates of less than 10% while those that required passive or minimal active

efforts had compliance rates of more than 20%. The IPD-1 standard had the highest

compliance rate for the standards that require active effort. What was unique about the

IPD-1 standard, when compared to other standards requiring active effort, was that the

active effort for IPD-1 could be generic. Any type of instructor post would meet the criteria for one post in 100 required by the IPD-1 standard. Active effort required by the IP-2 and PISI-1 standards also require specific content in the instructor posts. These observations can be summarized in an observation that may help in understanding the barriers to AED best practice implementation. The less active and specific effort required by the AED best practice, the more likely the AED best practice is to be implemented by first semester online instructors.

Another finding that required further discussion was related to the IPD-2 standard. Those instructors that went over the 20% maximum participation rate requirement (IPD-2) had between one and 31 student posts in their AEDs. The number of instructor posts for those same AEDs was between one and eight posts. The instructors that met the IPD-2 standard made between two and 19 posts. This observation indicated that the instructors who did not meet the IPD-2 best practice standard did not make more posts than other instructors, but the students made fewer posts than students in other AEDs. Several explanations for this observation are addressed below.

It was possible that the course subjects influenced the instructor IPD-2 compliance. To investigate that possibility, the courses subjects for each of the IPD-2 non-compliant instructors were compared. The courses covered the subjects of Art, US Constitution, Computer Science, Child Development, and Spanish. Other instructors who met the IPD-2 standard taught two of these discussion topics, US Constitution and Spanish, in other sections of the same course. This indicated that these two course subjects did not influence IPD-2 compliance. Examination of the remaining course

subjects (Art, Computer Science, & Child Development) revealed no pattern that appeared to contribute to instructor IPD-2 compliance.

Another possibility was that the purpose of the discussion influenced the participation rate of the online instructor in the AEDs examined. A comparison of the discussion directions and prompts revealed two categories of discussion purposes. The first category was question and answer AEDs. In these AEDs the students were to ask questions about material covered in the course and both the students and the instructor were to address the questions asked. The two instructors with the highest participation rates were engaged in question and answer AEDs where students were invited, but not required, to ask questions for others to answer. Two of the 24 instructors that met the IPD-2 standard also used the question and answer AED format, but they did not participate in the AEDs and neither did the students. This indicated that the question and answer AED format produced little to no participation. It may be that the question and answer AED format is not effective at producing an actual discussion. This seems to have been counterproductive for instructors attempting to meet the IPD-2 standard. The second category was student interaction AEDs. The other three instructors that did not meet the IPD-2 best practice were engaged in AEDs where the students were intended to interact with one another on a discussion topic. However, the majority of instructors that met the IPD-2 also used the second category (student interaction) of discussion purposes. Because of this, there did not appear to be any clear pattern that would explain over participation by the instructors based on AED purpose.

There may also have been an interaction between the AED best practices. Since the IPD-2 non-compliant instructors did not post more than IPD-2 compliant instructors,

influences on student participation were more closely examined. Table 13 shows the

instructor participation rate for the AEDs that did not meet the IPD-2 standard and the

other AED best practices that were met for the same AED.

Table 13. IPD-2 Non-compliance with Other AED Best Practices

Instructor participation	AED best practice compliance							
	*E-1	*E-2	PR-1	*IP-1	IP-2	*DG-1	PISI-1	IPD-1
50%								X
29.41%								X
25%								X
21.05%	X			X		X		X
20.83%			X					X
20.51%	X					X		X

Note: instructor participation at 25% and 50% was the same instructor in two different AEDs during semester one of the study.
*AED best practices linked to student participation in the literature.

To meet the IPD-2 best practice, instructor posts must have been 20% or less of

the total posts in the AED examined. Since the IPD-1 AED best practice addressed

minimum participation of the instructor and required instructor posts to be at least 1% of

the total, any instructor failing to meet IPD-2, by over-participating, would be guaranteed

to meet the IPD-1 (under-participating) best practices. The instructors that had the

highest percentage of posts (25% - 50%) did not meet any AED best practices other than

the IPD-1 best practice. The other three instructors that did not meet the IPD-1 best

practice met some, but not all, of the AED best practices that were linked to increased

student participation in the literature.

Those AED best practices linked to student participation in the literature include

E-1 (Dennen, 2005), E-2 (Gilbert & Dabbagh, 2005), IP-1 (Dixson et al., 2006), and DG-

1 (Bliss & Lawrence, 2009; Roberts et al., 2006; Schellens & Valcke, 2006). The IP-1

AED best practice standard that required individual student incentives to perform, was

only met by one of the instructors that did not meet the IPD-2 standard. The E-2 standard

required the presence of a grading rubric that contained grading criteria for timely

contributions to the AED on the part of the student. Such grading rubrics were not

present for any of the instructors that did not meet the IPD-2 standard. The E-1 standard

required discussion deadlines and student participation requirements. The E-1 standard

was only present for two of the instructor's that did not meet the IPD-2 standard.

Conversely, the instructors that met the IPD-2 standard used best practices that

promote student participation more often. Table 14 shows the number of times

instructors that met the IPD-2 standard and instructors that did not meet the IPD-2

standard used other AED best practices that enhance student participation.

Table 14. IPD-2 (Maximum Participation) Non-compliant and IPD-2 Compliant
Instructors with Other AED Best Practices

AED Best Practices that support student participation	Number of times met by IPD-2 non-compliant instructors (n = 5)	Percent IPD-2 non-compliant instructors meeting the best practice	Number of times met by IPD-2 compliant instructors (n = 24)	Percent IPD-2 compliant instructors meeting the best practice
E-1	2	40%	21	87.5%
E-2	0	0%	10	41.7%
IP-1	1	20%	16	66.7%
DG-1	2	40%	8	33.3%
Mean compliance		25%		57.3%

The five instructors that did not meet the IPD-2 best practice had a mean

compliance of 25% for the E-1, E-2, IP-1, and DG-1 AED best practices. The 24

instructors that met the IPD-2 standard had a mean compliance rate of 57.3% for the E-1,

E-2, IP-1, and DG-1 AED best practices. This observation indicated a potential

relationship between the IPD-2 best practice and the E-1, E-2, IP-1, and DG-1 best

practices. The Delphi panel defined the IPD-2 measure as a ratio between the number of

times an instructor posted and the total number of posts in an AED. While that method

was consistent with measurement methods found in the literature (Mazzolini &

Maddison, 2003) it created a situation where instructor behavior was linked to student

behavior. Because of this, IPD-2 compliance may be at least partially dependent on

compliance with the E-1, E-2, IP-1, and DG-1 best practices. Or, it may have been that

the presence of multiple best practices linked to promoting student participation (E-1, E-

2, IP-1, & DG-1) contributed to the instructors meeting the IPD-2 best practice in this

study.

   Research question one summary. In summary, the institution measures for

research question one revealed the participating institution's approach of designing

courses for the online instructors could have a positive impact on AED best practice

implementation if done correctly. It could also have a negative impact on AED best

practice implementation if the designers did not include AED best practices in the course

design and instructors did not make corrections. Examples of this positive and negative

effect include the IP-1 best practice and the PR-1 best practice. Only those instructors

provided with the appropriate course design attempted to meet the identified AED best

practice. Those that were not provided with the appropriate course design did not attempt

to meet the identified AED best practices. A flaw in the LMS also impacted AED best

practice implementation in the IP-1 AED best practice. There also appeared to be course

designer preferences to not use participant roles and performance rubrics. These

preferences may be due to a lack of understanding the benefits in using those best

practices or a lack of skill designing them into the online courses. None of the instructors

appeared to modify their course between weeks five and nine of the study that indicated a

willingness to comply with the institution's policy. Instructors may also have not

changed their courses because they did not have the time, technical skill, or enough of a sense of ownership of the course to modify it.

Even the best practices under the instructor control were often not implemented by first semester online instructors. This finding was consistent with the literature (Bero et al., 1998: Berry, 2008). It appeared the lower the active and specific effort required by the AED best practice, the more likely the AED best practice was to be implemented by first semester online instructors. In the IPD-2 best practice, instructors that over participated did not participate more than other instructors, but the students participated less than other students. Possible reasons for this observation were investigated such as course topic or purpose of the AED. However, evidence in support of those reasons was weak. A more plausible explanation may be the existence of an interaction between student participation and instructor participation. The E-1, E-2, IP-1, and DG-1 AED best practices were shown in the literature to correlate with increased student participation in AEDs. Instructors that demonstrated compliance with the IPD-2 best practice had a mean compliance rate of 57.3% with the E-1, E-2, IP-1, and DG-1 AED best practices. Instructors that were not complaint with the IPD-2 best practice had a mean compliance rate of 25% with the same best practices.

Research Question Two Conclusions

Research question two addressed the experience effect on new online instructor practices between the first and second semesters. To explore this question, the control group was not trained in AED best practices and their performance was compared over two semesters. Each of the AED best practices was measured for the control group during weeks five and nine of both semesters one and two of the study. A chi-square test

of goodness of fit was used to examine differences in the control group AED best

practice compliance between the first and second semester of the study.

Institution measure conclusions for research question two. The institutional

compliance with AED best practices E-1, E-2, PR-1A, and IP-1 was not significantly

different for the control group between semester one and semester two of the study. This

lack of change in control group AED best practice compliance provide opportunity for

insight into the impact the participating institution's approach to managing online courses

had on AED best practice implementation.

The E-1, E-2, PR-1A and IP-1 best practices required course design features to be

present that were created by the course designers. It appeared designing AED best

practices into the course and discouraging instructors from changing them may have

contributed to the observed consistency and higher level of compliance during the first

and second semesters. As with the first semester performance, the institution's AED best

practice mean compliance rate (69.28%) for semester two of the study was also higher

than the individual instructor's mean compliance rate (33.36%) for semester two of the

study. This could mean the institution's policy helped new online instructors engage in

AED best practices through designing the best practice into the course. Institution

designed courses could be one way to fulfill Berry's (2008) call for education leaders to

implement AED best practices.

However, the institution's compliance also did not improve between semesters for

the control group and, in some cases appeared to impede AED best practice

implementation on the part of the instructors. For example, the same instructors that

were not provided with a grade book item by the institution in semester one of the study

were also not provided with a grade book item in semester two of the study.

Consequently, those instructors without a grade book item were the only instructors that

demonstrated no compliance for the IP-1 best practice in the study. These instructors not

provided with a grade book item could have technically created one on their own but they

did not do so. This example is consistent with Dennen's (2005) observation of the

consequences of poor design in AEDs.

The same pattern was also observed for the E-1 and E-2 AED best practices. All

the methods for meeting the E-1 and E-2 AED best practices observed in this study were

created by the course designers. For instructors to meet the E-1 and E-2 AED best

practices when they were not designed into the course, they would have had to violate the

institution's policy by changing course design elements themselves. None of the control-

group instructors made modification to their course in these areas.

The lack of change between semesters indicated that instructors did not make

efforts to modify those portions of the course developed by the course designers. It may

have been that control-group instructors lacked the time, skill, or knowledge necessary to

modify portions of their course. It was also likely that the institution's policy

discouraged instructor modifications to the course and all of the control-group instructors

were compliant with that policy. This compliance may have been due to the fact that the

instructors in this study were working on a semester-by-semester contract. Violating the

institution policy to not modify their course during their first two semesters would likely

increase their chances of not being contracted to teach online courses in the future. Thus,

new online contract instructors, who had less standing than other instructors at the

institution, may have had limited desire to modify the course to meet AED best practices.

Participant measure conclusions for research question two. Four of the five participant measures showed no statistical difference for the control group between semesters one and two of the study. Those best practice measures included DG-1, IP-2, PISI-1 and IPD-2. Each is addressed below.

Two control-group instructors were fully complaint, three were partially compliant, and 10 demonstrated no compliance with the DG-1 best practice during the first semester. During the second semester, only one control-group instructor was fully compliant, none were partially compliant, and 14 were not at all compliant with the DG-1 best practice. While not a statistically significant difference, this resulted in a 26.6% drop in the number of control-group instructors who were at least partially compliant with the DG-1 best practice during the second semester.

This finding led to the question why did those four control-group instructors that demonstrated at least some DG-1 compliance during the first semester, not demonstrate any compliance during the second semester? One possible answer has to do with the method used to create AED groups. Creating groups in the participating institution's LMS did take some knowledge and skill. Once the technique was learned, however, it was quite simple to use. The other methods for instructors to create AED groups was for instructors to create groups during the AED itself using instructor posts, or give group assignments in the instructor notes feature in the participating institution's LMS. These methods did not require as much technical skill but they did pose organization and maintenance problems. For example, instructors that assigned groups using these methods were frequently asked questions by the students about who was assigned to which group or where to find the group posts.

It may also have been that the control-group instructors found the challenge of managing groups, distracted from the outcomes they were seeking and thus stopped assigning groups over time. This explanation is consistent with Hoya and Spero (2005), and Palmer (2011). Hoya and Spero (2005) found teaching efficacy to significantly decrease in the first year of teaching experience. They theorize that during the first year of teaching, instructors experience failures and discover teaching is more than applying techniques, and as a result they become unsure of their skills. Palmer (2011) found teaching efficacy was significantly impacted by instructor's cognitive perception that they understand how to teach. Frequent student questions about the organization of the AED groups may have led to the perception of control-group instructors that they did not understand how to successfully organize students into discussion groups. This could have led to them stopping their attempts to do so in the second semester.

It may also have been that control-group instructors lacked knowledge of the benefits of creating discussion groups with five to 10 students. This is consistent with observations in the literature (Bero et al., 1998: Berry, 2008). Educating instructors on the benefits of the DG-1 best practice along with identifying and teaching the skills to implement the DG- best practice in their LMS may increase compliance with the DG-1 standard.

The IP-2 standard required the online instructor to give group incentives to participate in the AED. Only one control-group instructor in each semester demonstrated full compliance with the IP-2 standard. Two other control-group instructors demonstrated partial compliance in each semester. This resulted in only four (26.7%) instructors demonstrating any effort to meet the IP-2 best practice. This may have been

because new online instructors are not aware of the IP-2 best practice. That supports De Simone's (2006) and Thompson's (2006) calls to educate new online instructors on AED this best practices.

It may also have been that course design structures did not adequately support instructor performance in this area. To meet the IP-2 standard, instructors were required to post written comments addressing group performance on the AED examined. This method may have been cumbersome for new online instructors as there was no LMS feature in place to remind the instructor of the need for this type of AED post.

None of the control-group instructors were fully compliant with the PISI-1 best practice during semester one or semester two of the study. This compliance rate of 0% was the lowest compliance rate for all of the AED best practice in the study. This observation led to the question why did new online instructors not meet the PISI-1 best practice standard at all during the study? It may have been that control-group instructors did not understand the benefits of promoting informal social interaction. However, examination of the instructors that attempted PISI-1 compliance revealed that nearly half of the instructors demonstrated some evidence of PISI-1 compliance in their AEDs. Eight of the instructors were partially compliant with the PISI-1 standard since they made at least one comment in their AED posts that demonstrated evidenced of the PISI-1 best practice; but those instructors were not consistent in their attempts. Table 15 shows the control-group instructors that had evidence of the PISI-1 best practice in their AED posts and the number of comments that demonstrated PISI-1 statements in each observation week of the study.

Table 15. Distribution of Instructor Posts That Demonstrated Evidence of PISI-1 (Promotes Informal Social Interaction)

Instructor number	Number of posts with PISI-1 evidence			
	Semester 1 week 5	Semester 1 week 9	Semester 2 week 5	Semester 2 week 9
Instructor 11	1	-	-	-
Instructor 12	-	-	-	1
Instructor 13	-	1	1	-
Instructor 15	-	-	1	-
Instructor 17	-	-	3	-
Instructor 19	-	-	4	-
Instructor 28	-	1	-	-

Semester two, week five had the highest number of PISI-1 compliant posts. However, three of the four instructors that made PISI-1 compliant posts in that measurement period did not make any other PISI-1 compliant posts in any other measurement period of the study.

