Newbury, R. (2013). Are design elements in blended learning courses factors of student completion rate? *International Journal of Technology in Teaching and Learning*, *9*(2), 139-158.

Are Design Elements in Blended Learning Courses Factors of Student Completion Rate?

Robert Newbury
University of Nevada, Reno

Over the past decade, 80 to 90 percent of courses at universities and colleges in the United States were delivered as *blended learning* courses. However, systematical research has rarely been done to identify the measureable impact and effectiveness of the design of blended learning on learning related outcomes. In this article, the authors first identified five design elements: (a) Online Activity as an Extension of In-class Activity, (b) Self-directed Learning Activity, (c) Collaboration and Communication, (d) Assessment, and (e) Reference Materials; and then explored whether any of these design elements are factors of student successful completion rates. A total of 2,624 blended learning courses offered in fall 2012 at a western state university were reviewed, out of which 1,143 courses met the criteria of the study and were used for data analysis. One of the five design elements was found significant on student successful course completion rates.

Keywords: blended learning, instructional design, completion rate

INTRODUCTION

The term *Blended Learning* appears with increasing frequency in current educational literature and research as the concept gains acceptance by educators. Blended learning is not a new concept although the term is believed to have been coined by Elliott Masie in the late 1990's, the combining of different modes of instruction by educators has been practiced for years. The contemporary interpretation of the term is accepted to be "…the use of two or more distinct methods of training" (p. 2) and has become generally accepted to include the incorporation of computer technology within the scope of the instruction (Blended Learning in K-12/Evolution of Blended Learning, 2011).

Robert Newbury, PhD, is an Instructional Designer, Department of Teaching and Technologies at the University of Nevada, Reno. Robert Newbury can be reached at rnewbury@unr.edu

In a prospectus on the future of online learning, Kim and Bonk (2006) reported that more than 2.35 million students enrolled in online courses. Respondents to a survey of higher education predicted a growth of blended learning courses from approximately 25% of course offerings in 2006 to more than 70% by 2013 (p. 26) and also predicted of a sharp increase in the quality of online courses.

In a research brief, John Watson (2004) identified the shift toward blended learning as "…driven by a small number of tech-savvy teachers and technology coordinators seeking new ways to provide enriching content." (p. 3) Early adopters and developers of blended learning did so out of interest, trial and error experimentation, and a desire to provide students with an enriched learning experience. A large volume of literature exists that tout the benefits of blended learning, but few research studies have been conducted to test whether there are improvements in student learning outcomes. The anecdotal evidence of improved student outcomes is generally accepted by educators was noted by the researcher in reviewing an abundance of publications, blogs, newsletters and websites that promote blended learning. The body of literature implies and supports a general belief that blended learning is better and produces improvements in student performance.

However, systematical research has rarely been done to identify the measureable impact and effectiveness of the design of blended learning on learning related outcomes. The primary purpose of study is to explore if including any of the elements of blended learning course design is a factor in differences found in student successful completion rates. The five blended learning design elements examined in this study are identified in the design models of Caman (2005), Osguthorpe and Graham (2003) as:

1. Online Activities as an Extension of In-class Activities
2. Self-directed Learning Activities
3. Collaboration and Communication
4. Assessment
5. Reference Materials

LITERATURE REVIEW

Because blended learning emerged very recently as a focus of educators, there are a limited number of research studies available. In a meta-analysis and review of online learning studies that examined the effectiveness of online instruction as compared to face-to-face instruction, researchers found no published experimental or quasi-experimental studies between 1994 and 2006 that contained sufficient data to compute an effect size (Means, Toyama, Murphy, Bakia, & Jones, 2010). Only after expanding the search to include research studies through July 2008 were the researchers able to identify five published studies that met the criteria to be included in the meta-analysis.

In an effort to establish a foundation for this study, this literature review focuses on five areas that the researcher has identified as critical to this research study. First, the literature is reviewed that defines the design models and concepts incorporated into a blended learning environment. Second, the design models are summarized to provide the identification and definition of the elements of blended learning examined in this study. Third, an examination of techniques used to categorize instructional design is presented. The last section captures literature that identifies factors in students' successful completion of courses.

BLENDED LEARNING DESIGN MODELS

The examination of the literature related to the design of blended learning begins with the question of "Why Blend?" Traditional instruction is well established and is supported

by many instructional design models including the ADDIE (Analyze, Design, Development, Implementation, and Evaluation) Model, Morrison, Ross and Kemp's Classroom-oriented Model, Seels and Glasgow's Product-oriented Model, Dick and Carey Systems Approach Model, and the ARCS (Attention, Relevance, Confidence, and Satisfaction) Model (Movwat, Joanne, 2004; Keller, 1987; ADDIE Model, 2012). In the literature, blended learning by contrast is not found to be systematically supported by an established and accepted network of design models. In answering the question of "Why Blended?" Graham (2005) identifies three reasons:

1. Improved pedagogy
2. Increased access and flexibility
3. Increased cost-effectiveness

Of these three reasons for blended learning, only the aspects of improved pedagogy and increased access and flexibility are addressed in this literature review, These reasons are related to design of a blended learning environment, whereas, increased cost-effectiveness is not as these offsets are found in offsets of construction cost and reusability of courses.

The design of a blended learning environment is addressed in two recent publications. Alonso, Lopez, Manrique and Vines (2005) in An Instruction Model for Web-based e-learning, outlined an approach based on learners applying concepts and evaluating the results. Huang, Ma and Zhang (2008) in Toward a Design Theory of Blended Learning Curriculum presented a design concept that focusses on activities and resources as each fits into an instructional context. While these two publications differ dramatically in the focus each represents a basis for examination of blended learning design models based on the integration of electronic media and internet based resources with a traditional teaching structure.

The Blended Learning Curriculum (BLC) model described by Huang, Ma and Zhang (2008) is an activity-based design consisting of three main components: pre-analysis, activity and resource design, and instructional assessment. Each of the main components contains subcomponents that outline actions that are unique to each phase. The activity and resource design is the core of the BLC model. In this phase, the learners' characteristics, learning objectives and resources of the blended environment are brought together to design multiple student activities. The activity and resource design phase produces a blended learning design report that specifically links the unit (activity) to teachers' instructional methods (resources). A visual representation of this process can be seen in Figure 1 (See next page).

