2015

# An analysis of online and blended learning environments : measuring approach and learning outcomes in corporate settings

Meghan B. O'Neal
*University of Northern Iowa*

# An analysis of online and blended learning environments : measuring approach and learning outcomes in corporate settings


## Abstract

Organizations use training as an investment with the desirable end goal of gaining a valuable employee, despite cost and time constraints on their organization. This review investigates how e-Learning and blended learning training methods are currently used in organizations. It measures the Return-On-Investment of e-Learning and blended learning training methods within corporate learning environments and examines means to improve learning outcomes for learners and the organization.

For this review, peer-reviewed journals were evaluated to analyze e-Learning and blended learning methods and outcomes. Conclusions reveal that both e-Learning and blended learning training models are being successfully used in corporate training modules. Factors such as development costs, training time, and course design will affect learner outcome and productivity and profitability for organizations. Additional research is needed to verify long term ROI for organizations using online or blended learning methods for means of training.

# AN ANALYSIS OF ONLINE AND BLENDED LEARNING ENVIRONMENTS: MEASURING APPROACH AND LEARNING OUTCOMES IN CORPORATE SETTINGS

A Graduate Review

Submitted to the

Division of Instructional Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

by

Meghan B. O'Neal

June, 2015

This Review by: Meghan B. O'Neal

Titled: Title of paper An Analysis of Online and Blended Learning Environments: Measuring Approach and Learning Outcomes

has been approved as meeting the research requirement for the

Degree of Master of Arts.

6/12/15
Date Approved

Leigh E. Zeitz
Graduate Faculty Reader

6/12/15
Date Approved

Joe Marchesani
Graduate Faculty Reader

6/12/15
Date Approved

Jill Uhlenberg
Head, Department of Curriculum and Instruction

## Abstract

Organizations use training as an investment with the desirable end goal of gaining a valuable employee, despite cost and time constraints on their organization. This review investigates how e-Learning and blended learning training methods are currently used in organizations. It measures the ROI of e-Learning and blended learning training methods within corporate learning environments and examines means to improve learning outcomes for learners and the organization. For this review, peer-reviewed journals were evaluated to analyze e-Learning and blended learning methods and outcomes. Conclusions reveal that both e-Learning and blended learning training models are being successfully used in corporate training modules. Factors such as development costs, training time, and course design will affect learner outcome and productivity and profitability for organizations. Additional research is needed to verify long term ROI for organizations using online or blended learning methods for means of training.

## Table of Contents

## Introduction

Training an employee is an essential and necessary part of the on-boarding process. Training enables employees to be successful in their positions. However, implementing training for employees can be a costly and timely strain on companies. In a 2012 article published by the Center for American Progress, it costs businesses approximately one-fifth of an employee's yearly salary to hire and train them properly to complete the job requirements (Boushey & Glynn). These costs also assume that the training is effective and completed successfully.

Businesses use training as an investment with the desirable end goal of gaining a valuable skilled and knowledgeable employee. Once properly trained, employees are profitable for the company as they become experts in that particular field or topic. Kisielnicki and Sobolewska (2010) remark that a trained employee serves as an advantage to an organization by providing internal intellectual assets that other companies with similar functions don't possess. This competitive edge is what differentiates businesses from others and promotes employee retention within the company.

Aside from job training, professional development and informal training courses are an easy way for businesses to strengthen their workforce. As businesses continue to compete in the marketplace, it is essential that professionals and business employees maintain skills and learn new techniques to continue to grow professionally (Oncu & Cakir, 2011). This type of professional development can lead to employee satisfaction and positive attitudes of the company.

Corporate training can be accomplished through several different outputs. Online training or e-Learning has opened many possibilities to businesses around the world. Liu and

Wang (2009) define e-Learning as learning retention and transfer of knowledge through electronic environments. This type of distance learning allows for larger class sizes, broader audiences (geographically), and gives both instructors and learners a flexible schedule (Marcal & Caetano, 2010). Yet it does not offer all of the options as that of face-to-face learning.

Combining face-to-face and online learning provides an alternative method of learning. This combined learning style has been termed as blended learning. Blended learning offers the interactive activities of online learning mixed with face-to-face methods such as classroom discussions or feedback (Edginton & Holbrook 2010). As research presented in this literature review shows, e-Learning and blended learning courses can be effective learning methods.