It may have been that the topic of the AED influenced the use of PISI-1. However, each instructor taught the same course over the two semesters of the study. If the AED design or topic influenced the use of PISI-1 use by instructors, there would have been a similar use rate between week five of the first semester and week five of the second semester. This was not the case.

It was possible that instructors 13, 15, 17, and 19 taught similar courses that contributed PISI-1 use. However, a comparison of the courses taught by those instructors revealed they were not similar courses; topics included the US Constitution, Religion, Mathematics, and Life Skills. It was also possible that instructors made attempts at PISI-1 early in the semester and made fewer attempts later in the semester. In this case, early attempts at PISI-1 would not have been observed since the study started measuring PISI-1 during week five of the semester. It may have been that more and earlier measures were needed to detect higher rates of PISI-1 compliance than were detected in this study.

It may also have been that new online instructors were not aware of the PISI-1 best practice. Or, they may have perceived that encouraging informal social interaction was not appropriate in online AEDs. This explanation would be consistent with questions the Delphi panel had when creating the operationalized definition of the PISI-1 best practice. The Delphi panel debated if the PISI-1 best practice should be included as one of the best practice for the participating institution. Some of the Delphi panel felt it was not appropriate to encourage informal social interaction in an academic discussion. This implied that there were additional barriers to PISI-1 use that went beyond just informing instructors of the best practice. There may have been deeply rooted philosophical barriers to PISI-1 use.

The IPD-2 standard had the highest compliance of all of the control-group-instructor measures. The control-group instructors were fully compliant 93.3% of the time during the first and semesters of the study. Only one control-group instructor did not meet the IPD-2 criteria in both semester one and semester two of the study. Consistent with the findings in research question one, the instructor did not post more than other instructors, but rather the students participated less. It was possible that students participated less due to extraneous demands on their attention such as a test or major assignment and thus did not participate as much.

The control-group instructor that did not meet the IPD-2 standard for research question two was also not compliant with E-1, E-2, IP-1, and DG-1 best practices in the AEDs examined. As pointed out in research question one, it may have been that the lack of compliance with E-1, E-2, IP-1, and DG-1, and the resulting low student participation,

that contributed to the instructor not meeting the IPD-2 best practice either semester of this study.

Instructor participation in AEDs at the minimum level (IPD-1) was the only AED best practice to be significantly different with the teaching experience effect between semester on and semester two of the study. That finding was not consistent with previous literature (Bailey, 2008; Dennen, 2005; De Simone, 2006).

This observation prompted further exploration of the IPD-1 best practice measure for research question two. The full compliance rate for IPD-1 doubled from 33.3% to 66.7% between semester one and semester two of the study. This meant that five additional instructors made posts that were at least 1% of the total posts in the AED examined during their second semester.

Examination of individual instructor data revealed those control-group instructors that did not meet the minimum compliance requirement in any measurement period, did not participate at all in the AED examined. This lack of participation in AEDs was not consistent with the institution's expectations of new online instructors. In the institution's online instructor certification course (OICC), the instructors were informed that they were expected to engage the online course at least five days a week and deepen student learning through discussion facilitation. Since the institution's expectations were made known to the control-group instructors regarding participation in online courses, why did they participate at such a low level?

It may have been that during their first semester, control-group instructors were overwhelmed with the tasks associated with managing an online course and lacked the motivation to put forth the effort required to participate in AEDs consistently. This

explanation was supported by the fact that most instructors that met the IPD-1 best

practice demonstrated participation rates of less than 6%. Control-group instructors that

met the IPD-1 best practice had a mean participation rate of 5.6% for semester one and

4.69% for semester two. This indicated online instructors' participation rates were closer

to the minimum AED best practice participation requirements of 1% than the maximum

participation AED best practice of 20%. It may have been that participating less was

easier than participating more in an AED and that was why so many control-group

instructors did not meet the IPD-1 best practice during the first semester. However, this

explanation did not account for influence of the institution's participation expectations

for new online instructors established by the OICC

Other explanations may account for the control-group instructor IPD-1

compliance rates. Six of the 15 control-group instructors partially met the IPD-1 standard

in the first semester. That meant they posted at least 1% of the time in one AED but not

in the other AED examined during semester one of the study. This indicated they were

not completely disengaged from students and were making at least some effort to

participate AEDs during the first semester. These instructors may have determined their

participation was not required for some of the AEDs examined in this study. They may

have determined, for example, that students could be more independent in discussion

during the latter half of the semester and therefore, the instructor didn't participate in the

AED examined during week nine of the 14-week semester. It may also have been that

those instructors not participating in the discussion perceived their five day a week course

engagement obligation was being met via other methods such as email, announcements,

posting grades or perhaps just reading student AED post but not commenting on them.

Control-group instructors showed statistically significant improvement during the second semester in IPD-1 compliance. This finding led to the question why did control-group instructors meet the IPD-1 standard more in the second semester? Examination of individual control-group instructor data showed that all but three of the 10 instructors that did not fully comply with IPD-1 in the first semester, made improvements in the second semester. It may have been that instructors gained confidence in their AED skills and used them more. It may have been that instructors were less overwhelmed during the second semester of instructor and had additional time and energy to spend in posting comments to AEDs. It may also have been that instructors were reminded about the expectation the institution had that they engage with students five days a week and facilitate discussions. Since the instructors contracted for each course they taught at the participating institution, a simple reminder may have motivated additional AED participation if the instructor wanted to receive additional contracts in the future. These possibilities will be discussed in the recommendations section below.

Research question two summary. The participating institution's approach of using a design team to develop courses and discouraging online instructors from changing courses generally resulted in higher and more consistent AED best practice compliance rates. This approach also resulted in consistency in AED best practice compliance rates between semesters. However, the institution's approach may have also impeded further AED use by instructors where the course design did not support instructor implementation of AED best practices. An example of this was the IP-1 AED best practice where instructors not provided with a grade book item were the only instructors who failed to meet the IP-1 standard in the study. Other examples of how the

institution's approach may have limited AED best practice implementation were found

with the E-1 and E-2 best practices. For instructors to meet the E-1 and E-2 best

practices, they would have had to make changes to the course design elements. None of

the instructors did so. New online instructors were not likely to take actions that were

contrary to the institution's policy during their first two semesters of instruction. It may

have been that the control-group instructors lacked the knowledge or skills necessary to

modify portions of the course. It may also have been that there was a continued effort on

the part of the instructor to secure future employment with the participating institution

and compliance with the institution's policy to not change the course was part of that

effort.

The control group AED best practice compliance rates continued to be low

between semesters as there was no significant difference in compliance rates between

semester one and semester two for all but one best practice. Examination of each AED

best practice separately revealed several possibilities as to why there was no significant

change in the DG-1, IP-2, PISI-1 and IPD-2 best practices. Four control group

participants stopped implementing the DG-1 best practice during the second semester. It

may have been that control-group instructors found the challenge of managing groups a

distraction from their other responsibilities. Control-group instructors may also have

lacked the knowledge of the benefits of creating AED groups with between five and 10

students.

The control-group instructors also demonstrated low rates of meeting the IP-2

best practice in both semesters. This may have been due to a lack of knowledge about the

IP-2 best practice or the cumbersome methods available to meet the IP-2 best practice in

the LMS. The control group demonstrated the lowest compliance rate for the entire study

in the PISI-1 best practice. None of the control-group instructors demonstrated full

compliance with the PISI-1 best practice in either semester and only eight demonstrated

partial compliance. It may have been that control-group instructors did not understand

the benefits of the PISI-1 best practice. It may also have been that the discussion topic or

the courses taught contributed to the lack of PISI-1 best practice use. It could also have

been that the measures of PISI-1 were taken at a time when PISI-1 compliance was lower

as compared with other times in the semester. Control-group instructors may also have

felt it was not appropriate to engage in PISI-1 behavior. This last explanation was

consistent with the Delphi panel discussion regarding the inclusion if the PISI-1 best

practice for the participating institution.

Control-group instructors demonstrate the highest compliance rates for the study

in the IPD-2 best practice. Only one instructor did not meet the IPD-2 standard in both

semester one and semester two of the study. That one instructor did not participate more

than other instructors, but the students participated less in the AEDs examined. That

instructor also lacked compliance with other best practices (E-1, E-2, IP-1, & DG-1)

linked with increased student participation. It may have been the absence of the other

AED best practice contributed to the instructor not meeting the IPD-2 best practice.

Control-group instructors demonstrated a statistically significant increase in IPD-

1 compliance between semester one and two of the study. This was not consistent with

previous literature (Bailey, 2008; Dennen, 2005; De Simone, 2006). Further examination

of individual control-group instructor compliance revealed those control-group

instructors that did not meet the IPD-1 best practice, did not participate at all in the

AED's examined. It may have been that first semester control-group instructors were overwhelmed with the tasks of managing the online course during the first semester. As a result, they did not participate in spite of the participation expectations outlined in the OICC. It may also have been that instructors felt they met course participation requirements in other ways than participation in the AEDs examined. The timing of the AED in the semester may have contributed to the instructors not participating in the AED examined. Explanations of why control-group instructors increased compliance with IPD-1 in the second semester include: Control-group instructors were less overwhelmed during the second semester of instruction and had more time and energy to spend in posting comments to AEDs. Control-group instructors may have been reminded of their obligation to facilitate discussion in AEDs. Instructors may have been motivated to participate in order to receive additional teaching contract opportunities.

Research Question Three Conclusions

Research question three addressed the treatment effect of the AED best practice training on new online instructor AED best practices. To explore this question, the experimental group was trained on AED best practices. The compliance rates with each of the AED best practice measures were then compared between the experimental and control groups during the second semester of the study using a chi-square test of independence.

Institution measure conclusions for research question three. The institution compliance with the E-1, E-2, and PR-1 measures was unchanged between the control and experimental groups. The most direct interpretation of these results is that the effect of treatment was not strong enough to overcome both the participant best practice

implementation barriers and the institution's policy. Even with training, instructors did not attempt to modify course designs that did not support AED best practices between the first and second semester of the study. The institution's policy was more influential on instructor behavior than both teaching experience and the AED best practice training. This meant that the course design and the institutional policy may have been more important factors in encouraging AED best practice implementation than teaching experience and training. There are several possible explanations for this.

One possible explanation for the institution's policy impact on AED best practice behaviors was the instructors desired to maintain employment at the institution. All of the experimental-group instructors in this study were temporary contract hires without any preferred status among the institution's faculty. Since the online instructors did not design the courses, they may have had a diminished sense of ownership of the course. In spite of receiving AED best practice training, this diminished sense of ownership may have impacted their investment in the course and in being complaint with AED best practices. They may have known the course did not meet AED best practices but they were not invested enough to attempt to make a change.

It may have been that the instructors did attempt to modify courses in a way that was consistent with the institution's policies; however, any changes that resulted from such efforts were not seen due the length of the study. This study only lasted two semesters. If instructor-requested changes to courses took a semester or more to be approved and implemented, any changes initiated by the trained instructors would not have been made until after the study was completed. Adding a semester or more to this

study, or training instructors earlier in the process, may have resulted in the detection of instructor efforts to modify their courses to meet AED best practices.

The IP-1 measure was different from the other institutional measures addressed above in that it required active instructor effort to achieve compliance. This meant that the required course design element (a grade book item) could either be not present, present with no instructor action, or it could be present with instructor action. While not statistically significant, there was some variation in the institution's IP-1 compliance that may have indicated some effort by the experimental group to implement the IP-1 best practice at a higher level. There was an increase in IP-1 compliance (14.2%) in the experimental group between semester one and semester two while there was a decrease (6.7%) in compliance for the control group between semesters one and two of the study. These changes occurred only in participants who were provided with a grade book item in the course design. Those instructors without a grade book item remained not compliant with the IP-1 best practice. This observation was consistent with IP-1 observations for research questions one and two in that variation in best practice compliance occurred only when instructors were provided with a course design feature that supported AED best practice implementation. It may have been that instructors not provided with a grade book item would have met the IP-1 best practice as a result of the training if they had the appropriate course design support.

Participant measure conclusions for research question three. The participant measures for research question three were DG-1, IP-2, PISI-1, IPD-1 and IPD-2. None of the participant measure best practice compliance rates were significantly different between the experimental and control groups except for the DG-1 best practice. This led

to the question why did the AED best practice training have no statistically significant effect between the experimental and control groups in this study? The lack of significant differences between the experimental and control groups may have indicated the treatment effect was not strong enough to overcome any experience effect in the IP-2, PISI-1, IPD-1, and IPD-2 best practices; however, other explanations also appeared plausible.

In research question two, the control group demonstrated a statistically significant increase in IPD-1 compliance. During the second semester of the study there was no statistically significant difference between the experimental and control groups in IPD-1 compliance. This observation would be consistent with the conclusion that the treatment effect was not strong enough to overcome the experience effect. However, reexamining observations from research question two provided an alternative explanation.

One potential reason for the significant experience effect observed for research question two was that control-group instructors could have been reminded of their obligation to facilitate discussion in AEDs. Further observation when examining research question three strengthened that conclusion. While it was not statistically significant, the experimental group IPD-1 compliance rate decreased from 64.3% to 50.0% between semester one and two. The control group IPD-1 compliance rate rose significantly from 33.3% to 66.7% between semester one and two of the study. Since a stratified random sampling procedure was used in this study, the course subject was controlled for. As a result, observed differences between the experimental and control groups could be attributed to instructor behavior. From this perspective, it appeared the control group underperformed during the first semester and performed at a similar level

as the experimental group during the second semester. This observation supported the explanation that control-group instructors may have been reminded of the institution's AED facilitation requirements. It also implied the best practice training was simply ineffective in increasing IPD-1 compliance as there was no training effect for the experimental group between semesters.

For the IP-2, PISI-1, and IPD-2 best practices, there was no significant experience effect observed when addressing research question two. Since there was not statistically significant difference between the experimental and controls groups during the second semester of the study, the training may not have affected the experimental groups best practice compliance at all. To explore this possibility the experimental group's first semester compliance rates for the IP-2, PISI-1 and IDP-2 best practices were compared between semester one and semester two of the study.

The IP-2, PISI-1, and IDP-2 compliance rates remained unchanged for the experimental group between semester one and two. Examination of individual participants' performances for each of these AED best practices did not reveal any information about the instructors that would explain the lack of change in instructor implementation of the IP-2, PISI-1, and IDP-2 best practices. One explanation of this is that the training was faulty in these areas. The training was designed to be both modularized and streamlined to accommodate instructors that were not being compensated for their time when participating in the training. It may have been that more intensive, longer, or comprehensive training on the IP-2, PISI-1, and IPD-2 AED best practices was needed to increase instructor compliance.

The experimental-group instructors that did not meet the IPD-2 standard (maximum participation of 20%) demonstrated the same pattern found when addressing research question one. The pattern was that they did not make more posts than other instructors, but the students participated less in their AEDs than students in other instructor's AEDs. Their AEDs also lacked compliance with other AED best practices that have been linked to student participation in the literature in areas such as clear expectations (Dennen, 2005), individual participation incentives (Dixson et al., 2006), participation rubrics (Gilbert & Dabbagh, 2005), and group size (Bliss & Lawrence, 2009; Roberts et al., 2006; Schellens & Valcke, 2006). This finding for research question three emphasized the need for further exploration of potential interactions between AED best practices discussed in research question one.