The BLC model enlightens this study in that the learning process of the model consists of a series of face-to-face teaching sessions coupled with specific student activities centered on the use of a virtual learning environment (VLE). Each of the BLC activities contains defined elements that focus on the student completing the activities outside of the traditional classroom either as an individual task or as group collaboration. The elements that are included in the BLC activity are:

1. *Lead-in*: The task objective, examples, and resources are provided
2. *Plan*: Students share ideas, plan strategies, define problems and develop plans
3. *Act*: Students interact with the virtual learning environment (VLE) solve the problems by collecting information, carry out defined task, and produce results
4. *Review*: Students present results and receive feedback from peer and instructors.

This study takes from the BLC model those elements or activities that identify specific components of the courses that would be appropriately used by the students to complete the four elements. The lead-in element would require access to course content, documents

and external resources. The plan element would include communications and collaboration, journals, assignments, group spaces and external resources. The act element incorporates almost any facility that would be available in a virtual space. The review element could include peer evaluation, assessment and communication elements.

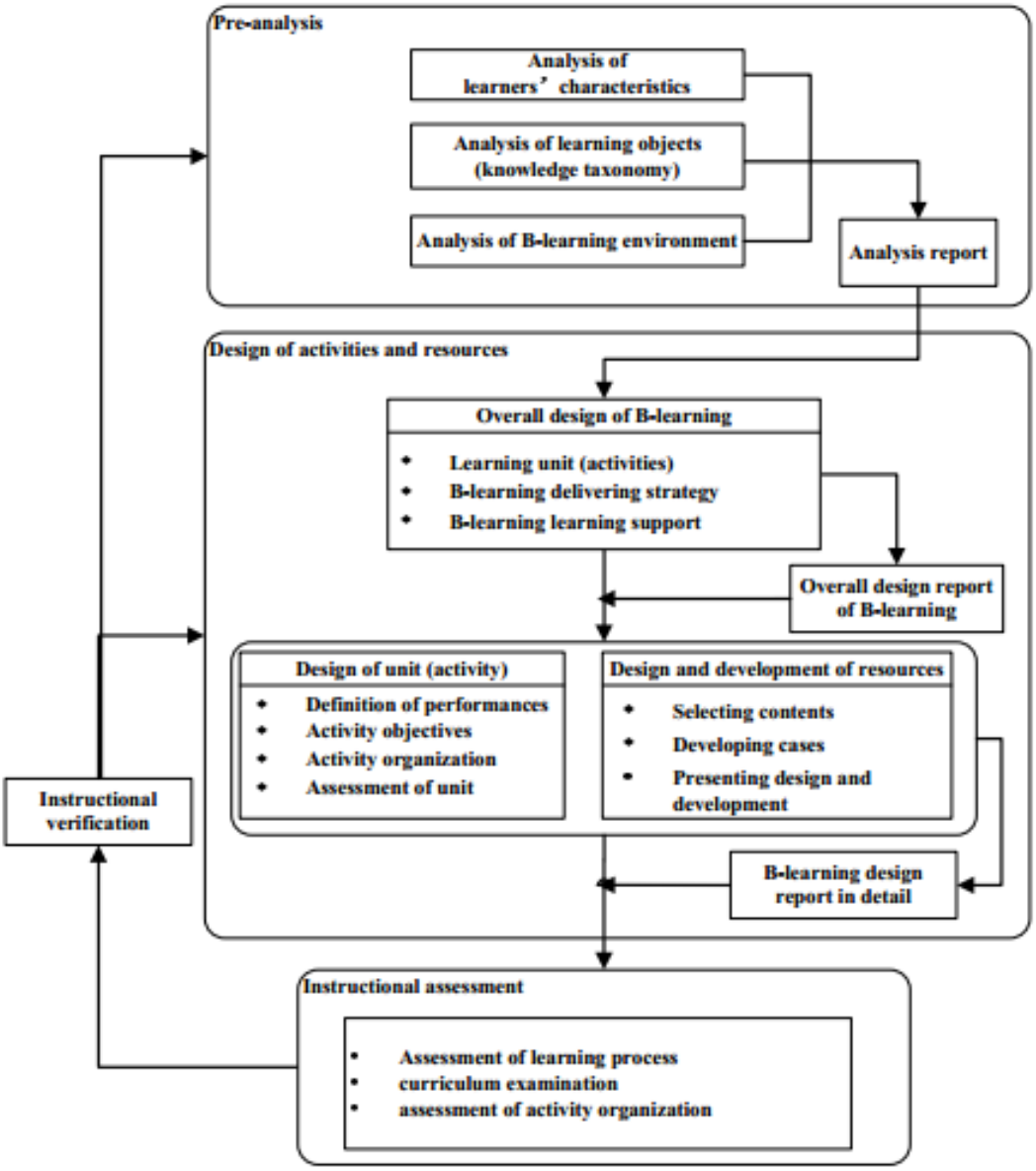

Figure 1. Blended Learning Curriculum (BLC) Model

The e-Learning Instructional model for web-based education within a blended learning approach put forth by Alonso, Lopez, Manrique, and Vines (2005) is based on content structure and founded in constructivist and social-constructivist theory. The concept of the model is for "learners to be engaged by the e-learning contents to the extent that they get to understand things that they did not comprehend before" (p. 222). The model is based on the ADDIE model with the addition of a series of psycho-pedagogical prescribers

intended to further the learning process. The model consists of seven phases as a guide to development of instruction and learning. These phases are:

1. *Analysis:* Defines what to teach
2. *Design:* Where and how to teach is defined
3. *Development:* The learning process, tools, and resources are identified
4. *Implementation:* Building the software of the e-learning process
5. *Execution:* The learner uses the e-learning process
6. *Evaluation:* Information regarding the learning process is gathered and analyzed
7. *Review:* The refining step in the process

A visual representation of the e-Learning Instructional model can be seen in Figure 2.