The effects of corporate training in e-Learning and blended learning systems are still being studied. While some organizations have used online or blended learning techniques for years, others are just beginning to assess their training needs. As corporations continue to experiment with online and blended learning techniques, more research is being compiled to verify what methods work well in corporate settings and what learning factors or motivators should be included in training development as these audiences differ from those in academia.

This review focuses on studies that measured the effects of e-Learning and blended learning methods in corporate learning environments. The purpose of this literature review is to compare the use and effectiveness of e-Learning and blended learning methods in corporate learning environments. These studies focused on internal employee training sessions and their outcomes. By reviewing research covering corporate learning methods, learning effectiveness, and learning outcomes, this review hopes to establish a framework for

successful learning methods and the reasons behind their success.

For this review, peer-reviewed journals were evaluated to analyze and compare e-Learning and blended learning methods and outcomes. For the purpose of this review, the following research questions were examined:

**RQ1:** How are e-Learning and blended learning systems being used in corporate training?

**RQ2:** What are the effects of e-Learning and blended learning systems on organizational success as measured with ROI?

**RQ3:** What learning factors influence the effectiveness of e-Learning and blended learning?

## Methodology

This literature review focuses on articles that examine the effectiveness of e-Learning and blended learning training techniques in corporate organizations. In a search for valid and comprehensive research, several steps were taken to find and narrow the search for related resources.

Initially, research articles were found by conducting an electronic search for academic journals through the University of Northern Iowa's OneSearch. Online databases were found through EBSCOhost within OneSearch. A variety of databases were searched including: ERIC, Business Source Complete, Academic Search Elite, Gale Virtual Reference Library, Science Direct, Academic Onefile, Education Full Text (H.W. Wilson), PsychINFO, Library, and Information Science & Technology Abstracts.

### Search Terms

Descriptive search terms were used to narrow research results. Searched keywords included: corporate training, blended learning, commercial e-Learning, organizational training, corporate training, ROI, training development, e-learning, online education, online learning, education, asynchronous training, instruction, synchronous training and web-based instruction. These searches produced an extensive number of research articles.

### Research Evaluation

The next step was to solidify the results as not all articles applied with the scope of research. Initial database searches were confined to peer-reviewed academic articles. As these searches still produced many peer-reviewed articles, it was necessary to narrow the scope of articles to those that specifically related to the research questions. Additional criteria such as publishing dates limited to 2005 and forward and the Boolean keyword *AND* were

included to refine search results. To determine which articles matched the research questions, article abstracts were reviewed. These remaining articles were evaluated to compare the types of research used, how the findings complemented the research topics and the validity of the studies.

## Analysis and Discussion

**[RQ1: How are e-Learning and blended learning systems being used in corporate training?]**

Training has morphed over the years, giving corporations a variety of options to use to efficiently train their employees. Face-to-face training is still in use today, but technology has allowed other training mediums to break through. As technology becomes more reliable and useful in training settings, its popularity is growing in corporate settings. Yet technology does not qualify as successful training on its own. Successful use of technology is determined by the approach or training design and the effectiveness of the end instruction module.

### Training Design (approach)

Training design is important to successful corporate training. The goal of corporate training often differs from that of academia. While academic institutions focus on building fundamental knowledge, organizational training is often constructed quickly to incorporate new products or ideas that may quickly become outdated (Wan, Compeau, & Haggerty, 2012). Corporations may not have the time or capability to conduct face-to-face training as often as it is needed. E-Learning or blended learning training designs offer solutions to these issues. As both learning methods have some similarities, an explanation of these methods of instruction is essential when deciphering which is best suited for corporate settings.

#### e-Learning

E-Learning is a virtual learning environment where learners interact with learning materials, peers, and instructors to complete course materials. (Wan et al., 2012). Interaction is mainly done through the Internet to allow for worldwide distribution and sharing (Liu &Wang, 2009). These online courses or modules offer interactive activities and feedback

through technology-based instruction (Wolfson, Cavanagh, & Kraiger, 2014). It is important to note that e-Learning is merely the medium of technology, not the goal of the training.