Evaluation of the DG-1 AED best practice measures resulted in the only significant treatment effect finding in the study. However, two factors raised questions about this finding. First, the chi-square test of independence only addressed differences between the groups during the second semester of the study. It could have been that significant differences already existed between the groups in the first semester of the study. Second, it could have been that the categorization of the compliance rates into full compliance, partial compliance and no compliance created situation where participant behavior changes were masked.

For example, participants had to have 100% of groups in an AED with between five and 10 participants to meet the DG-1 criteria. A participant could have had 20% of the AED groups between five and 10 students during semester one and 90% of the AED groups between five and 10 students during semester two and be categorized as not

compliant for both semesters. The 70% improvement would be masked by the categorization. Conversely, a participant could have 95% of groups between five and 10 students in semester one and 100% of groups between five and 10 students in semester two. They would be categorized as not compliant in semester one and compliant in semester two. This could have exaggerated their improvement when they only changed 5% of their groups. Because of these possibilities, the data were examined more closely. This will be discussed below.

To address both of these concerns about the DG-1 finding, an overall percent of group size compliance was also calculated for the experimental and control groups. This was calculated by dividing the number of AED groups that met the DG-1 best practice by the total number of groups present in the AED's examined. Figure 38 shows the percent of AED groups, for both the experimental and control group participants, that met the DG-1 size requirement in week five and nine of semester one, and week five and nine of semester two.
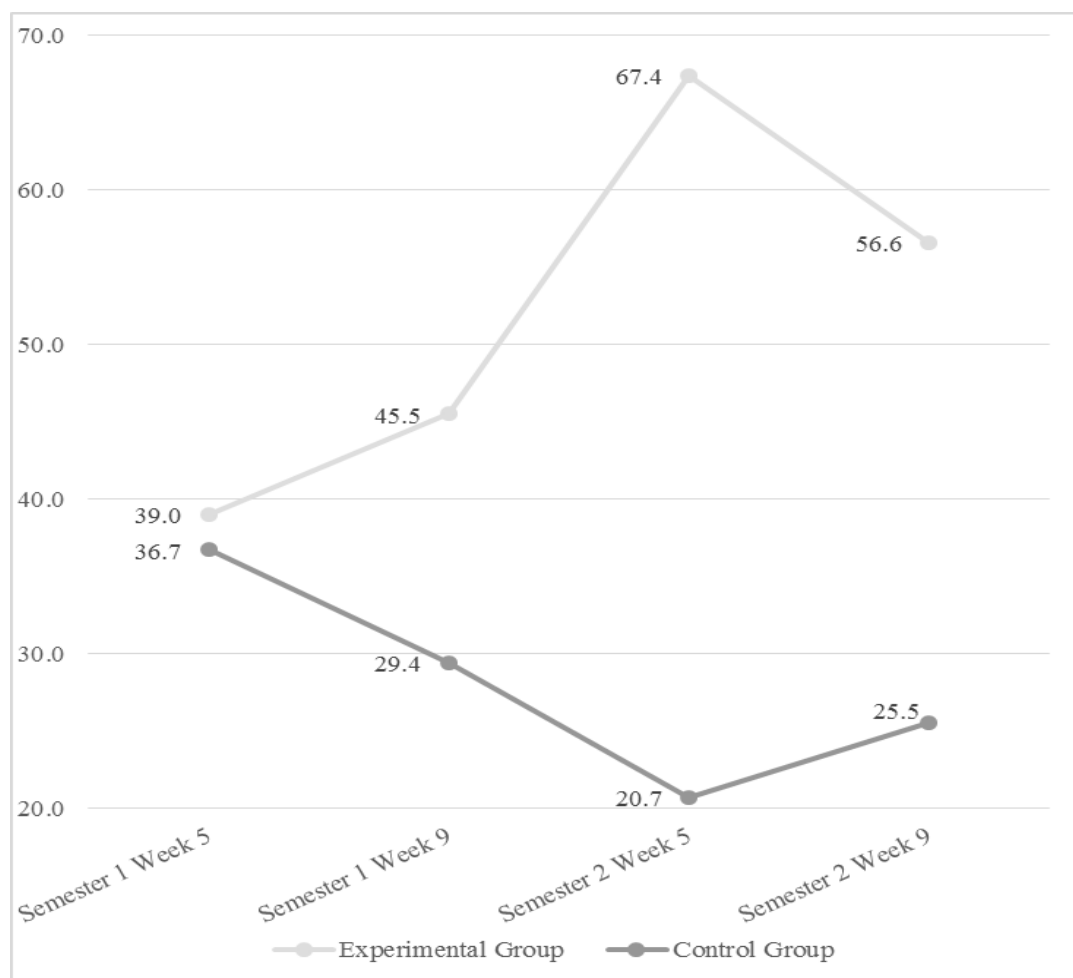
Figure 38. Percent of discussion groups meeting the DG-1 (group size) requirement in experimental and control groups during the study.

The percentage of AED groups that met the DG-1 criteria in semester one of the study was similar for both the experimental and control groups. The mean difference between groups in semester one was 9.2%. The mean difference between groups in semester two was 38.9%, which is 29.7% increase. The percentage of AED groups that met the DG-1 standard climbed for the experimental group after treatment while the percentage of AED groups that met the DG-1 standard decreased for the control group. These results indicated the statistically significant finding using the chi-square test of

independence represented meaningful change in discussion group sizes for the experimental group between semesters one and semester two of the study. These results also indicated meaningful group size differences between the experimental and control groups during the second semester of the study.

This finding led to the question, why was the DG-1 finding significant and not the other instructor AED best practices not influenced by the institution's policy? As discussed in research question two, online instructors contracted to teach a course not designed or produced by them may have led to a low sense of ownership in the course. This may have contributed to lack of motivation to invest in AED best practice implementation.

Another explanation for the DG-1 significant finding had to do with the amount of effort required to implement each AED best practice. It was observed when addressing research question one that each of the AED best practices not influenced by the institution's policy required different levels of effort to implement. This may also have been a factor in AED best practice compliance for instructors that had best practice training. To attempt to address this question, performance data for the experimental group from semester one and semester two were compared with the type of instructor effort required by the instructor to meet the AED best practice standards. Table 16 shows the baseline AED best practice compliance rate for the experimental group during semester one and semester two of the study with the type of effort required for each AED best practice not influenced by the institution.

Table 16. Instructor Effort for AED Best Practice Compliance Baseline and
Experimental Group Comparison

AED Best Practice	Baseline Compliance Rate	Semester Two Compliance Rate	Type of Instructor Effort	Effort Description
IP-2	0.0%	0.0%	Active multiple times	Give written performance feedback to each group
PISI-1	21.4%	21.4%	Active multiple times	Give written encouragement for informal social interaction
DG-1	28.6%	42.9%	Active one time	Assign students to groups
IPD-1	64.3%	50.0%	Active frequency varies	Make at least 1% of discussion posts
IPD-2	71.4%	71.4%	Passive	Don't make too many posts
n	14	14		

The DG-1 standard required one time active effort to set up groups in the

institution's LMS where the other standards required repeated efforts to meet the standard

and/or to adapt to student behaviors in the AED. It may have been that new instructors

needed more time and training to implement the more demanding AED best practices.

Research question three summary. The institution's compliance with E-1, E-2,

and PR-1 did not change between the control and experimental groups. Even with

training, instructors did not attempt to modify course designs that did not support AED

best practices between the first and second semester of the study. Possible explanations

for these observations were that instructors: complied with the institution policy in order

to continue employment, had a low sense of ownership and investment in the course

resulting in no effort to make changes, or attempted changes in a manner consistent with

the institution's policy that took too long to be observed in this study. In the IP-1 AED

best practice, only those instructors provided with a course design element that supported

the IP-1 best practice demonstrated variation in compliance. This observation confirmed

findings in research questions one and two, and may have contributed to the reason the best practice training was not effective in this area.

Compliance with the IP-2, PISI-1, IPD-1, and IPD-2 best practices were not significantly different between the experimental and control groups. This may be because the treatment was ineffective in overcoming the experience effect; however, the IPD-1 findings suggested the control group may have under participated during the first semester which brought the experience effect observed in research question two into question. For the IP-2, PISI-1, and IPD-2 best practices, there was no significant experience effect observed when addressing research question two so the best practice training had no experience effect to overcome. Further examination of the experimental group performance revealed no change in compliance rates for the experimental group between semester one and semester two of the study. It may have been that the training was ineffective for the IP-2, PISI-1, and IPD-2 best practices. Further examination of the IPD-1 best practice for the experimental group revealed the same pattern observed for the control group in research question two. That pattern was that IPD-2 non-compliant instructors were also not compliant with the E-1, E-2, IP-1, and DG-1 best practices.

The only significant finding for research question three concerned the DG-1 AED best practice. Due to the way data were categorized there was a potential that instructor performance was either exaggerated or minimized. However, a comparison of the percentage of AED groups for each instructor that met the DG-1 group size requirements confirmed the significant finding. Experimental-group instructors demonstrated an increase in compliance while control-group instructors demonstrated a decrease in performance. A possible explanation for this observation was a reduction in teaching

efficacy over time for the control group while the experimental group experienced

improved teaching efficacy with training.

Recommendations for Practice

The recommendations for practice fall into three categories. The first category is

for those online instructors who manage AEDs. The second category is for course

designers or instructors who design their own AEDs. The third category is for

administrators or institutions that create policy that impacts AED best practice

implementation.

Recommendations for online instructors. Online instructors do not need to

wait to be told to evaluate the best practices in their courses nor do they need assistance

from the institution to do so. Online instructors should use this study's AED Best

Practice Rubric to evaluate their previously taught course as a self-assessment. Strengths

identified through this self-assessment could be duplicated in future courses. Weaknesses

identified through this self-assessment could be improved upon and reevaluated using the

AED Best Practice Rubric until they meet the AED best practice standard.

Implementing AED best practices generally requires repeated active effort.

Online instructors should guard against thinking AED effectiveness is only the

responsibility of students. Online instructors need to be engaged in the AED structure

and process at least as much as a face-to-face discussion.

Instructors in this study that did not meet the IPD-2 best practice standard rarely

met the E-1, E-2, IP-1 and DG-1 best practice standards. While just focusing on one or

two AED best practices may seem more manageable, missing some AED best practices

may affect the implementation of others. Instructors should make a focused effort to implement all the AED best practices they are capable of implementing.

This study identified the potential of philosophical barriers to implementing AED best practices, such as PISI-1, which addressed the use of informal social interaction. Instructors should keep an open mind when evaluating AED best practices. Each AED best practice identified in this study was shown in the literature to promote student participation, student satisfaction, or student perceived learning. Instructors should actively engage in experimenting with researched based practices regardless of philosophical questions.

Instructors should take responsibility for AED best practices in their courses. Even when others design the course, there are often ways around the lack of best practices being present. At the very least, a discussion post by the instructor could add an AED best practice that was not otherwise present in the course design. For example, an instructor could add a discussion deadline in the first discussion post or a list of student participation requirements if they were not contained in the discussion directions created by the course designer.

This study indicated the LMS features might influence AED best practice compliance. Instructors should become familiar enough with the LMS used that they can detect flaws that get in the way of AED best practice implementation. Once identified, they should work around them and also advocate for upgrades that remedy those flaws.

Instructors in this study would have had to request course design changes to meet some of the AED best practice standards examined in the study. This added additional barriers to AED best practice use. Instructors should be assertive when requesting

modification to courses in order to meet AED best practices, since these enhance the student experience in the discussions.

   Recommendations for online course designers. Good course design can reduce the barriers to AED best practice implementation. Since several of the AED best practices (E-1, E-2, PR-1, & IP-1) can be designed into the course structure before the course is taught, course designers should become familiar with and skilled at including AED best practices in course design.

   It was evident in this study that instructors provided with grade book items met the incentives for performance (IP-1) standard at a higher rate than those not provided with a grade book item. Course designers should provide a grade book item for each AED in the course.

   Both during and after courses are designed, the AED Best Practice Rubric could be used to evaluate if institutional AED best practices are present in the design before the course is used. Identifying the absence of AED best practices in course design before they are used allows the opportunity for correction and improvement before the course is taught. This approach could reduce the need for future modification resulting from lack of participation in the course AEDs.

   This study identified the potential of philosophical barriers to implementing AED best practice, such as PISI-1, which addressed the use of informal social interaction. Each AED best practice identified in this study was shown in the literature to promote student participation, student satisfaction, or student perceived learning. Designers should become familiar with and actively engage in implementing research-based practices regardless of philosophical questions.

Efforts should be made to develop design features that facilitate AED best practice use. For example streamlining rubrics for ease of use or making group assignments quicker and easier to manage for the online instructor could improve their use. Another design element that could help online instructors is a real-time instructor participation rate calculator. This might assist the instructor in monitoring their participation rate in the AED.

While an LMS generally supports the online course design, this study found one feature of the institution's LMS that impaired AED best practice implementation. Any LMS should be examined to see if it hinders AED best practice implementation. In order to accomplish this, input should be gathered from the instructors as well as designers that use the LMS.

Recommendations for online administrators. Not all the courses in this study contained course design features that supported AED best practice implementation by online instructors. If an institution uses a design team to create online courses that to do not meet AED best practices, the institutional course development method is inhibiting AED best practice use. Administrators should monitor their institutionally designed courses for AED best practices using the AED Best Practice Rubric. Evaluating institutionally designed courses using the AED best practice rubric would do two things. First, it would provide accountability for the course designers to include AED best practices in course design. Second, it would provide a feedback mechanism to improve course design.

This study demonstrated that instructors could be successfully trained to establish group size for AEDs that meet the AED best practice standard. Administrators should

make such training available to instructors who are not currently meeting the group size AED best practice standard.

This study indicated that both instructors and course designers impact AED best practice implementation. Administrators should take the responsibility to train both the course designers and online instructors in AED best practices. Rather than require all instructors and all course designers to take a general training which can be costly and time consuming, the AED Best Practice Rubric could be used to identify specific training needs. The training given to instructors and designers could be more focused on individual need rather than a general perception of training needs.

In this study, one explanation for increased participation in AEDs for control-group instructors was that they may have received a reminder from the institution of their participation expectations. Instructors may benefit from institutional reminders and administrators should engage in reminding instructors of AED best practice expectations in a supportive manner. These reminders should be part of a larger plan of supporting and evaluating teacher effectiveness.

Administrators should note that new online instructors in this study did not change their courses when prohibited from doing so by institution policy. However, institutional policies to not change courses can be both helpful and hurtful for AED best practice implementation. Administrators would be wise to review and revise policies or practices that may have the unintended consequence of inhibiting the implementation of AED best practices.

In this study, the institution's policy to not change course design seemed to be more influential than teaching experience and training combined in new online instructor

AED best practice implementation. Establishing AED best practices in policy could be a method institutions could use to promote their use.

This study identified the potential for the LMS to influence designer preferences in designing AED best practice elements in the course. Administrators should examine the influence their LMS has on course designer use of AED best practices in course design.

In this study, it was determined that a flaw in the participating institution's LMS contributed to lack of compliance with IP-1 AED best practice. Administrators should evaluate their LMS to ensure the LMS supports AED best practices. This could be done by asking instructors to provide regular feedback on the LMS features: including what works well, what does not work well, and what LMS features need to be added.

Recommendations for Future Research

Research in the area of instructor AED best practices is a relatively new field that began with Thompson (2006) who attempted to create a list of best practices recommendations. Therefore, this study raised a number of questions that resulted in a large number of recommendations for future research.

This study had 30 participants all from the same institution. Replicating this study at other institutions with more participants is needed to both verify the study findings as well as evaluate the practicality of using the AED Best Practice Rubric in other settings.

The training provided to online instructors in this study was ineffective in impacting AED best practice implantation in areas other than the DG-1 best practice.