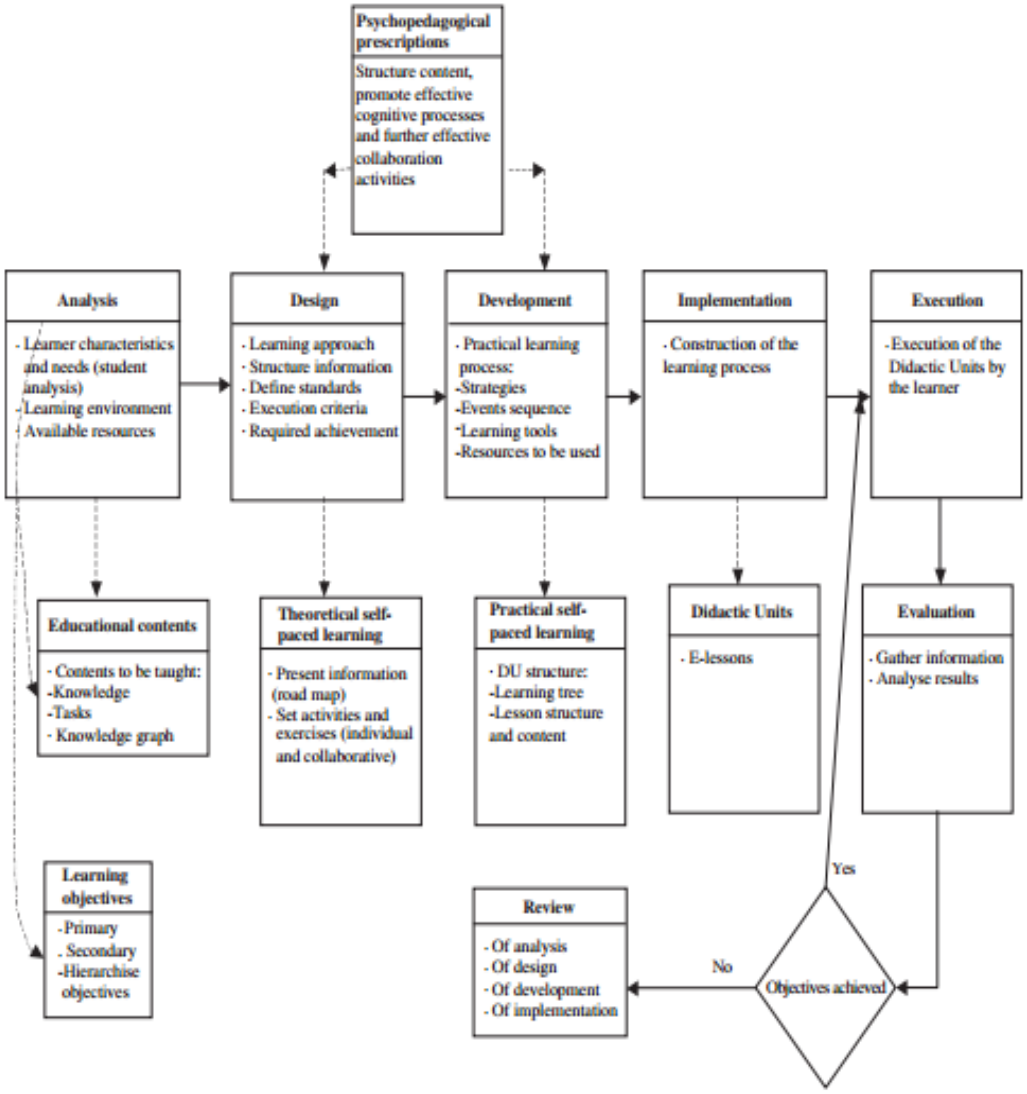

Figure 2. e-Learning Instructional Model

The psycho-pedagogical prescriptions that separate this model from the ADDIE model are content structure, cognitive process and collaborative activities which are considered in all phases of the design model. The prescripts are taken from well-founded theory and principles and are employed as guides in the design and development of learning activities

and evaluations. The application of these prescripts is seen in the model in the form of an e-lesson which is the end result of the process though all seven phases.

The e-lesson is of particular interest to the researcher as the e-lesson identifies the elements that would be identifiable in a course taught in a blended environment. The six sections identified in an e-lesson are:

1. *Presentation:* The subject is described
2. *Objectives:* The results of the learning
3. *Necessary knowledge:* Prerequisites for the tasks
4. *Learning tasks:* The learning activities
5. *Practice:* The learner applies new knowledge
6. *Conclusion:* The reinforces of learning

The sections of an e-lesson are the basis for identification of key design elements found in blended learning courses. The *Presentation* and *Objectives* sections require access to course content and documents. The *Necessary Knowledge* section would also require access to course content and documents but could also include online learning activities and assessment if the prerequisite knowledge was presented and the learner assessed. The *Learning Task* section is open to all of the facilities available in the course to include external resources, communications, collaboration and group functions. The *Practice* section would also include all of the facilities but could also include assessment and peer review. The *Conclusion* section would require access to course content and documents but could also include assessment as a reinforcement tool.

ELEMENTS OF BLENDED LEARNING

Evaluation of the theoretical basis for blended learning together with an examination of the blended learning design models previously described identifies elements that are commonly found in a blended learning environment. Constructivist and social-constructivist theory placed emphasis on the learning being actively engaged in the learning process to construct knowledge based on information discovered or presented as part of the process. Both the BLC model and the e-Learning Instructional model included elements in the design of activities that further built on the active engagement philosophy.

In a case study, Osguthorpe and Graham (2003) examined the goals of blended learning environments as a method for identifying the elements of blended learning. The evaluation of five cases concluded with six goals that emerged as the elements of blended learning: (p. 231):

1. *Pedagogical richness:* Improve student learning with a variety of teaching techniques
2. *Access to Knowledge*: Variety and richness of resources
3. *Social Interaction*: Collaboration and communication with peers and teachers
4. *Personal Agency*: Learning control of the learning process.
5. *Cost Effectiveness*: Reusable content and reduced classroom space
6. *Ease of Revision*: Dynamic access to online resources

With the exception of cost effectiveness and ease of revision, these goals are related directly to principles found in educational theories and instructional design models. Constructivist and social-constructivist theories fully support pedagogical richness in providing multiple and varied learning activities and both theories promote the learner as the agent of learning process. The blended learning environment though interconnection with internet resources, provides access to knowledge impossible to achieve in a textbook based lecture.

Jared Caman (2005) sought to further define the elements that set blended learning apart from traditional face-to-face lecture teaching and fully online teaching. In the publication *Blended Learning Design*, Caman identified five key elements based on the applying educational theories to blended learning as: (p. 2)

1. *Live Events*: Synchronous, instructor-led learning events.
2. *Online Content*: Learning experiences that the learner completes individually.
3. *Collaboration*: Environments in which learners communicate with others.
4. *Assessment*: A measure of learners' knowledge.
5. *Reference Materials*: Reference materials that enhance learning retention and transfer.

Caman identifies Live Events as one of the most critical elements of blended learning and expounds on the necessity to apply Keller's ARCS model to create engaging and effective live events. Caman also expresses the necessity of applying Bloom's taxonomy to assessment to create meaningful real-world based learning evaluation.

The goals identified by Osguthorpe and Graham (2003) together with the elements defined by Caman provide set of elements that would allow the online component of a blended learning environment to be analyzed. Since the evaluation would be focused on the course content available online, the elements that were examined are:

1. *Online activity as an extension of in-class activities*
2. *Self-directed learning activities*
3. *Collaboration and communications*
4. *Assessment*
5. *Reference materials*

The activities incorporated into each of the elements are described in the application of either the BLC model or the e-Learning Instruction model.