Online learning offers students a different learning experience than in a face-to-face learning environment. E-Learning tools are built for self-discovery and allow for individualized learning (Beyth-Marom, Saporta, & Caspi, 2005). This personalized learning is constructed through interactive learning modules completed by the learner. This type of learning can increase learner motivation (Leino, Tanhua-Piiroinen, & Sommers-Piiroinen, 2012). Essentially, the more interactive and engaging the instruction, the more the learner will want to complete the learning activities.

Organizations are using the academic framework of e-Learning for use in corporate settings. However, corporate e-learning has yet to gain the popularity and use that was first anticipated due to learner motivation and lack of familiarity with virtual environments (Wan et al., 2012). Organizations that used traditional means of training in classroom settings are experimenting with ways to train large amounts of employees or people within shorter periods of time (Olaniran & Rodriguez, 2010). Additionally, e-Learning offers a way to easily track employee progress usually through the use of a Learning Management or Learning Content System. Learners and employers are able to quickly assess employee growth or problem areas with this function.

E-Learning is often driven by learner-motivation as the learning is done in a virtual environment. Wan, Compeau, and Haggarty (2012) studied how a learner's personal and social self-regulated learning strategies contributed to e-Learning processes and outcomes in organizational settings. Their study focused on 212 employees at a large Chinese organization that offers their employees training and skills development. Most of this training

was in e-Learning format. They found that learners adopt self-regulated learning (SRL) strategies resulting in different e-Learning outcomes. SRL was found to be dependent on several factors including the learner's capabilities in virtual environments, learner motivation, and personal gain. Wan et al. offered several ways for organizations to improve their ROI by choosing e-Learning systems that support personal and social SRL strategies, offer managerial feedback to promote SRL strategies, and encouraging employee social interaction.

E-Learning offers a way to reuse and build upon existing information as it was previously presented. Archiving resources enables instructors to reuse materials and for students to recount what they previously learned (Olaniran & Rodriguez, 2010). Technology such as videos, video blogs (vlogs) or podcasts can be recorded for later viewing or use in materials.

E-Learning is often built through synchronous learning activities. Synchronous learning is the setting in which learning takes place at a given time. A face-to-face lecture is one of the most common forms of synchronous learning. However, synchronous e-Learning has been found to be an effective training tool in corporate learning programs as it allows organizations that are widely dispersed to deliver centralized multimedia data in training (Granda, Garcia, Nuno, & Suarez, 2010). Synchronous learning requires a regulation of training aspects such as a schedule, technology, class size, and time constraint (Chen & Shaw, 2006). These training characteristics are what make online training successful. One example of its use in online training modules is video conferencing during class time. Synchronous technologies offer aspects like social presence, but limit when and where the student can learn (Gribbins, Hadidi, Urbaczewski, & Vician, 2007; Hrastinski, 2006). For

instance, the act of a learner watching a video to completion is different from completing an online module on their own time. Synchronous training is constructed to be completed within these predetermined constraints. This acts as a means of motivation and accountability for students.

Communication and feedback through synchronous e-Learning methods are important to the success of the learner. In a study comparing synchronous and asynchronous learning techniques, Leino, Tanhua-Piiroinen, and Sommers-Piiroinen (2012) followed 91 learners and five instructors through five different professional development trainings that look place in major Finnish companies. This study attempted to measure the dynamics of social media tools incorporated into e-Learning in the workplace through several formats including: wikis, forums, blogs, and voice conferencing. Of the 69 learners that finished the professional development programs (others did not include social media into their programs because of unforeseen technical issues), the study showed that learners valued peer feedback and support through synchronous learning methods while they found asynchronous activities to be annoying. However, Leino et al. (2012) remarked that the design of the training was at times not conducive to asynchronous learning and therefore the same importance was not placed on these tasks.

Online training can have its weaknesses. E-Learning can be difficult for learners as they must complete seemingly unlinked activities to progress through the course while learning the material along the way (Wolfson et al., 2014). Additionally, learners that are not self-motivated may find it difficult to complete tasks or instructions in the modules. Online courses may not have enough interactivity for students and may have poorly constructed synchronous learning aspects (Marcal & Cartano, 2010). Learners have also noted the lack of

consistent or useful feedback needed to perform the training consistently and to completion. Synchronous e-Learning may not be the best approach to reach the greatest number of students at one time. As there are predetermined constraints to these e-Learning modules, this method may not allow manipulation of class size and time. The shortcomings of e-Learning have been addressed in other learning methods. Blended learning, specifically, attempts to combine the technical aspects of e-Learning with face-to-face instruction for a more engaging training experience.