Further research is needed to explore how extensive AED best practice training needs to be to improve AED best practice compliance in new online instructors.

This study focused on the AED best practice behaviors of new online instructors. It is unknown if there is a difference between new online instructor AED best practice implementation and experienced instructor AED best practice attainment. Further research is needed to identify the profile of experienced online instructor AED best practice behaviors.

This study found teaching experience alone resulted in a significant change in the IPD-1 best practice but not the other AED best practices. However, this study lasted only two semesters. A longitudinal study on online instructor's AED best practices would contribute to the understanding of the development process of AED best practice use.

In this study, new online instructors engaged in PISI-1 behaviors at a low level. However, this study only measured instructor practices twice during the semester and may have missed higher levels of PISI-1 compliance at other times during the semester. Further research is needed that measures instructor AED best practice compliance through the entire semester.

The participating institution's model for online courses included predesigned and developed courses taught by contracted online instructors. Future studies should compare this institution's model with other institutions' models of instructor-designed course to determine differences in AED best practice implementation between the models.

Instructors in this study did not create their courses and were discourage from modifying them. The literature indicated that teaching efficacy fluctuates in the first year of instructor (Hoya & Spero, 2005; Palmer, 2011). There may be a difference in teaching

efficacy between instructors that create their own courses and those that do not. Research is needed to measure contract online instructor teaching efficacy between courses they created and those created for them.

The participants in this study were contracted each semester to teach an online class. In this study, it was speculated that they did not make unauthorized changes in the AEDs due to their low status at the institution. A study to explore contract online instructor's sense of value in the institution may assist in understanding factors that contribute to instructors making changes in their courses. The contract arrangement also raised questions related to the online instructors' sense of ownership of the online courses they taught since the courses were created by a design team. Additional research is needed to explore the sense of ownership of online courses they teach but did not create.

Instructors did not modify course design elements in this study even when they received training on AED best practices. This may have indicated the institution's policy for instructors to not modify their course was effective in impacting instructor behavior. Or, there may have been other factors such as difficulty with the LMS, time constraints, or lack of skill to change course design elements. A study is needed to explore reasons for instructors not making modifications to courses when discouraged from doing so by institution policy.

Since the participating institution had predesigned courses, the institution created a process for course modification. This process may have impacted AED best practice implementation. A study to explore the effectiveness of the institution's course modification process could assist in determining whether it was a help or hindrance to AED best practice implementation. Other research could investigate what motivates

instructors to request changes to their course in the context of the institution's course modification process.

There may have been attempts by instructors to modify their courses in a way that was consistent with the institution's course modification process and policies. However, any changes that resulted from such effort would not have been detected in a study that lasted just two semesters. A follow up study is needed to determine AED best practice compliance over a longer period of time. And, since the AED best practice rubric was designed for use on archived courses, such a study is possible with the same participants.

Even with teaching experience and AED best practice training, many experimental-group instructors continued to fail to implement AED best practices that were under their control. A follow up study is needed to explore the experimental group perception of the online course AED best practice compliance and why they did not implement those best practices.

This study focused on the effect experience and training had on new online instructor AED best practice use. However, it was discovered that course design might also impact instructor AED best practice use. Further research is needed to determine how specific course design decisions impact AED best practice use on the part of online instructors.

This study found course design and institutional policy to be influential in instructors implementing AED best practices. A study comparing the effect of course design, institutional policy, teaching experience and training could identify the most effective methods of increasing AED best practice implementation.

The finding that the lowest student participation rates in AEDs also had the fewest AED best practices present indicated there might be an interaction effect of the AED best practices. Comparing student satisfaction, student participation and student learning with different AED best practice profile compositions would increase understanding of potential interactions between AED best practices.

While the study included multiple instructional disciplines, efforts were made to control for this variable in this study. Further research on discipline specific, or even course specific AED best practices is needed. It may be that a particular AED best practice profile is more effective with math classes than with sociology classes for example.

This study focused on instructor AED best practices only. Comparing different AED best practice profiles with student outcomes such as student satisfaction, participation, perceived learning, and social presence would increase the understanding of the impact instructor behaviors in AEDs have on students.

The control-group instructors in this study demonstrated a reduction in the group size AED best practice (DG-1) compliance over two semesters. A study is needed to determine why there was a reduction in control group DG-1 compliance and if the LMS appropriately supported discussion group creation.

Results of this study indicated that problems with the LMS may have contributed to some instructors not meeting at least one AED best practice (IP-1) even when the course design supported AED best practice use. Further research is needed to determine which LMS features are supportive and which are not supportive of AED best practice implementation by online instructors.

In this study, the possibility of designer preferences to not use grading rubrics for AEDs was identified. A study is needed to determine course design teams choose not to design courses with AED rubrics

An apparent design choice to not use role assignments in AEDs was also identified in this study. A study is needed to determine why most designers do not to use role assignments in AED design and why some do.

All but one of the training modules in the AED best practice training were ineffective. The timing of the training may have impacted instructor AED best practice compliance. A study is needed to explore the effect of the AED best practice training at different times i.e., between semesters, the end of the previous semester, during beginning of the semester etc.

This study focused on quantifying AED best practice implementation. Research of a qualitative nature to identify what factors lead to AED best practice implementation would be helpful in designing training and addressing environmental factors that either enhance or distract from AED best practice use.

In this study instructors were less likely to implement AED best practices that required active and repetitive effort. A study is needed to explore reasons for instructors not implementing AED best practices that require active and repetitive effort.

Some instructors participated too much and some instructors did not participate at all in AEDs during this study. Potential explanations for this behavior included the course topic, the purpose of the AED, or the instructor time constraints. Further research is needed to determine what factors influence instructor participation in the AEDs.

Summary

This study explored the nature of AED best practice use by new online instructors and the influence experience teaching and training have on new online instructor AED best practice implementation. Based on a review of literature, a definition of and AED best practice was created and used to identify nine AED best practices that were shown to increase student participation, satisfaction or learning. Training was then developed based on the target AED best practices. This training was given to new online instructors starting their second semester of instruction at the participating institution. The AED Best Practice Rubric was developed based on the nine identified AED best practices. This rubric was then used to measure the AED best practice compliance for each of the nine AED best practices and create an AED best practice profile for study participants. The AED best practice profiles were used to address each of the research questions. Conclusions made in each research questions were categorized into the participating institution's influenced AED best practices and the instructor AED best practices.

Conclusions from the study include the following: The AED best practices that require the least active and specific effort on the part of the online instructor are more likely to be implemented by first semester instructors. There may be an interaction between AED best practices that enhance student participation in AEDs. Time teaching can have an effect on AED best practice implementation in at least one AED best practice area. Training new instructors on AED best practices can have a positive impact on AED best practice implementation in at least one AED best practice area. The institution's policy regarding online courses can have a positive impact on AED best practice

implementation. The institution's policy regarding online courses can also hinder AED best practice implementation by new online instructors.

The recommendations for practice resulting from this study include the following: Online instructors should use this study's AED Best Practice Rubric to evaluate their previously taught course as a self-assessment. Online instructors need to be engaged in the discussion structure and process at least as much as a face-to-face discussion. Course designers should become familiar with and skilled at including AED best practices in course design. Use the AED Best Practice Rubric to evaluate if all possible AED best practices are present in the design before the course is actually taught. Institutions that use the same course design model as the participating institution should monitor the institution-designed courses for AED best practices use. Institutions should take responsibility to train both the course designers and online instructors in AED best practices. Institutions should use the AED Best Practice Rubric to identify specific training needs.

Research opportunities exist that, if carried out, can expand the understanding of AED use by online instructors. They include replicating this study, studying training techniques, studying different groups of online instructors, studying AED best practice implementation over longer periods of time, and comparing individual AED best practice compliance with institution AED best practice compliance. Comparing AED best practice profiles between different academic disciplines is also a research possibility. Other research opportunities include comparing student satisfaction, student participation and student learning with different AED best practice profile compositions and investigating potential interactions between the AED best practices. Research on the

reasons for AED best practice implementation and the instructor experience while implementing AED best practices is also needed to increase understanding of the instructor experience.

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APPENDIX A

Best Practice Literature Summary

Table A1. *AED Best Practice Literature Summary*

AED Based Best Practices	Definition	Literature
Expectations	The expectations for the discussion assignment are clearly established.	Arbaugh, 2010; An et al., 2009; Dennen, 2005; Dixson et al., 2006; Gilbert & Dabbagh, 2005; Ke, 2010; Hew et al., 2009
	The instructor providing a rubric for students that clearly defines grading criteria.	Gilbert & Dabbagh, 2005
	Regular discussion deadlines are employed.	Dennen, 2005
Assigned Roles	Discussion roles are well-defined.	Dennen, 2005
	Discussion participants are assigned roles.	Schellens et al., 2005
	Role of facilitator is assigned.	Dixson et al., 2006; Hew, Cheung and Ng, 2009
	Role of summarizer is assigned.	Schellens et al., 2005
Group Size	Group size is between 3 and 12 participants.	Bliss & Lawrence, 2009 a; Roberts et al., 2006; Schellens & Valcke, 2006
Incentives	Individual incentives for discussion participation are present.	Dixson et al., 2006; Ogunleye, 2010
	Group-based performance incentives are present.	Kelly, 2010; Taylor, 2006

Table A2. *AED Best Practice Literature Summary Continued*

AED Based Best Practices	Definition	Literature
Informal Social Interactions	The instructor encourages informal social interaction in discussions	Swan & Shih, 2005
	Informal social interaction not related to the discussion assignment is present.	Dixson et al., 2006
Instructor Participation	The instructor posts frequently enough that students perceive they are interested in the discussion.	An, Shin, & Lim, 2009; Mazzolini & Maddison, 2003
	Instructor to student post ratio facilitates the discussion development.	Bliss & Lawrence 2009 b; Mazzolini & Maddison, 2003
	The instructor demonstrates immediacy.	Arbaugh, 2010

APPENDIX B

AED Best Practice Training Completion Prompts

Dear (participant name)

I appreciate your willingness to participate in this study. It is important that you complete all of the discussion board best practice training before the next semester starts. I have noticed you haven't made progress on the training in the last few days. I recognize you are very busy. I hope the training will enhance the quality of your classes. Your completion of this training will also assist your colleagues in identifying what really works in discussion boards and help future students to gain the full benefits of online learning.

Dear (participant name)

Thank you for your efforts toward completing this training on discussion board best practices. By completing this training and implementing what you have learned, you are contributing to not only the quality of your own course but others as well. I encourage you to continue your efforts. The training was designed to be as efficient as possible. Each section shouldn't take more than (insert time from the pilot tests) to complete.

Dear (participant name)

You just have (# of sections) of the training sections to complete. Each of the sections is designed to help you focus on improving discussion boards in courses you will be teaching next semester. You are actually preparing for class by completing the training. I encourage you to complete these last few sections and I thank you for your efforts to improve our understanding of discussion board use.

APPENDIX C

Instrument

AED Best Practice Data Collection Instrument		
Expectations Best Practice		
E-1		
The expectations for the discussion assignment are clearly established as demonstrated by the presence of directions for the discussion (An, Shin, & Lim, 2009; Arbaugh, 2010; Beaudin, 1999; Dennen, 2005; Dixson, Kuhlhorst & Reiff, 2006; Gilbert & Dabbagh, 2005; Hew, Cheung and Ng, 2009; Ke 2010) that contain discussion deadlines, student participation requirements, and a discussion prompt.	Discussion deadlines were present in the discussion directions examined	
	Student participation requirements were present in discussion directions examined	
	A Discussion prompt was present in the discussion directions examined	
E-2		
The expectations for the discussion assignment are clearly established as demonstrated by the instructor providing a rubric for students that contains grading criteria for timely contribution to the discussion, demonstration of knowledge, and compliance with posting protocols (Gilbert & Dabbagh, 2005).	Grading criteria for timely contribution to the discussion present is in the grading rubric examined	
	Grading criteria for demonstration of knowledge is present in the grading rubric examined	
	Grading criteria for compliance with posting protocols is present in the grading rubric examined	
Participant Roles Best Practice		
PR-1		
When roles are assigned in discussion boards, all roles are well-defined as demonstrated by the presence of a description for all (100%) roles assigned for each discussion (Dennen, 2005).	Roles were not assigned	
	# of roles assigned	
	# of role descriptions	
	% of role descriptions present	
Discussion Group Size Best Practice		
DG-1		
Group size is between 5 and 10 participants (Bliss & Lawrence, 2009; Roberts et al., 2006; Schellens & Valcke, 2006) in 100% of groups within the discussion examined.	# of groups present in the discussion examined	
	# of groups between 5 and 10 in the discussion examined	
	% of groups between 5 and 10 in the discussion examined	

Incentives for Performance Best Practice		
IP-1		
There is evidence that all students (100%) were provided an individual incentive for discussion participation (Dixson et al. 2006) in the form of a grade, evaluation rubric, or written feedback in the discussion examined.	# students in the discussion examined	
	#students given discussion grade in the discussion examined	
	% students given grade	
	#students given evaluation rubric in the discussion examined	
	% students given evaluation rubric	
	#students given written feedback in the discussion in the discussion examined	
	% students given written feedback in discussion	
IP-2		
There is evidence that group-based incentives are present for the discussion examined (Taylor, 2006; Kelly, 2010). The group-based incentives include group grade, group rubric or written instructor feedback to the group.	# groups in the discussion examined	
	# groups given discussion grade in the discussion examined	
	% groups given grade	
	# groups given evaluation rubric in the discussion examined	
	% groups given evaluation rubric	
	# groups given written feedback in the discussion examined	
	% groups given written feedback	
Promoted Informal Social Interaction Best Practice		
PISI-1		
The instructor encourages informal social interaction in discussions (Swan & Shih, 2005). This is demonstrated by the instructor inviting students to share personal information, by the instructor modeling informal discussion, or by the instructor identifying student informal social interaction in writing within the discussion examined.	# of times instructor invites student to share personal information in the discussion examined	
	# of times the instructor models informal discussion in the discussion examined	
	# of times instructor identifies student informal social interaction in writing within the discussion examined	

Instructor Participation in Discussion Best Practice		
IPD-1		
The instructor posts frequently enough that students perceive the instructor is interested in the discussion (An, et al., 2009, Ke, 2010; Mazzolini & Maddison, 2010) as demonstrated by an instructor to student posting ratio of no less that 1%.	# of student posts during discussion	
	# of instructor posts during discussion	
	% of instructor posts	
IPD-2		
Instructor to student post ratio facilitates the discussion development (Bliss & Lawrence 2009; Mazzolini & Maddison, 2003) as demonstrated by no more than 20% of posts are made by the instructor.	# of student posts during discussion	
	# of instructor posts during discussion	
	% of instructor posts	

APPENDIX D

Summary of AED Best Practice Measurements in the Literature

Instruments used in the best practice literature					
Authors	Instrument	Context	What measured	Subjects	Findings
Hew Cheung & Ng, 2009	Survey	1 course 13 students	motivation	Students	Student discussion facilitators contributed to increased motivation for student participation
An, Shin, & Lim, 2009	1. count 2. Survey	3 courses 3 instructors	# of replies in discussions	Students	1. Clear structure contributes to increased # of replies. 2. Too much instructor involvement decreased # of replies
Ke 2010;	1. Interviews 2. Content Analysis 3. Classroom Community Scale 4. Learner Satisfaction Survey 5. Study Process Questionnaire 6. Virtual observation	10 courses Ranging from undergrad to Doctorate	Student perceptions (survey, interviews and CC scale) Instructor experience and course design	Student Instructor	Instructor behavior such as personal disclosure, not too little and not too much participation facilitates learner satisfaction. Discussion design significantly influences learner satisfaction.
Arbaugh, 2010	1. Survey 2. Interviews	46 courses 18 instructors 11 different course topic areas	Student perception	Student Instructor	Instructor informal behavior and immediacy significantly influences student satisfaction

Instruments used in the best practice literature continued					
Dennen, 2005	1. Interviews 2. Observation 3. Surveys	9 courses topics Undergrad to masters 8 instructors 7 universities	AED design impact on Student participation	Student Instructors	Clear guidelines and deadlines correlate with high participation and high quality discussions in AED
Gilbert & Dabbagh, 2005	1. # of posts 2. AED content analysis	1 course over 4 semesters	AED structure effect on meaningful discourse	Students	Clear guidelines and rubric positively correlate with meaningful discourse. Discussion protocols negatively correlate with meaningful discourse
Dixson, Kuhlhorst, & Reiff, 2006	1. Interaction Process Analysis (coded discussion posted) Assignment grade	1 course with 19 students	Dominate group leaders and group academic performance.	Students	Groups assigned group leaders/facilitators got higher scores on assignments. Individual incentives contribute to participation
Schellens Van Keer, Balcke, & De Wever, 2005	Assignment grade	1 course with 268 students	AED Role assignment impact on achievement	Students	Role of summarizer positively correlated with higher achievement
Bliss & Lawrence, 2009 a	1. Count 2. Content analysis	17 math courses(topics not specified)	# of posts Category of posts	Students	Small group work facilitates student participation.