Online activity as an extension of in-class activity is a key distinction for the blended learning environment in that instructor-led instruction is fully supported as an effective technique for presentation of knowledge while also recognizing that instruction can expand beyond the classroom. The blended environment should be seen as an extension of the instructor -led teaching rather than as a replacement. Coman (2005) identified live events as the key element to the success of a blended environment. Osguthorpe and Graham (2003) viewed the classroom activity as the foundation for any blended environment. This study, in examining the online components of the blended learning courses, supports this view.

EVALUATION OF INSTRUCTIONAL DESIGN

As with the literature for the theoretical basis for blended learning, the literature related to the evaluation of instructional design in blended learning is sparse as was noted in the U.S. Department of Education Evaluation of Evidence-Based Practices in Online Learning (Means, Toyama, Murphy, Bakia, & Jones, 2010). A search for literature directly related to the evaluation of a blended learning design identified a variety of resources with checklists to be used as a guide in creating a blended learning course but did not reveal any evidence based research into the measurement of blended learning design.

Two rubrics were found that have been used to evaluate online learning to be of interest in categorizing blended learning. Blackboard Corporation sponsors an Exemplary Course Award program that utilizes established criteria for selection based on a published rubric that establishes criteria for evaluation of five critical areas of course design. Quality Matters also provides a rubric for evaluation of online course design that focuses on eight

areas. The rubrics are similar in the method used for evaluation and either rubric would provide a basis for evaluation of a blended learning course. These two rubrics were used in development of the evaluation rubric used in this study.

Blended Learning Element Identification Rubric. For the purposes of this analysis and data gathering, the researcher developed a Blended Learning Element Identification Rubric (Appendix A) to categorize course content or activities within a selected course for each of the five elements of blended learning course design. The basis of the data gathering was an examination of the course structure to determine if the content related to an element was present in the course. In cases where course structure provided inconclusive evidence of an element, then a copy of the course was created so a review of the course could be conducted. Inclusion of any of the expected content related to an element was sufficient to count that course as including an element.

ONLINE COURSE COMPLETION RATES

Until recently, most research into course completion rates compared fully online course delivery to traditional face-to-face instruction as the online mode of instruction was viewed as "not only cheaper and more convenient but also better". (Jenkins, 2012, p. 3) Atchley, Wingerbach and Akers (2013) examined the completion rates in a comparison of online and face-to-face instruction and found that students in an online course received a higher percentage of as (34.6%) than students in traditional instruction (31.3%). This narrow view, examining only the students receiving a grade of A, might be used to support online delivery as better than traditional instruction, however, this restricted view fails to provide a true representation of student performance. From the data provided in the report (Atchley, Wingenbach, & Akers, 2013, p. 111), the percentage of students receiving a grade of A, B or C in an online course (91.6%) was lower than the percentage of students receiving similar grades in a traditional course (94.5%).

The question remains of where blended or hybrid instruction fits into this comparison. The flipped learning model represents the fullest integration of technology with traditional instruction and has been the subject of research on student performance. Walsh (2014) examined the flipped model in comparison to traditional instruction for identical courses through use of the DFW Rate. This rate is determined as the receiving a D or F grade in the course or withdrawing from the course (Walsh, p. 2). Conversely, the non-DFW rate would be students receiving a grade of A, B or C in the course. Walsh reported that in the pilot study, the non-DFW rate for flipped model instruction was 2% to 4% higher than for the same course taught as traditional instruction.

In a research report published by Educause (Dziuban, Hartman, & Moskai, 2004) a comparison of the student successful completion rates, i.e. students receiving a grade of A, B or C, reported that students achieved the highest successful completion rate for blended instruction (93.3%) with the completion rate for traditional instruction (91.6%) slightly higher than the completion rate for fully online instruction 91.3%). This study reported the withdrawal rate separately with the withdrawal rate for blended instruction (4.4%) being slightly higher than the rate for traditional instruction (4.1%) with the withdrawal rate for both blended instruction and traditional instruction being considerably less than the withdrawal rate for fully online instruction (7.2%).

While each of these reports provide slightly different successful completion rates when comparing the three mode of instruction, traditional, online and blended, the overall trends remain the same. In all cases, online instruction had the lowest successful completion rate, whereas, blended instruction successful completion rate was above traditional instruction. The indication that blended instruction is associated with a higher student successful

completion prompted the need for investigation of blended learning design as an explanation for this reported difference.

RESEARCH QUESTIONS

The purpose of this study is to explore if including any of the elements of blended learning course design is a factor in differences found in student successful completion rates. The research questions examined in this study are:

1. What is the frequency of occurrence of each of the five elements of blended learning design (online activity as an extension of in-class events, self-directed learning activity, collaboration and communication, assessment, and reference materials) within the courses of the review period?
2. Are there any differences in student mean completion rates between courses that have a blended learning design element (online activity as an extension of in-class events, self-directed learning activity, collaboration and communication, assessment, and reference materials) and those that do not have it?

METHODOLOGY

SAMPLE

The analysis of the blended learning design elements is dependent on identifying if a course includes any content items that indicate an element of the blended learning design. The population of this study consisted of all 2,624 blended learning courses offered in the fall 2012 semester at a western state university. After a thorough review by the researcher, a total of 1,143 courses met the criteria of the study and were used for analyses. Procedures of course sample selection is detailed in the following Data Collection section.

PROCEDURES

The analysis of the courses offered during the fall 2012 semester is necessary to determine if and which of the five elements of the blended learning course design model are a factor in the differences found in the student completion rate. This analysis hinged on defining a technique for determining if a course contains content or activities that indicate the presence of each of the identified course design elements. The initial step of this analysis was defining the course content or activities that would be expected when each of the design elements is present in a course.

Element One. The first element, *Online Activity* as an extension of in-class events, was the most difficult element to identify without a detailed review of the course structure and content. Blended learning design presumes the extension of the classroom activity but does not clearly define the type of activity or how the in-class activity is extended. For the purposes of this study, an extension of live in-class activity would include any activity that would have originated in the face-to-face session and is then continued through pre-planned individual or group activity that directly references the live activity. As such, a discussion board where students would create posts and reply to posts of other students that referenced content presented during an in-class lecture would be considered an extension whereas a discussion board where students posted information regarding topics not presented during a class session would not be considered as an extension.