**Blended Learning**

Blended learning courses are becoming a popular way to offer training in a mixed approach of e-Learning and face-to-face instruction. The popularity of blended training programs continues to gain momentum and acceptance in corporate settings (Edginton & Holbrook, 2010). This is a comparatively new shift in the use of blended learning compared to its availability in academics.

Blended learning courses are comprised of both face-to-face and online learning methods. This implementation of methods enables students to maintain some aspects of traditional learning as well as computer-based or online learning activities (Aggarwal, Fowler, Hackbarth, Legon & Turoff, 2006). Blended learning courses are similar to e-Learning in that they place more of the responsibility of coursework completion onto the learner. This learning technique allows for student-guided learning.

The blended learning method has proven to be a better match than e-Learning for some organizations. In a 2005 study through SkillSoft, employees were asked how they preferred to train. Of the 3000 respondents to the survey, 13 percent preferred the interaction at instructor-led courses and 20 percent preferred to learn informally through colleagues or

online training modules. The majority 67 percent preferred a blended learning approach of both online and classroom instruction (Baldwin-Evans, 2006). Based on this data, organizations should consider blended learning as training options for their businesses.

Similarly, Edginton and Holbrook's quantitative study (2010) gathered feedback from learners in a pharmacokinetic course on blended learning environment acceptance. Students met independently in online modules instead of a classroom for 6 hours a week and met for one hour a week with the instructor for face-to-face interaction and feedback. Pre-course and post-course questionnaires were distributed for evaluation of student enthusiasm or concern for online modules compared to face-to-face interaction with the instructor. Results comparing pre-course and post-course attitudes showed a 25% increase in enthusiasm by students about maneuvering through and learning in a blended learning environment. There was also a 21.2% increase of enthusiasm of interaction with online modules. However, the post-course questionnaire found that the students highly valued the instructor interaction in the blended environment to confirm knowledge of learning content.

As with e-Learning development, much goes into building blended learning training. For blended learning to be successful, instructors and designers must understand how the technology and tools work and how to use them effectively (Olaniran & Rodriguez, 2010). They must be aware of what types of online activities should be included for best results in training. Kim, Bonk, and Oh (2008) surveyed 118 corporate employees to study the use and attitude of blended learning in corporate settings. Participants were from China, Korea, Taiwan, the United States and the United Kingdom and worked in a variety of corporate settings and sizes including non-profit, government, and business. The results concluded that attitudes of blended learning use were moderately positive. The popularity of blended

learning in corporate settings continues to grow. Some participants noted that implementing blended learning was challenging at times as instructional methods and tools were often mixed. A clear instructional strategy to initiate blended learning is needed for proper implementation.

The use of tools and timelines for blended learning can vary. It is necessary that materials are developed to allow learners to complete tasks in an adequate time period. Course time restraints may not account for material comprehension (Olaniran & Rodriguez, 2010). Too much information without adequate time to learn could result in less information absorption (Aggarwal et al., 2006). It is important to establish learner expectations for successful course completion.

Blended learning includes asynchronous learning activities in training settings. Asynchronous learning is defined as online learning that happens in the learner's choice of time or place (Aggarwal et al., 2006; Chen & Shaw, 2006). Asynchronous blended learning activities range from online chats and forums, to emails, wikis and screen sharing. Learners are encouraged to complete tasks with instructor and/or peer feedback through these tools.

In blended learning environments, learners are encouraged to take an active role in their own learning. Asynchronous blended learning techniques can be as effective as face-to-face learning (Aggarwal et al., 2006). Marcal and Caetano (2010) surveyed 38 organizations in Portugal that provided training via distance learning through various technologies. The survey asked questions on 5 different dimensions of blended learning: 1) e-Learning and blended learning activities, 2) cooperation and assistance which focused on interaction between trainees and facilitators, 3) Learning Management System (LMS) or Content Management System (CMS) platforms and support provided to maneuver within these, 4)

criteria of training assessments, and 5) training outcomes and satisfaction of blended learning courses. Results showed that blended learning held considerable weight against other learning methods focused solely on face-to-face or e-Learning methods. Most of the organizations surveyed found blended learning as a successful means to develop training. Yet other organizations noted that learning barriers such as learner differences, unfamiliar technology and instructional suitability played a role in student failure.