Instruments used in the best practice literature continued					
Roberts et al., 2006	1. Survey	5 sections of the same course	Concept of voice in a group	Students	Small groups (n = 3)have greater sense of voice than larger groups (n = 6)
Schellens & Valcke, 2006	1. Content analysis	1 course, 1 section	Quality of posts	Students	Groups larger than 12 result in decreased quality of posts
Taylor, 2006	1. Content analysis	1 course volunteer students participate in experiment	Information sharing	Students	Group incentives inspire more knowledge exchange among group members
Kelly, 2010	1. Test performance 2. Survey	Experiment volunteers	Information sharing	Students	Information exchange is better under group incentives
Swan & Shih, 2005	1. Survey 2. Content analysis	2 courses 2 instructors	Social presence Course satisfaction	Students	Perceived presence of instructor correlates with student satisfaction
Mazzolini & Maddison, 2010	1. Participation rates 2. Thread length 2. Survey	Multiple courses over multiple semesters	Archived discussions	Students Instructors	Instructor post correlate with student participation.
Bliss & Lawrence, 2009 b	1. Count	33 mathematics courses(topics not specified)	Participation, quality, quantity and instructor presence	Students Instructors	Instructor presence correlates with student participation.

APPENDIX E

Online Instructor Certification Course Schedule

Course Schedule

➢ This schedule is an overview of the course activities; the course structure follows Learning Model architecture (Prepare, Teach One Another, and Ponder/Prove).
➢ You will find a detailed outline of specific activities in each week's lesson folder in the Main Menu of the course.
➢ Please plan to complete each week's tasks by Friday night (we don't expect you to work on this course during the weekend).
➢ Several tasks, such as group discussions, will require daily engagement during the week.

Week One: BYU-Idaho Models and Personal Honor

Week One Objective:
✓ To learn about and how to apply the context and methodology of the BYU-Idaho Mission, Framework, Learning Model, and Online Instructor Standards for teaching online at BYU-Idaho.

In Week One you will complete the following tasks (see the weekly lesson folder for details):
Prepare:
• Read from the BYU-Idaho Online Instruction Handbook: through p. 13
• View Technology Tips tutorials
• Read supplemental Readings (optional)
Teach One Another:
• Participate in the week's small group discussions
Ponder/Prove:
• Application of Skills: Post a Jing screencast of the week's sandbox activities
• Submit the weekly feedback and reflection quiz
• Write in the Triple-Entry Reflective Journal (optional)

Week Two: Instructor Engagement and Student Contact

Week Two Objectives:
✓ To identify and practice course management and facilitation strategies that reflect the online Instructor Standards and that allow for continued improvement and ongoing instructional development in a Learning Model culture emphasizing responsibility, preparation, participation, and reflection.

✓ To demonstrate the ability to actively facilitate group interaction without controlling it, encouraging team ownership of collaborative processes and projects while respecting individual accountability.

In Week Two you will complete the following tasks (see the weekly lesson folder for details):

Prepare:
- Read from the BYU-Idaho Online Instruction Handbook: pp. 14-37
- View Technology Tips tutorials
- Read supplemental Readings (optional)

Teach One Another:
- Participate in the week's small group discussions

Ponder/Prove:
- Application of Skills: Post a Jing screencast of the week's sandbox activities
- Submit the weekly feedback and reflection quiz
- Write in the Triple-Entry Reflective Journal (optional)

Week Three: Timely Feedback and Instructional Development

Week Three Objective:
- ✓ To demonstrate excellent communication skills that enable effective interaction with students; prompt, respectful responses and substantive feedback to students and that creates a learning environment in which students feel secure communicating with each other and the instructor.

In Week Three you will complete the following tasks (see the weekly lesson folder for details):

Prepare:
- Read from the BYU-Idaho Online Instruction Handbook: pp. 38-46
- View Technology Tips tutorials
- Read supplemental Readings (optional)

Teach One Another:
- Participate in the week's small group discussions

Ponder/Prove:
- Application of Skills:
  - Post a Jing screencast of the week's sandbox activities
  - Schedule and participate in a synchronous Adobe Connect meeting
- Submit the course feedback and reflection quiz
- Write in the Triple-Entry Reflective Journal (optional)

APPENDIX F

University Training and Experimental Treatment Comparison

University Training and Treatment

This section provides a description of the OICC, and a description of the experimental group treatment. It also provides a comparison of the OICC and experimental group treatment.

Mandatory instructor training

The university recently revised their OICC and trained the first cohort of online instructors in March 2012. In the current version of the OICC, the instructors are informed of the university mission, the university learning model, the instructor's role in the online program, and the standards for online instructors at the university. The online certification course is organized around five university standards. They are (a) personal honor, (b) instructor engagement, (c) student contact, (d) timely feedback, and (e) instructional development.

The OICC addresses each of the AED best practices found in the literature by at least mentioning it during the training. This includes giving a "tip" for online instruction, showing an example that demonstrates the use of an AED best practice, or addressing an expectation for online instructions which could potentially be applied to AEDs. Table F1 shows the OICC content that addresses AED best practices found in the literature.

Table F1. *AED Best Practice Addressed in the OICC*

OICC Content	Expectations	Participant Roles	Group Size	Incentives	Informal Interactions	Instructor Participation
Orient students to course requirements	x					
Managing student expectations	x					
Regular announcements	x					
Model participation	x					
Hold individual students accountable	x					
Define clear roles		x				
Use collaborative teams			x			
Deepen the discussion				x		x
Use a rubric for feedback				x		
Online instructor task is community building					x	
Make personal contact with email					x	
Encourage student personal information in discussions					x	
Modeling online communication					x	x
Engage online course five days a week						x
Don't respond to every post						x

Experimental group treatment

The experimental group treatment is AED best practice training. This training is designed to be given near the beginning of the semester to facilitate application of AED best practices to in online courses. Participants are given between one and two weeks to complete the AED best practice training. They are also sent reminder prompts to use their AED best practices strategies during the semester. This approach is consistent with

Bero et al. (1998) who found that such strategies are among the most effective in

encouraging use of research in practice.

The AED best practice training is organized around the six AED best practices

identified for this study. They are (a) Expectation, (b) Participant Roles, (c) Discussion

Group Size, (d) Incentives for Performance, (e) Instructor Participation, and (f) Promotes

Informal Social Interaction. When addressing each AED best practice, the training

defines the standard, gives an example of the standard being implemented in an AED,

and prompts the participant to identify how the standard could be implemented into their

assigned course. Table F2 shows the content of the AED best practice training as it

relates to AED best practices in the literature.

Table F2. *AED Best Practice Addressed in the AED Best Practice Training*

AED Best Practice Training Content

	Expectations	Participant Roles	Group Size	Incentives	Informal Interactions	Instructor Participation
Directions	x					
Deadlines	x					
Participation requirements	x					
Discussion prompts	x					
Rubric	x					
Role assignments definitions		x				
Discussion group size			x			
Individual-based incentives				x		
Group-based incentives				x		
Encourages informal social interaction					x	
Instructor minimal participation						x
Instructor maximum participation						x

Training and treatment comparison

The OICC (standard institutional training) and the experimental group treatment (AED Best Practice Training) are compared on four criteria. They are (a) the presence of each of the AED best practices in the training content, (b) the presentation of the AED best practice in a context specific to AED use, (c) the presence of application examples for each of the AED best practices, and (d) the presence of prompts for the participant to apply the content to a course they are teaching or are planning to teach.

Table F3 provides a complete comparison of the OICC content with the AED best

practice training content as they relate to the four comparison criteria.

Table F3. AED *Best Practice Training and OICC Comparison*

Best Practice Category	Present in Training	AED Specific	Example of Application	Application prompt
OICC				
Expectations	x	x	x	
Participant Roles	x			
Discussion Group Size	x			
Incentives for Performance	x			
Informal Social Interactions	x	x		
Instructor Participation	x	x		
AED Best Practice Training				
Expectations	x	x	x	x
Participant Roles	x	x	x	x
Discussion Group Size	x	x	x	x
Incentives for Performance	x	x	x	x
Informal Social Interactions	x	x	x	x
Instructor Participation	x	x	x	x

Both the OICC and the AED best practice training address all six AED best

practices identified in the literature. However, in the OICC, half of the AED best

practices are addressed indirectly in the context of an online course. For example, the

OICC addresses the AED best practice of defining roles but it addresses it in the context

of general collaborative group assignments where students define their roles. It does not

address the use of roles in AEDs. On the other hand, the participant roles section of the

AED best practice training identifies the benefits of role assignments in AEDs, and

establishes the standard that roles be well defined.

Most of the AED best practice areas identified in the OICC lack examples of

application. For instance, The OICC addresses the use of incentives for student

performance but does not provide examples of those incentives. The Incentives for performance section of the AED best practice training identifies both individual based incentives and group-based incentives as AED best practices, and gives examples for both. The individual-based incentives examples focus on individual achievement such as grades or instructor feedback to motivate students to participate. The group-based incentive examples focus giving group grades or written feedback to the group.

The OICC also does not prompt the participant to apply any of the AED best practices to a specific course to be taught by the participant. In contrast, the AED best practice training prompts participants to create a plan for implementing each AED best practice in a course to be taught.

APPENDIX G

Team-Based Course Development
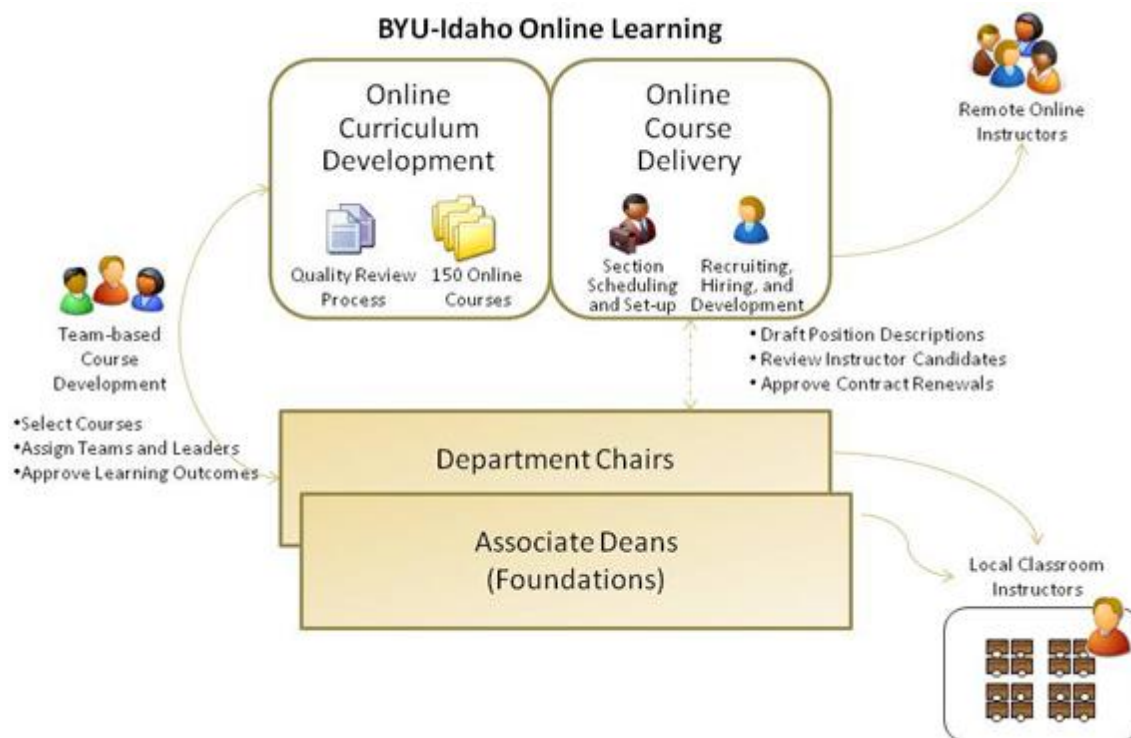
Figure G1. Online course development flow chart for the participating institution.

APPENDIX H

Learning Hierarchy
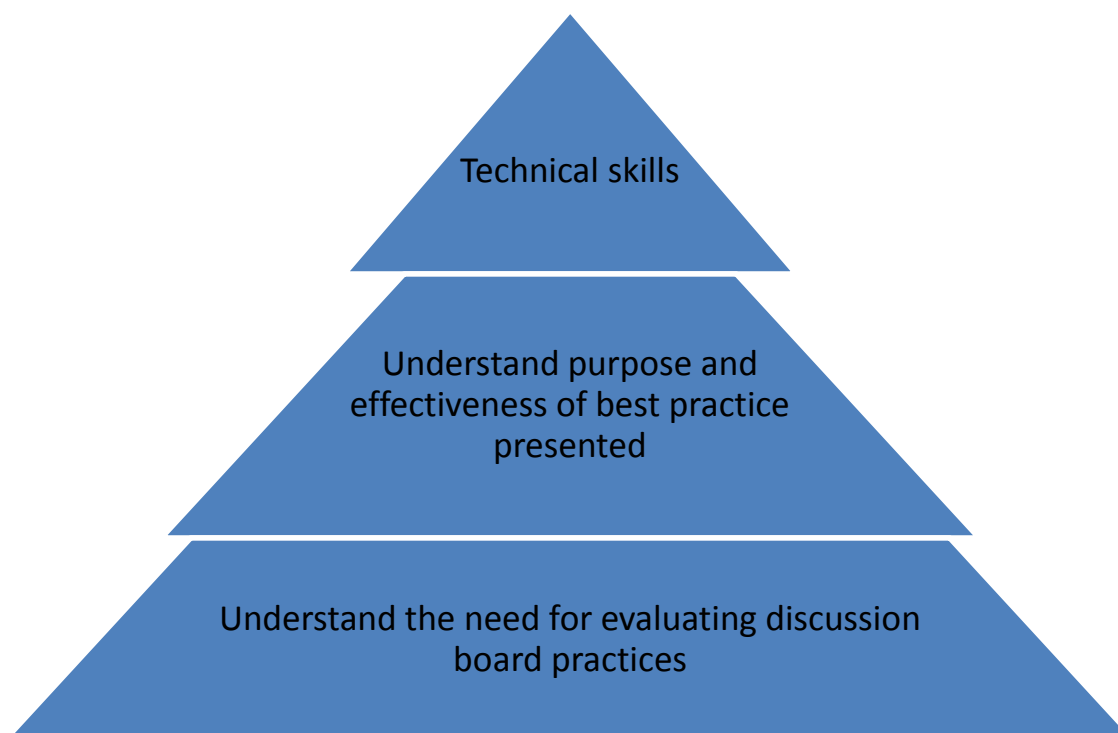
Figure H1. Learning hierarchy for participant in AED best practice training.