The types of activities and content identified as an extension of the live activity were supplemental reading materials referenced or related to a class presentation; research activities based on a topic presented in a live activity; discussions, blogs or journals related to the in-class presentation or discussion; weblinks, reference material or publisher content related to topics presented during in-class activities. Not included in this grouping were assessments of material and content that was presented in-class. This type of activity is not viewed as an extension of the live event but rather a measurement of the student's comprehension. Not included in this grouping are class handouts, lecture notes or other lecture presentation materials that were used during the classroom activity and provided as a convenience for the student.

Element Two. The second element, *Self-Directed Learning Activities*, is by definition (Carman, 2005, p. 2) as those "…learning experiences that the learner completes individually, at his own speed and on his own time". In keeping with this definition, the analysis sought to identify activities in which the learner performs an activity designed for self-education of a topic area but not be directly related to an in-class activity. Types of course content and activities that were included are research projects; directed internet search activities such as WebQuests; reflection journals; and individual presentations.

Element Three. The third element, *Collaboration and Communications*, required the examination of a course to determine if course tools that promote collaboration and communication were included. The actual use of many of these tools varies greatly but in addressing this element, the inclusion of the tool is of primary concern. The tools that are available within the course management system used that were examined are discussion board; course blog; announcement tool; message tool; email tool; and group activity.

Element Four. The fourth element, *Assessment*, was also analyzed based on the inclusion of available learning management system tools but also considered the inclusion of publisher provided assessment options. The element of assessment included tests, quizzes, self-tests, surveys, publisher provided test/quizzes, graded assignment, and group assignments. The specific tools that were examined are tests; surveys; assignments; group assignments; McGraw-Hill assessment link; Pearson assessment; SafeAssign plagiarism check tool; and SCORM content.

Element Five. The fifth element, *Reference Materials*, was analyzed based on the inclusion of links to available reference materials or research materials. These materials can be provided using a number of different techniques ranging from inclusion of documents links to providing students access to online research facilities. To analyze this element, a course was examined for a bibliography or list of references used in creation of course content; links to information on required and optional textbooks; links to publisher content used within the course; and links to supplemental materials relevant to the subject area. Excluded from consideration as reference materials were lecture notes and presentation materials used during a face-to-face session that were included as a convenience for the students.

SCREENING PROCESS

The course screening process was conducted in two phases. The first phase was performed using database search techniques to identify courses which did not meet basic requirements for evaluation. The criteria included: 1) course not available to students during the semester, 2) courses without course content beyond the basic course shell, and 3) courses not used for instruction or student activity. The second phase involved an examination of the structure of each course to determine if the course content met the requirements outlined in the Blended Learning Element Identification Rubric.

The first phase of the process focused on identifying courses in which the instructor had provided information or activities for the students that would indicate the course met the criteria for evaluation. Since the university did not require any specific course content be included in the online component of a blended learning course, the decision of how or whether to use a predefined basic course shell is at the discretion of the instructor. The predefined basic course is created based on the instruction mode coding for the course in the scheduling system.

The first screening process identified courses that had not been used by the instructor for course content and these courses were eliminate from further analysis. This screening was based on two factors: the course shell containing no content other than that provided during the course creation, or the course had not been made available to students during the semester. This screening was conducted using a series of database queries used to identify basic course content, course availability and student activity. All courses passing this first screening were included for further screening.

During the screening of courses, the research found that a number of courses were used only for enrollment purposes and not used for instruction. Enrollment tracking courses occur when an instructor had requested that multiple course sections be combined into a single course. The original course shells are retained and used only to track student enrollment. The screening process also checked for courses without any student enrollment. Both enrollment tracking courses and courses without student enrollment were eliminated from further analysis.

The second phase of the screening required evaluation using the Blended Learning Element Identification Rubric. The data gathering was conducted based on reports produced that included information necessary for identification and classification of content without the researcher examining each course. The process for conducting the evaluation was:

1. A course content report was produced that provides the researcher with the detail of the structure of a course that included:
    a. Content Areas found in the course table of content (course menu) to include type of content, title, description provide to students and activity statistics if recorded. The course content within the content area included identification of each by content type, description and activity statistics if recorded.
    b. Assignments found in the course to include title, description and group association.
    c. Tests, quizzes, and surveys found in the course to include the title of the item and description.
    d. Collaboration and communication tools in the course to include course discussion board, messages, send email, course blog, journal and wiki.
    e. Group definitions and activity to include tools provided to groups.
2. The course content as provided in the course content report was examined using the Blended Learning Elements Identification Rubric and scored based on item descriptions provided in the report. If during this phase, the researcher is unable to identify specific content related to the blended learning elements based on the description of the content, the researcher/reviewer indicated in the notes that detailed examination of the course content and activities is necessary.
3. In the case of a course that is identified as requiring further analysis, an examination of the course content was conducted using a copy of the course that did not include student information or activity. The researcher accessed the copied course, examined the course content and provided a revised evaluation of the inclusion of blended learning design elements.

The results of the course evaluation were encoded for processing and analysis. The student successful completion rate was calculated for each course using the grade standard of C minus or above as a passing grade, and the rate was included with the data captured during the examination of the course content.

MEASUREMENTS

Measurement of instructional design elements. The process of determining if a course contains any or all of the identified blended learning design elements is subjective in nature. To address this concern, the researcher developed a scoring rubric to provide specific guidelines for evaluation of course content. The Course Element Identification Rubric (Appendix A) provides specific criteria that must be met for a course to be categorized as containing content directly related to that blended learning design element.

The Course Element Identification Rubric is a static spreadsheet which lists the expected course content or tool for each of the blended learning design elements. The Course Element Identification Rubric was completed for each course using the output from the course structure and content query. The query output was reviewed and the rubric updated to reflect course content and tools that were found in the course. If the reviewer encountered content or tools that could not be clearly identified from the titles and descriptions, the rubric would be marked for detailed review. The completed rubrics were gathered for coding and data entry.

The detailed review was completed by first creating a copy of the course that removed identifying student information. The reviewer examines the copied course and completes the rubric. The copied course is deleted after the review process.

Based on the criteria in the Course Element Identification Rubric, each course being analyzed was coded as either including a design element or not including that design element. A diagram of the workflow for course content analysis is in Figure 3 (See next page).

Measurement of Successful Completion Rate. The successful completion rate for each course is calculated as the number of students receiving a final grade of C minus or above divided by the number of students completing the course. The number of students completing the course equals to the number of students enrolled minus the number of students who withdrew from the course or received an incomplete grade.

DATA COLLECTION

Data were collect for the courses identified as being delivered as blended learning instruction based for one semester. A total of 2,624 courses had been identified as blended learning course delivery based on the course catalog information. Of these courses, 104 courses were found to be incorrectly coded as blended learning delivery and should have been correctly identified as online courses. These courses were eliminated from the analysis.