Like e-Learning, there are limitations to blended learning methods. Asynchronous blended learning requires more emphasis on student participation to fulfill learning tasks than other models. Learners may feel insecure to participate in asynchronous activities where they must share their work and opinions with other students (Hrastinski, 2006). Therefore, it is important to promote learner motivation and confidence to complete asynchronous training tasks or modules.

Much of the focus of blended learning falls on learner interaction and instructors feedback. As asynchronous learning is set up in a learner-centered role, feedback from instructors may not be immediate (Olaniran & Rodriguez, 2010). It is based on the interactions of other learners and instructors. If learners work at different paces, they may be frustrated that their success is based on the timeliness of others for feedback and instruction.

**[RQ2: What are the effects of e-Learning and blended learning systems on organizational success as measured with ROI?]**

Knowledge is the key to proactive and successful employees. Employees feel they are valued if they can grow and learn in their positions and are supported by their employer. In return, these employees offer skilled service and loyalty back to their organizations. It is important for organizations to measure these effects on their businesses by reviewing training

course outcomes to verify if the time and money they spend on their employees to complete training is worth the investment. Through these learning outcomes, organizations are better able to measure the demonstration of learning and their return on investment (ROI).

**Learning Outcomes**

Learning outcomes can be difficult to measure from the student's perspective as the information can be used and stored differently from learner to learner. Preferences and effectiveness of learning techniques heavily relies on the learner's individual learning styles and habits (Beyth-Marom et al., 2005). No specific type of learning method will work for all learners. While assessments and surveys offer immediate learner feedback on training materials, longer-term material retention takes more time to assess and gather.

The effectiveness of a learning module can be determined by measuring the outcome of the student's learning. An easy way to determine student success is by the metrics from an organization's LMS or CMS. An LMS can be used to see what courses employees have signed up to take and which employees completed the training. These systems also allow organizations to see the success rate for courses and in some instances can be used to pinpoint what areas of the learning topic were difficult for the student to master. The metric outcomes of the training taken can be a great way to measure the effectiveness or ineffectiveness any given training module on the LMS.

E-Learning and blended learning are structurally different. This can affect learner perceptions and outcomes. Kupritz, Lim, and Morris (2007) measured the learning outcomes of 125 learners that took part in the same class through different instructional methods. 59 of the students completed the course in e-Learning format, while the remaining 69 completed a blended format course. While no significant differences in learning outcomes emerged,

differences in instructional and learning factors did occur. Those working in the online only environment perceived a heavier work-load than those in the blended course. Those learners in the blended course appeared to have a better grasp of instructions for tasks and activities. Learners seemed to value activities that offered a variety of communication and collaboration aspects.

Motivation also determines learner outcomes of online and blended learning courses. Joo, Lim, and Kim (2012) surveyed 248 learners who enrolled in e-Learning courses at a large Korean company to study what effects student motivation or self-efficacy, intrinsic value and the perceived usefulness or ease of use had on learning flow or achievement by the learner. Self-efficacy, intrinsic value, and perceived usefulness were found to have significant effects on learning flow. Learners were more likely to experience learning flow when these factors were present. Intrinsic value, test anxiety and perceived usefulness of content held similar results with their effects on achievement. However, self-efficacy and learning flow did not promote the same results. Researchers found that previous studies failed to examine external factors such as perceived usefulness and the ease of use of the program and focused only on learner motivation, yet these were important factors in learner satisfaction and outcomes.

**Return on Investment**

Training affects employees and businesses in several ways. Besides cost and time spent on development, employees often complete training on time they would regularly be spent completing job tasks. This can result in more employee downtime for the company. Corporate training also tends to focus on the skills gained and how the information is used, rather than acquiring new knowledge (Joo, Lim, & Park, 2011). This may make it more

difficult to measure the immediate learner outcomes as these skills are used over the extent of the learner's time in the position.