APPENDIX I

Project Timeline

Time line												
	June 2012	July 2012	Aug 2012	Sept 2012	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	March 2013	April 2013	May 2013	June 2013
Training	Design & develop training		Pilot test training					Implement and evaluate training					
Study					Subject Recruitment and Sample selection			Conduct experiment				Analyze Data	
Instrument	Instrument Development				Delphi Process					Test & Validate Instrument			

Figure I1. Time line for project.

APPENDIX J

Storyboard

1. LMS Interface: Participant selects AED training from drop down menu.	2. Introduction that contains directions comes up automatically.
3. Participant selects one of the 6 best practice modules.	4. Participant reviews content including examples.
5. Participant types their response to the assignment prompt and submits it.	6. Participant selects another of the 6 best practice modules until all are completed.

Figure J1. Storyboard for AED best practice training LMS interface.

HEADER HERE
Insert subheading hear: specific to content

Content Text Here

(Content is direct, brief and instructive)

Insert Visual Here

(visual illustrates content area)

Insert Text for Visual Here

Content Text Here

(Content is direct, brief and instructive)

Boarder frames content

EXAMPLES

Examples of Content Appropriately Applied Here (Examples are direct, brief and illustrative)

Figure J2. Storyboard content template for AED best practice training page one.

HEADER HERE
Insert subheading hear: specific to
content

ASSIGNMENT

Insert Assignment Directions Here

(Assignments alien with training objectives. They are submitted on I-Learn)

INFORMATION
Interested in More Information? Check out these Links.

Insert Reference Links Here

Figure J3. Storyboard content template for AED best practice training page two.

APPENDIX K

Training Goals and Objectives

The general purpose or goal of this learning module is for the instructor participants to increase their implementation of best practices in the context of discussion board management.

The overall goal for this learning module is:

1. Training participants will implement asynchronous electronic discussion best practices throughout the semester at a higher rate than untrained participants as measured by a researcher-designed instrument.

The objectives for the learning module address each best practice identified in the literature. They are:

1. Participants will identify how the structure and expectation best practice standard can be implemented in their course by answering the following question in writing. How can you create better structure and expectations in your online class discussions?

2. Participants will identify how the participant role assignment best practice standard can be implemented in their course by answering the following question in writing. How can you create useful role assignments in your online class discussions?

3. Participants will identify how the group discussion size best practice standard can be implemented in their course by answering the following question in writing. How can you create discussion groups from 5 to 10 participants in online class discussions?

4. Participants will identify how the participation incentive best practice standard can be

implemented in their course by referencing at least one point from the training

module when answering the following question in writing. Using at least one

point from this training module, how can you create individual incentives for

participation in your online class discussions?

4.1 Participants will identify how the participation incentive best practice standard can be

implemented in their course by referencing at least one point from the training

module when answering the following question in writing. Using at least one

point from this training module, how can you create group incentives for

participation in your online class discussions?

5. Participants will identify how the promotion of informal social interaction best

practice standard can be implemented in their course by answering the following

question in writing. How can you create an environment that promotes informal

social interaction in your online class discussions?

6. Participants will identify how the instructor playing a minor role best practice standard

can be implemented in their course by answering the following question in

writing. How can you play a minor role in your online class discussions?

APPENDIX L

AED Best Training Content

Discussion Board Best Practice
Directions

POINTS TO CONSIDER

- Discussion board best practices are beginning to emerge in research literature.

- This training is based on research done on discussion board use.

- This training is designed to help you identify what best practices you are already using and educate you on those you can use in the future.

Sometimes it helps to know where you are going.

Directions

Review the individual topic points, examine the examples provided and answer the question or questions at the end.

The time listed in each topic title indicates how long it will take to read through the material.

Answering the questions will aid in preparing you for implementing the best practice in your courses.

Taking the satisfaction survey at the end will aid in improving the training. Please take the time to do so.

Figure M1. Introduction to the best practice learning module.

Discussion Board Best Practice
Expectations

POINTS TO CONSIDER

- Clear discussion board expectations increases discussion effectiveness.

- Expectations are established through directions and evaluation rubrics.

- Regular deadlines (always due Friday at 5:00 PM) help establish clear expectations.

Got it?

- At BYU Idaho, clear expectations are defined as directions that address discussion deadlines, student participation requirements and a discussion prompt or "D-P-P"

- Rubrics are powerful tools for establishing clear expectations for student performance. At BYU Idaho, discussion rubrics should include criteria for the student's timely contribution to the discussion, their demonstration of knowledge and their compliance with the discussion assignment directions or protocols.

Check out the examples below for evidence of D-P-P and rubrics

EXAMPLES

Example 1
Directions: Each of you is required to introduce yourself to the class. After you complete your introduction, I expect you to respond to every post about your introduction. You will have one week to complete this assignment.
Here are the requirements for the introduction:
1. Name and current position
2. One sentence about what you expect to learn from this course. (What do you want to know?)
3. One sentence about how you learn best. (Think back to something that you learned and reflect on the process you used to learn this.)
4. One paragraph pointing out what you find interesting about yourself. (What makes you the person you are at this point in your life?)

Example link

Figure M2. Expectations best practice learning module page one.

Discussion Board Best Practice
Expectations

EXAMPLES

Example 2 Continued

Group Intervention Rubric

Criteria	Not acceptable	Below Average	Average	Superior	
	0	10	20	30	
Thoroughness	Intervention includes access to less than 4 of the 4 needs.	Intervention includes access to 3 of the 4 needs.	Intervention includes access to education, treatment, adaptive equipment, and funding.	Intervention includes access to education, treatment, adaptive equipment, and funding and appears realistic.	
	0	10	20	30	
Logic	The intervention appears to have a cause and effect relationship with less than 3 of the 4 needs.	The intervention appears to have a cause and effect relationship with 3 of the 4 needs.	The intervention appears to have a cause and effect relationship with the identified needs.	The intervention appears to have a cause and effect relationship with the identified needs and uses client strengths in addressing the needs.	

ASSIGNMENT

Click the open button in Brain Honey and submit your answer to the following question.

Using at least one point from this training module, how can you create better expectations in your online class discussions?

Figure M3. Expectations best practice learning module page two.

Discussion Board Best Practice
Expectations

EXAMPLES

Example 2 Continued

Group Intervention Rubric

Criteria	Not acceptable	Below Average	Average	Superior	
	0	10	20	30	
Thoroughness	Intervention includes access to less than 4 of the 4 needs.	Intervention includes access to 3 of the 4 needs.	Intervention includes access to education, treatment, adaptive equipment, and funding.	Intervention includes access to education, treatment, adaptive equipment, and funding and appears realistic.	
	0	10	20	30	
Logic	The intervention appears to have a cause and effect relationship with less than 3 of the 4 needs.	The intervention appears to have a cause and effect relationship with 3 of the 4 needs.	The intervention appears to have a cause and effect relationship with the identified needs.	The intervention appears to have a cause and effect relationship with the identified needs and uses client strengths in addressing the needs.	

ASSIGNMENT

Click the open button in Brain Honey and submit your answer to the following question.

Using at least one point from this training module, how can you create better expectations in your online class discussions?

Figure M4. Expectations best practice learning module page three.

Discussion Board Best Practice
Expectations

INFORMATION
Interested in More Information? Check out these Links.

An et al. 2009

Arbaugh, 2010

Beaudin, 1999

Dennen, 2005

Dixson et al. 2006

Gilbert & Dabbagh, 2005

Hew et al. 2009

Figure M5. Expectations best practice learning module page four.

Discussion Board Best Practice
Group Size

POINTS TO CONSIDER

Too Big

- It's not uncommon to find online class discussions where only 30% of the class participates in a meaningful way.

- Groups larger than 12 become too challenging for students to stay engaged.

Class size is not group size---
It really is easy to get lost in the crowd.

Too Little

- Researchers caution not to make groups too small for your specific purposes. If groups are too small they may lose diversity of thought.

Just Right

- While there is no magic number to make a group work well, researchers are finding as the group size goes down, the number of posts, the quality of posts, and the participation level of students goes up.

- Group size of between 3 and 12 students are supported by research literature. The target discussion group size at BYU-Idaho is between 5 and 10 students.

EXAMPLES

Example 1

A class of 48 students is divided into six groups of eight to debate the following question.

Does gun control help or impede the reduction of violent crime? The instructor chooses the best arguments for and against gun control to share with the entire class.

Figure M6. Group size best practice learning module page one.

Discussion Board Best Practice
Group Size

EXAMPLES

Example 2

A class 31 students is allowed to self-select teams ranging from 5 to 10 individuals in each team for a class project. This resulted in three teams of 5 and two teams of 8. The instructor gave them the following discussion assignment related to their assigned class project.

Read the attached scenario and write an intervention strategy for handling the problems identified. Critique each team member's strategies. Then choose the best strategy to submit for grading. While all team members will receive the same score for the submitted strategy, each team member will receive a rating from the rest of the team based on how well they contributed to the end product.

ASSIGNMENT

Click the open button in Brain Honey and submit your answer to the following question.

Using at least one point from this training module, how can you create discussion groups from 5 to 10 participants in online class discussions?

INFORMATION
Interested in More Information? Check out these Links.

Berry 2008

Bliss & Lawrence, 2009

Fung 2004

Roberts, Lowry, & Sweeney, 2006

Schellens & Valcke, 2006

Figure M7. Group size best practice learning module page two.

Figure M8. Incentives best practice learning module page one.

Discussion Board Best Practice
Incentives

EXAMPLES

Example 2 (Individual-based Incentive)

Post Rating Rubric (Instructor)

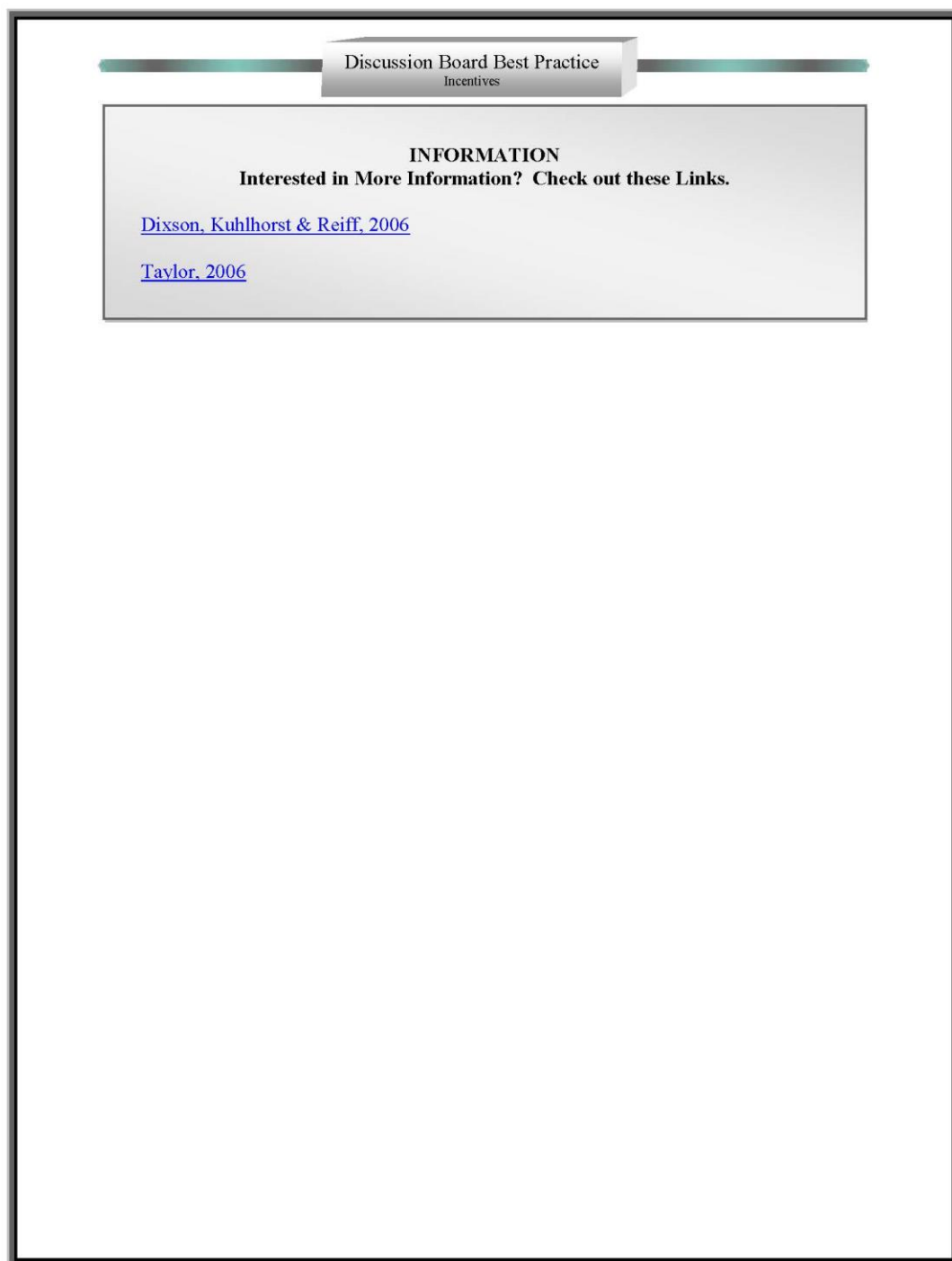| Criteria	4 points - Outstanding	3 points - Proficient	2 points - Basic	1 point - Below Expectations
Critical Thought	Content rich; Demonstrates complex insight and analysis	Substantial information; Evidence that some analysis or insight has taken place	Information is commonplace and insufficient; Little evidence of analysis or insight	Information is superficial; No analysis or insight
Connections	Clear connections to past or current events; Substantial evidence of application to real-life situations	Some connections to past or current events; Some evidence of application to real-life situations	Limited connections to past or current events; Limited evidence of application to real-life situations	No connections to past or current events; No evidence of application to real-life situations
Uniqueness	Many new ideas; Many new connections; Shows depth and detail	Some new ideas; Some new connections; Shows some depth and detail	Few new ideas; Few new connections; Shows little depth and detail	No new ideas; No new connections; No depth and detail
Style	No grammatical errors; No spelling errors	A few grammatical errors; A few spelling errors	More than a few grammatical errors; More than a few spelling errors	Considerable grammar errors; Considerable spelling errors

Rubric link

Figure M9. Incentives best practice learning module page two.

Discussion Board Best Practice
Incentives

EXAMPLES

Example 3 (Individual-based Incentive)

Student Participation Peer Evaluation

Submit the following survey on each of the members in your discussion group.
Rate how well each discussion group member participated in the discussion. (1=
poor, 10= wonderful) Your rating together with others in your discussion group
will be averaged to give each person their personal participation grade for each
discussion.

EDLT 365 Discussion Member Evaluation

Group member:

This person was enthusiastic about the discussion.

     1   2   3   4   5   6   7   8   9   10

This person contributed to the topic in a productive way.

     1   2   3   4   5   6   7   8   9   10

This person is knowledgeable about the topic.

     1   2   3   4   5   6   7   8   9   10

ASSIGNMENT

Click the open button in Brain Honey and submit your answer to the following
questions.