The first examination of the courses was to identify course used only for tracking of student enrollment and not used for instruction. Enrollment tracking courses occur when an instructor has requested that multiple course sections can be combined into a single course and the original course section used only for tracking of student enrollment. A total of 505 courses were identified as enrollment only courses and eliminated from further analysis.

The next examination of the courses was to determine if the instructor of the course had made any modifications or additions to the course shell. If no modification had been made to the course shell nor any of the tools such as announcements, email/messages, or

grade center had been used, then the course would be eliminated from further analysis. A total of 865 courses were eliminated based on this criterion.

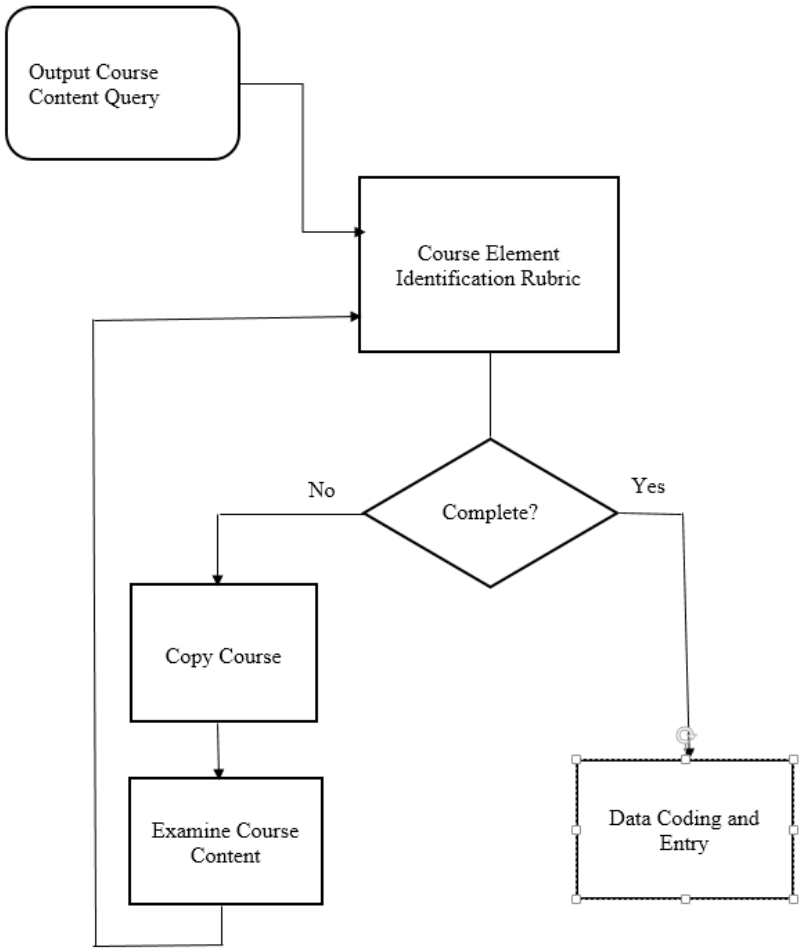

Figure 3. Workflow for course content identification

In addition, it was found that 6 course had no student enrollment although the course had been created and modified by the instructor with content or activities. These courses were also removed from the analysis.

The remaining 1143 courses for the semester were examined to determine if each of the five elements of a blended learning course design were present in the courses. This examination was conducted using data base queries to identify the types of content in the course and by an examination of the course content to refine the identification of the elements based on the scoring rubric. The result of this process was identification of the presence of a design element in a course and recorded as either a yes or no.

DATA ANALYSIS

The data analysis for the first research question was conducted using descriptive statistics to determine the frequency and percentage for each of the blended learning design elements. The data analysis for the second research question was conducted using a set of t-tests to determine if a significant difference in the student completion rate exists when a

blended learning design elements is included vs. when the design element is not included. Each blended learning design element was analyzed separately.

RESULTS

RESULTS FOR RESEARCH QUESTION ONE

With question 1 the researcher examined the frequency at which each of the five blended learning design elements occurred within the selected courses using descriptive statistics. The analysis revealed that blended learning design element 5, Reference Materials, occurred most frequently (*n=969, percent=84.8*) and element 1, Online Activity as an Extension of In-class Activity, occurred least frequently (*n=240, percent=21.0*). These results are summarized in Table 5.

Table 5. Frequency distribution of design elements in selected courses

Element	Exists	Frequency	Percent
1 - Online Activity as an Extension of In-class Activity	Yes	240	21.0%
	No	903	79.0%
2 - Self-directed Learning Activity	Yes	732	64.0%
	No	411	36.0%
3 - Collaboration and Communication	Yes	437	38.2%
	No	706	61.8%
4 - Assessment	Yes	366	32.0%
	No	777	68.0%
5 - Reference Materials	Yes	969	84.8%
	No	174	15.2%

RESULTS FOR RESEARCH QUESTION TWO

Each design element was analyzed separately using a set of t-tests to determine if a difference exists in successful completion rate for students in a course with the design element vs. the completion rate for students in a course without the design element. The results of the analysis are reported for each design element separately.

Design Element 1, Online Activity as an Extension of In-class Activity. The analysis found no significant difference between the successful completion rate for students in classes with this element (*t(1141)=-0.23, n=240, m=0.892, sd=0.17,p=0.82, d=0.01*) when compared to the successful completion rate for students in classes without this element (*n=903, m=0.896, sd=0.34*). No further analysis of this element was conducted.

Design Element 2, Self-directed Learning Activity. The analysis found no significant difference between the successful completion rate for student in classes with this element (*t(1141)=-0.89, n=732, m=0.890, sd=0.36, p=0.37, d=0.*05) when compared to the successful completion rate for students in classes without this element (*n=411, m=0.907, sd=0.20*). No further analysis of this element was conducted.

Design Element 3, Collaboration and Communication. The analysis found no significant difference between the successful completion rate for students in classes with this element (*t(1141)=-0.38, n=437, m=0.892, sd=0.20, p=0.71, d=0.02*) when compared

to the successful completion rate for students in classes without this element (*n=706, m=0.899, sd=0.37*). No further analysis of this element was conducted.

Design Element 4, Assessment. The analysis found no significant difference between the successful completion rate for students in classes with this element (*t(1141)=-0.17, n=366, m=0.894, sd=0.19, p=0.87, d=0.*01) when compared to the successful completion rate for students in classes without this element (*n=777, m=0.898, sd=0.36*). No further analysis of this element was conducted.