Additionally, managing training and learning can be a complex task. Factors such as a changing global workforce, updated training materials, coordinating training at several locations, and completing requests for individual learning, and the need to contain costs while producing quality training are all issues organizations have to consider when developing training (Wan et al., 2012). Businesses should be aware of these issues before implementing e-Learning or blended learning into their training strategy.

Training is continuous. Industries such as healthcare, financing, information technology, education, and government are high users of e-Learning methods. The impact of consistent training can affect organizational productivity and profitability. Lai & Liou, (2010) studied the impact of e-Learning cost on an organization's performance. 123 e-Learning users and 123 non-e-Learning users were selected for the study. The two groups were compared by firm size, sales and assets. The researchers found great significance of return of investment (ROI) and return on assets (ROA) after organizations adopted e-Learning instruction including cost reduction and productivity. These reviewed e-Learning modules offered training to a large number of internal employees and resulted in a better cost per employee ratio for time and costs spent on training development. Profitability and productivity in job performance also ranked higher by adopters of e-Learning. The results also showed that those that participated in e-Learning, in turn improved the profitability of their firms.

Some organizations leave the responsibility of learning entirely to the employee. Organizations tend to promote formal training needed for job skills or for compliance over

informal training. Employees may feel the need or have the option to complete informal training on their own time to hone their skills in addition to formal training promoted by the company. It is important for organizations to specify formal training courses or training paths to the employee. Often businesses fail in finding training that best fits the learner's needs (Baldwin-Evans, 2006). Failure to assist employees in finding proper training for their job functions or goals results in mismanaged company time and potential unanticipated training costs.

**[RQ3: What learning factors influence the effectiveness of e-Learning and blended learning?]**

Many hours of design and testing go into creating effective course materials. The implementation of e-Learning and blended learning materials has continued to gain popularity as development efficiencies result in better time management and lowering budget costs. Yet, efficiency does not guarantee training effectiveness (Joo et al., 2011). As more organizations take part in e-learning and blended training opportunities, it is important to discuss what development and learning factors create successful training modules.

Internal and external learner factors can influence the effectiveness of e-Learning and blended learning in corporate settings. Learner engagement in the training activities can be affected by the amount of collaboration included in the course and the feedback offered based on performance. The learning environment can influence how motivated a learner will be to complete tasks. Learning factors such as the barriers of knowledge of learning tools, material quality issues, time needed to complete the coursework, and learning costs can affect a learner's outcome.

**Learner Engagement**

Learner engagement can be measured by how much effort learners apply to training and educational activities (Oncu & Cakir, 2011). Their success in the course is an important factor to measure effective training. Thoughtful training development is one of the best ways to promote learner engagement. Oncu & Cakir (2011) have noted benchmarks for successful online development:

- Learner engagement and collaboration is necessary to improve student satisfaction.
- Instructional design methods of courses must be tested and updated as necessary.
- Instructors have a different role in online courses. They must be prepared for this change of venue.

These guidelines summarize the need for feedback and engagement through tested methods and training tools for best learner outcomes.

Learning and training tools can be considered as important to the course as the content. Tools should be used to engage and motivate learners, not to impede their learning. It is important for designers to understand the different needs of students and use the best tools to ensure learning takes place (Ozdemir et al., 2008). Learning tools should promote collaboration and evolve or be updated to be most effective (Lee & Bonk, 2014). Learning can be improved by mixing teaching techniques, tools and content. Using interactions and videos in place of static text and images can improve retention rates among students (Lai & Liou, 2010). Tools and technology will continue to change and businesses must be aware of these innovative shifts.

Knowledge and content should be managed to include continuous improvements. Inclusion of an organization's Knowledge Management (KM) in the process of developing

and sharing organizational knowledge should be central in course design. KM includes creativity, knowledge sharing, application and validation from the learner and to each other (Yeh, Huang, & Yeh, 2010). Evolving training methods through KM and learning tools provides more sophisticated goal-oriented training.

**Collaboration**

Working collaboratively offers learners stimulation and reinforcement through their peers instead of solely through the instructor. One of the most essential parts of online courses is using collaboration as a reinforcement tool (Lee & Bonk, 2014; Edginton & Holbrook, 2010). Online and blended learning courses are more successful when these elements are included in the learning process.