**1. Using at least one point from this training module, how can you create
individual incentives for participation in your online class discussions?**

**2. Using at least one point from this training module, how can you create group
incentives for participation in your online class discussions?**

Figure M10. Incentives best practice learning module page three.
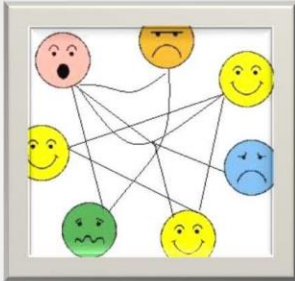
Figure M11. Incentives best practice learning module page four.

Discussion Board Best Practice
Informal Social Interaction

POINTS TO CONSIDER

- Students socialize in online discussion groups and face-to-face discussion groups in a similar way.

- Informal social messaging helps groups to bond, increases student satisfaction, and improves learning outcomes.

- Instructors should encourage student informal interaction with invitations, modeling, or identifying informal discussion.

Social connections aren't a bad thing.

EXAMPLES

Below are statements students made about informal social interactions during discussion boards.

"We got to be really great friends. We see the same way; we feel the same way you know. We were in groups where we were these 2 people who worked really hard... There is a way to form relationships and to have a sense of community…" (Ke, 2010)

"Some discussion boards can be really good but others are really bad. Having a place where you can just talk to people about random stuff really helps to get to know them."

The following is an example of an instructor identifying, modeling, and encouraging informal social interaction as it relates to an assignment.

"Thank you for using a personal experience to show application of one of the centering techniques from the chapter. I like fishing too. It's really relaxing and allows me time to think. That's what I like about teaching online. It allows me to use the best time of day to think (fish) and still be productive. What other personal experiences do you have that could help you use centering or stress management techniques?"

Figure M12. Informal social interaction best practice learning module page one.

Discussion Board Best Practice
Informal Social Interaction

ASSIGNMENT

Click the open button in Brain Honey and submit your answer to the following question.

Using at least one point from this training module, how can you create an environment that promotes informal social interaction in your online class discussions?

INFORMATION
Interested in More Information? Check out these Links.

Dixon, Kuhlhorst & Reiff, 2006

Ke, 2010

Swan & Shih, 2005

Figure M13. Informal social interaction best practice learning module page one.

Discussion Board Best Practice
Instructor Involvement

POINTS TO CONSIDER

- Yes, you can do too much and in the case of discussion board facilitation, less is better.

- Instructor high participation rates do not encourage student-to-student posts and do not result in higher satisfaction on the part of the student.

My students love me!
I'm there all of the time!

- Students, when facilitating discussions, learn and participate more than when an instructor facilitates the discussion board.

- Being aware of and involved with every student post can be overwhelming and even unrealistic.

- If you think about it, it makes sense. Those who work the hardest learn the most. If the instructor is working harder than the student, then who is benefiting?

- To be successful in discussion board management, instructors need to find a balance where they are not too involved but involved enough to support students. At BYU Idaho, the target participation rate for instructors is no less than 1% of posts and no greater than 20% of posts.

EXAMPLES
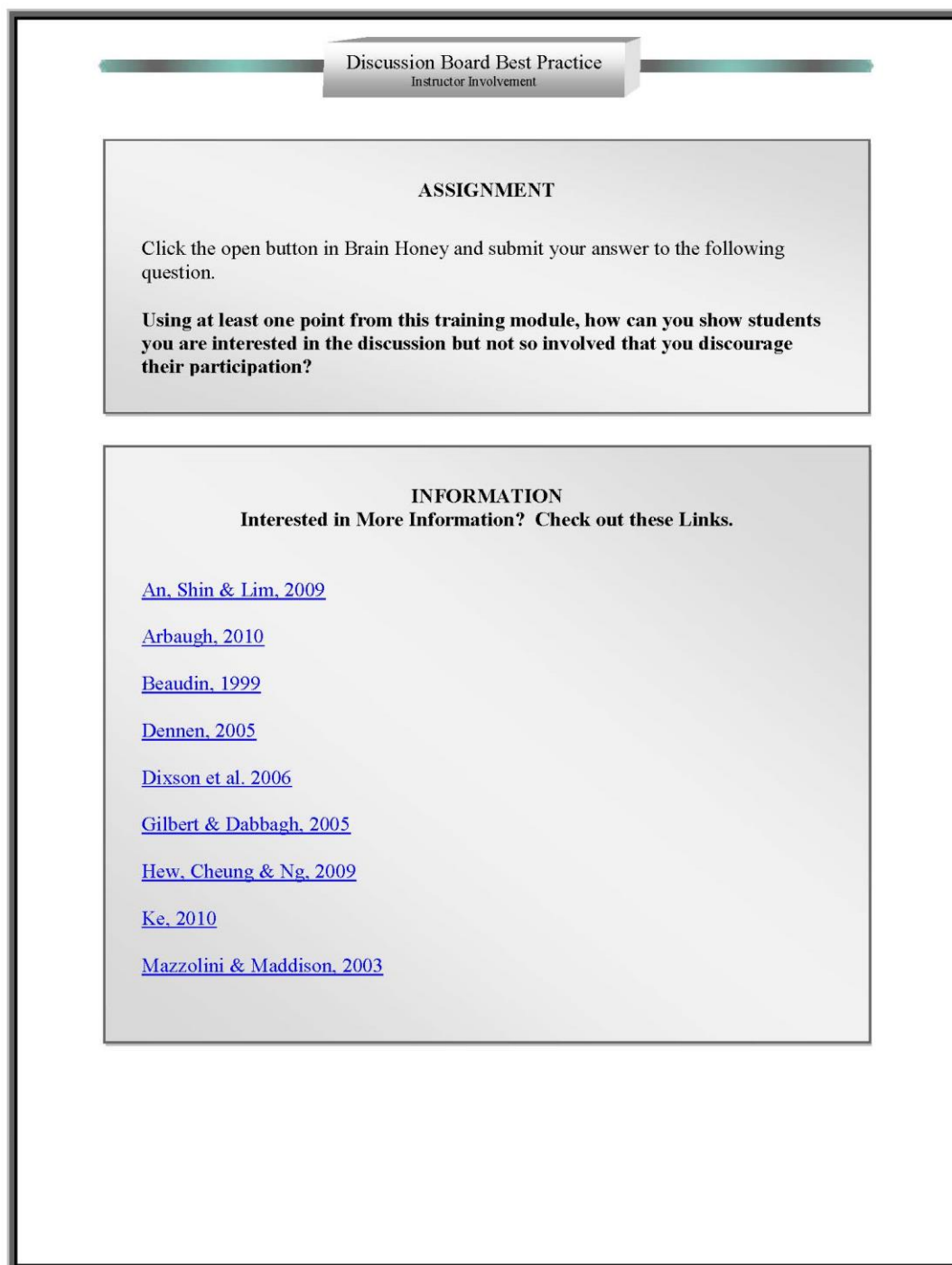
Example 1 (student response to an over involved instructor)

"I felt like he was stalking me with comments and questions about my posts. It freaked me out and I felt overwhelmed."

Example 2 (student response to an appropriately involved instructor)

"I liked that she let us speak our minds and only got involved when we got off track or had questions."

Figure M14. Instructor participation best practice learning module page one.

Figure M15. Instructor participation best practice learning module page two.

POINTS TO CONSIDER

- Researchers have found that having a group discussion with strong student leadership results in higher participation rates.

- The use of roles facilitates a more rapid and consistent level of interaction.

If we were all Santa Clause, what would we have to talk about?

- Learning occurs when there is interaction. Assigned student roles facilitate productive interaction and learning. It gives students both direction and purpose in the online discussion.

- Students participating in the role-assigned discussion groups more often achieved the highest learning levels as compared to other groups.

- Some roles are better than others. The roles of summarizer (summarizes the discussion thread) and facilitator (starts and manages the discussion thread) for example, result in significantly higher learning levels than other roles.

- Roles need to be well defined to be effective. Roles that lack clear definitions result in confusion and take away from the learning atmosphere.

- Each student would benefit from taking on a role assignment. It gives them something to look for and contribute in the discussion.

EXAMPLE

The following is a summary of a discussion forum from a group of Social Work students discussing their understanding of the professional value of competence. Names have been changed to reflect the assigned role. The role assignments used in this example were: initiator, researcher, experience sharer, opinion giver, counter opinion, and summarizer. The roles were defined for the students before the discussion board took place. The role definitions are listed below. Over look some of the student grammar and observe how the roles play off one another to generate real discussion and insights.

Figure M16. Assigned roles best practice learning module page one.

Discussion Board Best Practice
Role Assignment

EXAMPLE CONT.

Experience Sharer #2 (New) 9/26/2011 8:28 AM

I discussed this value with my mother. One of her statements that I thought was very insightful was her comment that "every profession should have competent people". As social workers we are no exception. Social workers handle people's lives, they are depended on for so much, and if they do not have the skills to do a good job they will not be able to help anyone, and could only make the problems worse.

Counter Opinion (New) 9/26/2011 9:14 AM

We, as social workers, need to keep up with the latest research and practices. We want to be as highly trained as we can so we can offer the best services possible for our clients. But, it isn't realistic to think we can ever be competent all the different areas we need to practice in. That's what liability insurance is for.

Researcher (New) 9/26/2011 1:23 PM

Competence is the specific knowledge that we have about our profession. There are all different kinds of people at different stages of life that need help. In order to give the best care we need to have a good knowledge of many things. If we have competence we are able to show respect to our clients and their families. Throughout our careers we will have to continually keep learning more so we are able to help!

Opinion Giver #1 (New) 9/26/2011 6:58 PM

I totally agree that we don't have to know everything and that it is okay to say let me do some research and get back to you with the best information. Our clients will understand that we are human beings just like them and we can't know everything. I think that in more ways than in just social work sometimes "I don't know" is the best answer.

Opinion Giver #2 (New) 9/26/2011 8:11 AM

I like how (experience sharer) pointed out that part of being competent is not being afraid to admit that we don't know. We aren't going to know everything, but we can admit that we don't have an answer, and then be willing to find out the information so we can become more knowledgeable. I think clients will have more trust in us if we don't give them answers that we aren't sure about. I also think planning to use liability insurance won't help clients trust us.

Figure M17. Assigned roles best practice learning module page two.

Discussion Board Best Practice
Role Assignment

EXAMPLE CONT.

Opinion Giver #2 (New) 9/27/2011 1:06 AM

I like how (researcher) pointed out that there is always going to be new research and practices that we as social workers need to keep up on and study. Times change, society changes, and therefore the situations we see and ways to handle them will also change. Going back to the medical example, if doctors still used the same surgical procedures from 200 - even 70 years ago we wouldn't see nearly the same success rates. The same goes for social work. While some human truths will stay the same - learning new practices, ways to help clients and the resources that are available will always be beneficial!

Summarizer (New)9/27/2011 10:34 AM

After discussing competence, I have come to learn that the whole world needs it. The sad thing is that there will be some people who do not take the time to understand competence in situations other than their own. We will be working with many different people. If we do not have competence, not much work is going to get done. I think it is interesting to know that learning new skills won't end after school.

ASSIGNMENT

Below are some ideas about potential roles in discussion boards.

Moderator	*Leader*	*Analyzer*
Summarizer	*Real Experience Relater*	*Questioner*
Dissenter	*Story teller*	*Others?*

Think about the following questions.

- *Would some of these roles work in your courses?*
- *How would you define those roles for your students?*
- *Are there other roles you could use in your course?*

Click the open button in Brain Honey and submit your answer to the following question.

Using at least one point from this training module, how can you create useful role assignments in your online class discussions?

Figure M18. Assigned roles best practice learning module page three

Discussion Board Best Practice
Role Assignment

INFORMATION
Interested in More Information? Check out these Links.

Dixson, Kuhlhorst & Reiff, 2006

Dixson, Kuhlhorst & Reiff, 2006

Gilbert & Dabbagh, 2005

Schellens, Van Keer, Valcke & De Wever, 2005

Figure M19. Assigned roles best practice learning module page four.

APPENDIX M

Satisfaction Survey

Proud

I learned something new from this training.

- ○ Strongly Disagree
- ○ Disagree
- ○ Agree
- ○ Strongly Agree

Comments

The training was well organized.

- ○ Strongly Disagree
- ○ Disagree
- ○ Agree
- ○ Strongly Agree

Comments

My questions about discussion board best practices were answered in a helpful way.

- ○ Strongly Disagree
- ○ Disagree
- ○ Agree
- ○ Strongly Agree

Comments

The training was engaging and kept my interest.

- ○ Strongly Disagree
- ○ Disagree
- ○

https://byui.qualtrics.com/SE/?SID=SV_1Im69ZIKdfcRgKF

Proud

Agree

   ○ Strongly Agree

Commnets

_____

The instruction methods used in the training helped me want to learn.

○ Strongly Disagree

○ Disagree

○ Agree

○ Strongly Agree

Comments

_____

The training was easy to access and navigate.

○ Strongly Disagree

○ Disagree

○ Agree

○ Strongly Agree

Comments

_____

The amount of time it took to complete the training was appropriate.

○ Strongly Disagree

○ Disagree

○ Agree

○ Strongly Agree

Comments

https://byui.qualtrics.com/SE/?SID=SV_1Im69ZIKdfcRgKF

APPENDIX N

AED Best Practice Measure Abbreviations and Brief Working Definitions

Best Practice	Measures	Working Definition
Expectations Best Practice	E-1	Instructor provides clear discussion directions
	E-2	Instructor provides a clear discussion rubric
Participant Roles Best Practice	PR-1A	If present, Instructor describes roles assigned
	PR-1B	Instructor assigns roles
Discussion Group Size Best Practice	DG-1	Instructor organizes discussion group size between 5 and 10
Incentives for Performance Best Practice	IP-1	Instructor provides individual incentives
	IP-2	Instructor provides group incentives
Promotes Informal Social Interaction Best Practice	PISI-1	Instructor promotes informal social interactions
Instructor Participation in Discussion Best Practice	IPD-1	Instructor post are at least 1% of total
	IPD-2	Instructor post are no more that 20% of total

Figure O1 AED Best Practice Measure Abbreviations and Brief Working Definitions

APPENDIX O

SPSS Output Research Question Two Normality Test

Research question 2 Normality tests

Table P1. *Expectation 1 Semester One and Two*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for EXPT1_SEM1_Summary	.485	15	.000	.499	15	.000
Residual for EXP1SEMESTER2	.453	15	.000	.561	15	.000

a. Lilliefors Significance Correction

Table P2. *Expectation 2 Semester One and Two*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for EXPT2_SEM1_Summary	.385	15	.000	.630	15	.000
Residual for EXPT2_SEMESTER2	.350	15	.000	.643	15	.000

a. Lilliefors Significance Correction

Table P3. *Participant Role Semester One and Two*

No statistical analysis was done.