Design Element 5, Reference Materials. The analysis found a significant difference between the successful completion rate for students in classes with this element (*t(1141)=4.57, n=969, m=0.914, sd=0.31, p<.001,d=0.36*) when compared to the successful completion rate for students in classes without this element (*n=174, m=0.798, sd=0.33*). Further analysis of the results of this analysis is needed.

The data analysis for question 2 revealed that only blended learning design element 5, Reference Materials, appeared to be a factor in the successful completion rate for blended learning course delivery. The results of the set of t-tests are summarized in Table 6.

Table 6. Cross-tabulation of Frequency and Mean Successful Completion Rate by Course Design Element

			Courses with the element				Courses without the element		
Element	t	df	n	m	SD	p	n	m	SD
1. Online Activity	-0.23	1141	240	.892	0.17	0.82	903	.898	0.34
2. Self-directed	-0.89	1141	732	.890	0.36	0.37	411	.907	0.20
3. Collaboration	-0.38	1141	437	.892	0.20	0.71	706	.899	0.37
4. Assessment	-0.17	1141	366	.894	0.19	0.87	777	.898	0.36
5. Reference	4.57	1141	969	.914	0.31	<.001	174	.798	0.33

Course design is a key component in creating and delivering effective instruction and with blended learning course delivery identified as a factor in successful completion, this study focused on elements of blended learning course design. The data gathered from the examination of blended learning courses revealed that reference materials are included in a blended learning course most frequently and that the students' successful completion rates are highest for courses that included reference materials.

This study does not attempt to find any causal relationship between course delivery, course design elements and students' successful completion of courses. The findings, taken as a whole, do indicate that element 5, Reference Materials, being included in the online component of a blended learning course could be a factor in the overall successful completion by students.

Based on result of the analysis, the findings for the research questions are:

1. For research question 1, blended learning design element 5, Reference Materials, did occur more frequently than the other four design elements.
2. For research question 2, a significantly higher students' successful completion rate was found for blended learning courses that contained blended learning design element 5, Reference Materials, when compared to courses that did not include this design element.

CONCLUSIONS AND DISCUSSION

CONCLUSIONS

Since blended learning course delivery is relatively new to the field of education, a single design model does not exists that addressed the unique issue of blended learning course delivery in the same manner that the ADDIE or ARCS models are applied to face-to-face instruction delivery. Two models, the Blended Learning Curriculum (BLC) model (Huang, Ma, & Zhang, 2008) and eLearning Instructional model (Alonso, Lopez, Manrique, & Vines, 2005) were combined to create the definitions used by this study to identify and evaluate the blended learning design elements. This study provides partial validation of the Blended Learning Curriculum model and the e-Learning Instruction model as a foundation for creating the structure of a blended learning course.

Based on the results of the analysis, we can conclude that a difference exists in the frequency at which each of the blended learning design elements exists in the courses examined and that blended learning design element 5, Reference Materials, occurred significantly more frequently than any of the other four design elements. Further analysis of the data revealed a significant difference in the students' successful completion rate for courses that contained blended learning design element 5, Reference Materials, when compared to courses that did not contain this element. Based on this analysis, it appears that a blended learning course which include element 5, Reference Materials, is a factor in the changes found in the overall students' successful completion rate for blended learning course delivery. This analysis does not imply that reference materials being included within a blended learning course causes an increase in student success but does provide a finding that warrants further study.

While the presence of element 5, Reference Materials, in a blended learning course does appear to be a factor in the difference in students' successful completion rates, caution need be the watchword in applying this conclusion. The reason reference materials occurred more frequently in blended learning courses is not explored in the study. In speculating about the reasons for a much higher rate at which reference materials are included in a course, three reasons surface immediately: 1) the availability of reference materials, 2) ease of including the materials in a course, and 3) ease of electronic access to the materials by the students.

Caution is also necessary in applying this finding as an indicator that including course materials leads to a difference in students' successful completion of a course. The inverse of this finding, i.e. not providing students access to course materials, might be more of a deterrent to students' successful completion than is the inclusion of the course materials is a benefit. Without a detailed analysis of the frequency and duration of access to the course materials by the students, this finding and conclusion should be considered as only one of many factors that impact students' successful completion rates.

From the perspective of the instructional designer, this study established a methodology for analyzing the structure of courses based on course design models. This methodology is applicable at multiple points in the course development cycle and as a tool for evaluation of existing courses. The methodology of identification of course design elements could also provide the data necessary for a more detailed analysis of course content in future studies.

IMPLICATIONS

Finding that the presence of reference materials in blended learning courses is a factor in difference in students' successful completion rates is important for both faculty teaching

courses and to instructional designers developing courses. The data provided in this study does not identify how or why reference materials being present in a course is a factor in changes in student successful completion but does provide a clear message that the reference materials are of value. Based on these indicators, placing emphasis on providing students with online access to course materials and supplemental materials in a blended learning delivered course would be a positive action toward the improving student completion and mastery of course materials.

Based on these findings, the design of a blended learning course should include course reference materials that are both directly related to the course lecture and are supplemental materials that provide students with additional or alternative information. The reference materials reviewed in this study were accessible online and in most cases, provide the option for printing or loading to mobile devises. Ideally, the reference materials would be organized so students can quickly locate and use the materials provided.

RECOMMENDATION FOR FURTHER RESEARCH

While blended learning course delivery does appear to be a factor in the differences found in students' successful completion rates, the field of blended learning is very broad and a closer examination of the spectrum of blended learning delivery is needed. Identifying design element 5, Reference Materials, as being found most frequently in blended learning courses and determining that the presence of this design element is a factor in the difference in students' successful completion of a course, does not examine this by type of materials included nor student access to the materials.

The process of examining the structure and content of the courses for this study revealed a vast range of techniques and degrees of integration of online technology. Blended learning design encompasses courses that include only minimal course materials such as the course syllabus to other fully developed courses based on the flipped classroom model. This study grouped all blended learning courses together regardless of the degree of integration of technology. Further research is needed to determine if the degree of integration of technology is also a factor in the differences for students' successful completion rates. A proposed future study would perform the investigation of completion rates based on three levels of integration: 1) Basic integration focused primarily on access to documents and communications, 2) Intermediate with an emphasis pedagogy, learner interaction, and assessment, and 3) Advanced with full integration of instruction, i.e. flipped model. The results of this proposed study would provide information needed to focus on effectiveness of each levels of integration and provide basis for possible modification of course design and faculty training.

There is little doubt that further research is needed to investigate the factors contributing to differences in students' successful completion rates in blended learning courses that included blended learning design element 5, Reference Materials. Because of the variety of reference materials that can be included in a blended learning course, a future study identify the types of materials, delivery method for the materials and relating these factors to student success would be of value. A proposed study would examine the course materials by media type, i.e. text/documents, web sites, audio files, video files, games, or simulations, to determine how frequently each type occurs but also the number and amount of different media types in courses.

This study identified a single blended learning design element as the most frequently occurring but did not investigate the various combinations possible with the five design elements. Further analysis that examined the frequency of at which combinations of two, three, four or all five design elements occurred within the courses is needed. This analysis would reflect the degree to which a course met all or part of the expectations of the blended

learning course design model. This analysis would also reveal if a difference in the students' successful completion rate was found based on different degrees of implementation of the blended learning course design model.

Also of value would be a research study that examined the use pattern by students for course reference material with emphasis on frequency and duration of use. A proposed study would map frequency of access to course content against the schedule of class sessions, assignment due dates and assessments. An investigation into the use pattern would need to include information on frequency and duration of access, source of access, i.e. computer, laptop, mobile device, and pattern of access within the media, i.e. multiple views of same part, skipped content. The results of this study would reveal information necessary to identify how students use the reference materials provided and also identify course materials that were not used. This information could lead to improvements in the design of blended learning courses and modification of presentation of course materials.

In summary, the findings indicated that inclusion of course reference materials was a factor in the positive changes in students' successful completion rate for blended learning courses, which could be an addition to the body of knowledge supporting blended learning as an effective method for delivery of courses. This study also opens the opportunity for further investigation into the effectiveness of the blended learning course design by building a foundation for exploring the elements of a blended learning course.

REFERENCES

ADDIE Model. (2012). Retrieved November 2012, from Learning-Theories: http://www.learning-theories.com/addie-model.html

Atchley, W., Wingenbach, G., & Akers, C. (2013, October). Comparison of Course Completion and Student Performance through Online and Traditional Courses. *The International Review of Research in Open and Distance Learning, 14*(4), 104-1116.

Alonso, F., Lopez, G., Manrique, D., & Vines, J. (2005, March). An Instructional Model for Web-based e-learning Education with a Blended Learning Process Approach. *British Journal of Educational Technology*, pp. 217-235.

Blended Learning in K-12/Evolution of Blended Learning. (2011, March). Retrieved September 2012, from Wikibooks: http://en.wikibooks.org/wiki/Blended_Learning_in_K-12/Evolution_of_Blended_Learning

Blackboard Exemplary Course Program Rubric. (2014, March). Retrieved from Blackboard Catalyst Awards: http://www.blackboard.com/resources/catalyst-awards/BbExemplaryCourseRubric_March2014.pdf

Carman, J. (2005, August). *Blended Learning Design: Five Key Ingredientss.* Retrieved August 2012, from Agilant Learning: www.agilantlearning.com/pdf/Blended%20Learning%20Design.pdf

Dziuban, C., Hartman, J., & Moskai, P. (2004). *Blended Learning.* Bolder: Educause. Retrieved from net.educause.edu/ir/library/pdf/ERB0407.pdf

Graham, C., Maisie, E., Hofmann, J., & Wagner, E. (2005). Introduction to Blended Learning. In C. Graham (Ed.), *Handbook of Blended Learning* (pp. 3 - 21). Retrieved October 2012

Huang, R., Ma, D., & Zhang, H. (2008). Towards a Design Theory of Blended Learning Curriculm. *LNCS.* Beijing: CS City University.

Jenkins, R. (2012, March 13). *Online Classes and College Completion.* Retrieved from The Chronicle of Higher Education: http://chronicle.com/article/Online-ClassesCollege/131133/

Keller, J. (1987). Development and Use of the ARCS Model of Instructional Design. *Journal of Instructional Development, 10*, 2-10. Retrieved from http://www.arcs model.com/ Mot%20dsgn%20A%20model.htm

Kim, K.-J., & Bonk, C. (2006). The Future of Online Teaching and Learning in Higher Education. *Educause Quarterly, 4*, pp. 22 - 20. Retrieved from http://net.educause. edu/ir/library/pdf/EQM0644.pdf

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies.* Washington, DC: Center for Technology in Learning. Retrieved from http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf

Movwat, Joanne. (2004, December). *The Use of Traditional Instructional Systems Design.* Retrieved November 2012, from The Herridge Group: http://www.herridgegroup.com/ pdfs/The%20use%20of%20Traditional%20ISD%20for%20eLearning.pdf

Osguthorpe, R., & Graham, C. (2003). *Blended Learning Environments Definitions and Directions.* Retrieved October 2012, from ERIC: http://www.eric.ed.gov /ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue _0=EJ678078&ERICExtSearch_SearchType_0=no&accno=EJ678078

Quality Matters Rubric Standards, 5th Edition. (2014, June). Retrieved from Quality Matters: https://www.qualitymatters.org/node/2305/download/QM%20Standards%20 with%20Point%20Values%20Fifth%20Edition.pdf

Watson, J. (2004). *Blended Learning: The Convergence of Online and Face-to-Face Education.* Viena, VA: NACOL (North American Council for Online Learning. Retrieved from : http://www.inacol.org/research/promisingpractices/NACOL_PP-BlendedLearning-lr.pdf

Walsh, K. (2014, August 24). *Flipped Learning Pilot Radically Reduces DFW Grde Rates in Two Courses.* Retrieved from EmergingEdTech: http://www.emergingedtech.com/ 2014/08/flipped-learning-pilot-reduces-dfw-grade-rates/

APPENDIX

Blended learning design element identification rubric used to categorize courses for data collection.

Blended Learning Element Identification Rubric

Course ID:

Online Activity	Course Content	Yes/No	Notes
	Supplemental Reading Materials		
	Research Activities		
	Discussion, Blogs, Journals		
	Review materials		
	Publisher content		

Self-directed Learning Activities	Course Content	Yes?No	Notes
	Research projects assignments		
	Directed search activities		
	Reflection journals		
	Student Presentations		

Collaboration and Communications	Course Content	Yes/No	Notes
	Discussion Board		
	Course Blog		
	Announcement tool		
	Message Tool		
	Email Tool		
	Group Activity		

Assessmment	Course Content	Yes/No	Notes
	Tests		
	Surveys		
	Assignments		
	Group Assignments		
	Publisher Assessments		
	SCORM content		

Reference Materials	Course Content	Yes/No	Notes
	Biliograph or Reference list		
	Text book information		
	Publisher content		
	Subject matter expert content		
	Supplemental materials		