Table P4. *Discussion Board Size*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for DG1SEM1WE5	.321	15	.000	.707	15	.000
Residual for DG1SEM1WE9	.360	15	.000	.701	15	.000
Residual for DG1SEM2WE5	.378	15	.000	.605	15	.000
Residual for DG1SEM2WE9	.344	15	.000	.677	15	.000

a. Lilliefors Significance Correction

Table P5. *Incentives for performance IP-1 Grade Use*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for IP1GRSEM1WE5	.406	15	.000	.580	15	.000
Residual for IP1GRSEM1WE9	.404	15	.000	.576	15	.000
Residual for IP1GRSEM2WE5	.403	15	.000	.587	15	.000
Residual for IP1GRSEM2WE9	.407	15	.000	.575	15	.000

a.   Lilliefors Significance Correction

Table P6. *Incentives for performance IP-1 Rubric*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for IP1RUBSEM1WE5	.514	15	.000	.419	15	.000
Residual for IP1RUBSEM1WE9	.514	15	.000	.419	15	.000
Residual for IP1RUBSEM2WE5	.485	15	.000	.507	15	.000
Residual for IP1RUBSEM2WE9	.479	15	.000	.516	15	.000

a. Lilliefors Significance Correction

Table P7. *Incentives for performance IP-1 Written Feedback*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for IP1FBSEM2WE5	.308	15	.000	.654	15	.000
Residual for IP1FBSEM2WE9	.330	15	.000	.612	15	.000
Residual for IP2FBSEM2WE5	.535	15	.000	.284	15	.000
Residual for IP2FBSEM2WE9	.514	15	.000	.413	15	.000

a. Lilliefors Significance Correction

Table P8. *Promotes Informal Social Interactions*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for PISI_summary_sem1week9	.514	15	.000	.413	15	.000
Residual for PISI_summary_SEM1week5	.535	15	.000	.284	15	.000
Residual for PISI_summary_SEM2week5	.426	15	.000	.562	15	.000
Residual for PISI_summary_SEM2week9	.535	15	.000	.284	15	.000

a. Lilliefors Significance Correction

Table P9. *Instructor participation*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for IPD12SEM1WE5	.294	15	.001	.623	15	.000
Residual for IPD12SEM1WE9	.291	15	.001	.604	15	.000
Residual for IPD12SEM2WE5	.257	15	.009	.663	15	.000
Residual for IPD12SEM2WE9	.192	15	.141	.875	15	.040

a. Lilliefors Significance Correction

APPENDIX P

SPSS Output Research Question Two

Table Q1. *Research question two SPSS crosstab output of the control group for each of the AED best practice measures during the second semester of the study*

Expectations best practice, E-1	No statistical analysis was performed.			
Expectation best practice, E-2	Compliance	Observed N	Expected N	Residual
	NONE	5	5.0	.0
	PARTIAL	2	1.0	1.0
	FULL	8	9.0	-1.0
	Total	15		
Participant role best practice, PR-1	No statistical analysis was performed.			
Incentives for performance best practice, IP-1	Compliance	Observed N	Expected N	Residual
	NONE	5	5.0	.0
	PARTIAL	2	1.0	1.0
	FULL	8	9.0	-1.0
	Total	15		
Incentives for performance best practice, IP-2	No statistical analysis was performed.			
Discussion group size, DG-1	Compliance	Observed N	Expected N	Residual
	NONE	14	12.0	2.0
	FULL	1	3.0	-2.0
	Total	15		
Promotes informal social interaction, PISI-1	Compliance	Observed N	Expected N	Residual
	NONE	10	12.0	-2.0
	PARTIAL	5	3.0	2.0
	Total	15		
Instructor participates in discussion, IPD-1	Compliance	Observed N	Expected N	Residual
	NONE	3	4.0	-1.0
	PARTIAL	2	6.0	-4.0
	FULL	10	5.0	5.0
	Total	15		
Instructor participates in discussion, IPD-2	No statistical analysis was performed.			

Table Q2. *Research question two SPSS output of chi-square statistic for each of the AED best practice measures.*

Expectations best practice, E-1	No statistical analysis was performed.	
Expectation best practice, E-2	Chi-Square	.278a
	df	1
	Asymp. Sig.	.598
	Exact Sig.	.793
	Point Probability	.363
	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 6.0.	
Participant role best practice, PR-1	No statistical analysis was performed.	
Incentives for performance best practice, IP-1	Chi-Square	1.111a
	df	2
	Asymp. Sig.	.574
	Exact Sig.	.773
	Point Probability	.116
	a. 1 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 1.0.	
Incentives for performance best practice, IP-2	No statistical analysis was performed.	
Discussion group size, DG-1	Chi-Square	1.667a
	df	1
	Asymp. Sig.	.197
	Exact Sig.	.331
	Point Probability	.235
	a. 1 cells (50.0%) have expected frequencies less than 5. The minimum expected cell frequency is 3.0.	
Promotes informal social interaction, PISI-1	Chi-Square	1.667a
	df	1
	Asymp. Sig.	.197
	a. 1 cells (50.0%) have expected frequencies less than 5. The minimum expected cell frequency is 3.0.	
Instructor participates in discussion, IPD-1	Chi-Square	7.917a
	df	2
	Asymp. Sig.	.019
	Exact Sig.	.018
	Point Probability	.004
	a. 1 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 4.0.	
Instructor participates in discussion, IPD-2	Chi-Square	1.025a
	df	1
	Asymp. Sig.	.311
	Exact Sig.	.390
	Point Probability	.546
	a. 2 cells (50.0%) have expected frequencies less than 5. The minimum expected cell frequency is 2.90.	

APPENDIX Q

SPSS Output Research Question Three Normality Test

Table R1. *Normality Tests for Research Question Three IP-2 through DG-1*

Tests of Normality[a,b,c,d,f,g,h,i]

	Kolmogorov-Smirnov[e]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Residual for IP2FBSEM1WE5	.539	29	.000	.184	29	.000
Residual for IP2FBSEM1WE9	.536	29	.000	.281	29	.000
Residual for IP2FBSEM2WE5	.539	29	.000	.184	29	.000
Residual for IP2FBSEM2WE9	.536	29	.000	.281	29	.000
Residual for EXPT1_Sem1_WE5_Summary	.501	29	.000	.460	29	.000
Residual for EXPT_Sem1_WE9_Summary	.501	29	.000	.460	29	.000
Residual for EXP1WEEK5_SEM2	.485	29	.000	.500	29	.000
Residual for EXP1WEEK9_SEM2	.501	29	.000	.460	29	.000
Residual for EXPT2_SEM1_We9_Summary	.399	29	.000	.617	29	.000
Residual for EXPT2_SEM1_We5_Summary	.399	29	.000	.617	29	.000
Residual for EXPT2WEEK5_SEM2	.399	29	.000	.617	29	.000
Residual for EXPT2WEEK9_SEM2	.399	29	.000	.617	29	.000
Residual for DG1SEM1WE5	.283	29	.000	.718	29	.000
Residual for DG1SEM1WE9	.283	29	.000	.726	29	.000
Residual for DG1SEM2WE5	.274	29	.000	.729	29	.000
Residual for DG1SEM2WE9	.300	29	.000	.741	29	.000

a. Residual for IP2GGSEM1WE5 is constant. It has been omitted.

b. Residual for IP2GGSEM1WE9 is constant. It has been omitted.

c. Residual for IP2RUBSEM1WE5 is constant. It has been omitted.

d. Residual for IP2RUBSEM1WE9 is constant. It has been omitted.

e. Lilliefors Significance Correction

Table R2. *Normality Tests for Research Question Three IP-1 through IP-D 1*

Tests of Normality[a,b,c,d,f,g,h,i]

Residual for IP1GRSEM1WE5	.416	29	.000	.548	29	.000
Residual for IP1GRSEM1WE9	.393	29	.000	.556	29	.000
Residual for IP1RUBSEM1WE5	.484	29	.000	.513	29	.000
Residual for IP1RUBSEM1WE9	.483	29	.000	.519	29	.000
Residual for IP1FBSEM1WE5	.297	29	.000	.670	29	.000
Residual for IP1FBSEM1WE9	.334	29	.000	.672	29	.000
Residual for IP1GRSEM2WE5	.412	29	.000	.549	29	.000
Residual for IP1GRSEM2WE9	.437	29	.000	.541	29	.000
Residual for IP1RUBSEM2WE5	.466	29	.000	.549	29	.000
Residual for IP1RUBSEM2WE9	.464	29	.000	.555	29	.000
Residual for IP1FBSEM2WE5	.291	29	.000	.713	29	.000
Residual for IP1FBSEM2WE9	.313	29	.000	.691	29	.000
Residual for PISI1INSEM1WE5	.539	29	.000	.184	29	.000
Residual for PISI1INSEM1WE9	.539	29	.000	.184	29	.000
Residual for PISI1MOSEM1WE5	.502	29	.000	.299	29	.000
Residual for PISI1MOSEM1WE9	.506	29	.000	.419	29	.000
Residual for PISI1IDSEM1WE5	.539	29	.000	.184	29	.000
Residual for PISI1IDSEM1WE9	.531	29	.000	.280	29	.000
Residual for PISI1INSEM2WE5	.539	29	.000	.184	29	.000
Residual for PISI1MOSEM2WE5	.486	29	.000	.475	29	.000
Residual for PISI1MOSEM2WE9	.391	29	.000	.361	29	.000
Residual for PISI1IDSEM2WE5	.519	29	.000	.358	29	.000
Residual for PISI1IDSEM2WE9	.534	29	.000	.288	29	.000
Residual for PISI1INSEM2WE9	.539	29	.000	.184	29	.000
Residual for IPD12SEM1WE5	.313	29	.000	.663	29	.000
Residual for IPD12SEM1WE9	.220	29	.001	.788	29	.000
Residual for IPD12SEM2WE5	.255	29	.000	.705	29	.000
Residual for IPD12SEM2WE9	.266	29	.000	.639	29	.000

a. Residual for IP2GGSEM1WE5 is constant. It has been omitted.

b. Residual for IP2GGSEM1WE9 is constant. It has been omitted.

c. Residual for IP2RUBSEM1WE5 is constant. It has been omitted.

d. Residual for IP2RUBSEM1WE9 is constant. It has been omitted.

e. Lilliefors Significance Correction

f. Residual for IP2GGSEM2WE5 is constant. It has been omitted.

g. Residual for IP2GGSEM2WE9 is constant. It has been omitted.

h. Residual for IP2RUBSEM2WE5 is constant. It has been omitted.

i. Residual for IP2RUBSEM2WE9 is constant. It has been omitted.

APPENDIX R

SPSS Output Research Question Three

Table S1. *Research question three SPSS output of Chi-Square statistic for the experimental group and control group semester one E-1 through IP-1 AED best practice measures during the first semester.*

Expectations best practice, E-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.210^a	2	.546	1.000
	Likelihood Ratio	1.597	2	.450	1.000
	Fisher's Exact Test	1.215			1.000
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.				
Expectation best practice, E-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	$.056^a$	1	.812	1.000
	Continuity Correction b	.000	1	1.000	
	Likelihood Ratio	.057	1	.812	1.000
	Fisher's Exact Test				1.000
	N of Valid Cases	29			
	a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.31.				
	b. Computed only for a 2x2 table				
Participant role best practice, PR-1	No statistical analysis was performed.				
Incentives for performance best practice, IP-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	$.077^a$	2	.962	1.000
	Likelihood Ratio	.077	2	.962	1.000
	Fisher's Exact Test	.376			1.000
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .97.				

Table S2. *Research question three SPSS output of Chi-Square statistic for the experimental group and control group semester one IP-2 through IPD-2 AED best practice measures during the first semester*

Incentives for performance best practice, IP-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	2.005[a]	2	.367	1.000
	Likelihood Ratio	2.775	2	.250	1.000
	Fisher's Exact Test	1.875			1.000
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.				
Discussion group size, DG-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.687[a]	2	.430	.489
	Likelihood Ratio	1.744	2	.418	.489
	Fisher's Exact Test	1.621			.489
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .97.				
Promotes informal social interaction, PISI-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	5.162[a]	2	.076	.106
	Likelihood Ratio	6.713	2	.035	.106
	Fisher's Exact Test	4.952			.106
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.45.				
Instructor participates in discussion, IPD-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	2.635a[a]	2	.268	.201
	Likelihood Ratio	3.068	2	.216	.201
	Fisher's Exact Test	2.484			.201
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.				
Instructor participates in discussion, IPD-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	2.635a	2	.268	.201
	Likelihood Ratio	3.068	2	.216	.201
	Fisher's Exact Test	2.484			.201
	N of Valid Cases	29			
	a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.90.				

Table S3. *Research question three SPSS crosstab output of the experimental and control groups for each of the AED best practice measures during the second semester of the study.*

Expectations best practice, E-1			NONE	PARTIAL	FULL	Total
	Treatment	Control	2	1	12	15
		Treatment	3	0	11	14
	Total		5	1	23	29
Expectation best practice, E-2			NONE		FULL	Total
	Treatment	Control	8		7	15
		Treatment	10		4	14
	Total		18			11
Participant role best practice, PR-1A	No statistical analysis was performed.					
Participant role best practice, PR-1B			NO USE		USE	
	Treatment	Control	14		1	15
		Treatment	11		3	14
	Total		25		4	29
Incentives for performance best practice, IP-1			NONE	PARTIAL	FULL	Total
	Treatment	Control	5	2	8	15
		Treatment	3	0	11	14
	Total		8	2	19	29
Incentives for performance best practice, IP-2			NONE	PARTIAL	FULL	Total
	Treatment	Control	12	2	1	15
		Treatment	14	0	0	14
	Total		26	2	1	29
Discussion group size, DG-1			NONE	PARTIAL	FULL	Total
	Treatment	Control	14	0	1	15
		Treatment	6	2	6	14
	Total		20	2	7	29
Promotes informal social interaction, PISI-1			NONE	PARTIAL	FULL	Total
	Treatment	Control	10	5	0	15
		Treatment	9	2	3	14
	Total		19	7	3	29
Instructor participates in discussion, IPD-1			NONE	PARTIAL	FULL	Total
	Treatment	Control	3	2	10	15
		Treatment	5	2	7	14
	Total		8	4	17	29
Instructor participates in discussion, IPD-2			NONE		FULL	Total
	Treatment	Control	2		13	15
		Treatment	4		10	14
	Total		6		23	29

Table S4. *Research question three SPSS output of chi-square statistic for the E-1 through IP-1 AED best practice measures.*

Expectations best practice, E-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.210a	2	.546	1.000
	Likelihood Ratio	1.597	2	.450	1.000
	Fisher's Exact Test	1.215			1.000
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.				
Expectation best practice, E-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.007a	1	.316	.450
	Continuity Correction b	.385	1	.535	
	Likelihood Ratio	1.017	1	.313	.450
	Fisher's Exact Test				.450
	N of Valid Cases	29			
	a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.31.				
	b. Computed only for a 2x2 table				
Participant role best practice, PR-1A	No statistical analysis was performed.				
Participant role best practice, PR-1B		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.327a	1	.249	.330
	Continuity Correctionb	.376	1	.540	
	Likelihood Ratio	1.373	1	.241	.330
	Fisher's Exact Test				.330
	N of Valid Cases	29			
	a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.93.				
	b. Computed only for a 2x2 table				
Incentives for performance best practice, IP-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	2.943a	2	.230	.251
	Likelihood Ratio	3.719	2	.156	.215
	Fisher's Exact Test	2.566			.306
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .97.				

Table S5. *Research question three SPSS output of chi-square statistic for the IP-2 through IPD-2 AED best practice measures.*

Incentives for performance best practice, IP-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	3.123a	2	.210	.349
	Likelihood Ratio	4.278	2	.118	.349
	Fisher's Exact Test	2.682			.349
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.				
Discussion group size, DG-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	8.747a	2	.013	.010
	Likelihood Ratio	9.992	2	.007	.010
	Fisher's Exact Test	8.143			.010
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .97.				
Promotes informal social interaction, PISI-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	4.309a	2	.116	.174
	Likelihood Ratio	5.505	2	.064	.153
	Fisher's Exact Test	3.854			.174
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.45.				
Instructor participates in discussion, IPD-1		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	.996a	2	.608	.763
	Likelihood Ratio	1.003	2	.606	.763
	Fisher's Exact Test	1.115			.675
	N of Valid Cases	29			
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.93.				
Instructor participates in discussion, IPD-2		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
	Pearson Chi-Square	1.025a	1	.311	.390
	Continuity Correctionb	.306	1	.580	
	Likelihood Ratio	1.038	1	.308	.390
	Fisher's Exact Test				.390
	N of Valid Cases	29			
	a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.90.				