Lee and Bonk (2014) studied the use and future of collaboration and collaborative tools in the workplace. They surveyed 97 corporate and government personnel, learning managers and instructional designers located globally. Participants were asked questions about future research on collaboration and collaboration tools in the workplace and gauged the interest of the participants for future study on collaboration tools. Findings showed that the importance of collaboration and collaborative tools is growing in the workforce. Collaborative tools such as wikis were found to have the greatest interest from participants as a collaborative tool. Group discussions were later held for clarification on survey questions. 30 participants took part in the discussion section of the study. The discussion sessions covered factors personnel face when choosing and promoting collaborative tools and technology within the workplace, implementing these tools, measuring their effectiveness, and future research possibilities surrounding collaboration. Discussions showed that participant feedback promoted the use of collaboration tools by instructional designers into

corporate blended learning. In addition, collaborative processes and tools can be used with Knowledge management (KM) and learning management systems (LMS) to strengthen learning strategies.

Working collaboratively offers learners stimulation and reinforcement through their peers instead of solely through the instructor. Collaboration is a means of teamwork and social support learners that they may not have in other course settings (Wolfson et al, 2014). Social capital represents the impact of networking on an individual and how these networks aid each other (Lu, Yang, & Yu, 2013). Employees can use collaborative training events as opportunities to learn new social and job performance skills through others in their network that they may not otherwise learn on their own.

Lu, Yang, and Yu's (2013) study measured social capital, or use of networking, in online instruction and compared these perceptions with learner scores. They surveyed 174 participants to gather perceptions of social capital and online learning satisfaction. Additionally, the researchers reviewed learner outcomes from actual online group projects and scores. The findings showed a positive effect of social capital or networking on a student's satisfaction toward online learning and on virtual group learning outcomes. Online learning promoted social capital through community, trust, cooperation, and inclusion based on the interactions through the online learning environment. The students' group scores were found to positively affect learning outcomes and familiarity with collaborative tools. Their study noted that learners tended to be more comfortable with asynchronous tools as they allowed them more freedom in the time they had to complete assignments. This group also noted that synchronous tools like Adobe Connect were very effective, yet it was more challenging to learn the tool and connect to other learners.

**Feedback**

Instructor interaction with learners is also needed for online course materials to be successful. Benbunan-Fich and Arbaugh's (2006) quantitative study investigated group collaboration and individual study outcomes of students in MBA course solely delivered online. Their study concluded that working individually with prepared coursework materials was not the most successful way to complete online courses. Learners that completed their coursework this way ranked lowest on perceived learning and objective learning outcomes. Learners also perceived low interaction from the instructor when materials were pre-packaged and not reinforced by the instructor. Through learner perception, the most successful students had interaction directly with the instructor at various points during the course duration and with each other.

Feedback between instructors and learners may manipulate the way the coursework is perceived and completed. Cohen and Nachmias (2011) note that the lack of direct communication between the instructor and learner in online instruction often leads to difficulty in accurately assessing the quality of the teaching and learning. Learners may become confused or discouraged if instructor feedback is not sufficient for their learning needs.

Feedback to the learner is essential for motivation and measuring learning flow. Joo, Lim, and Park (2011) surveyed 379 learners enrolled in e-Learning courses at a large electronics company in Korea to measure organizational support, learning flow or the moments when learning is interesting, but not too difficult to complete, and learning transfer. The results showed that organizational support through e-Learning in corporate settings had a significant direct effect on learning flow. Learners were more likely to be engaged in the

learning modules if they had peer or supervisory support. Organizational or managerial support and learning flow also had an effect on the learner's satisfaction with the learning modules. Finally, organizational support was found to have an important effect on learning transfer. Supervisory support of the content of the training was found to have a greater effect longer term on learner outcomes.

**Learning Factors**

Much goes into an organization's preparedness when creating e-Learning or blended learning modules. Hattinger, Ericksson, Malmskold, and Svensson (2014) held 16 interviews with 15 manufacturing firms to study the capabilities and readiness that organizations need for successful e-Learning participation. They studied awareness of competency needed, the participant's e-Learning maturity level, dynamic capabilities or the ability to change or customize as needed, and co-creativity through collaboration, networking, and partnerships. Results showed a wide range of readiness between the firms. All firms rated high for level of awareness, but only four rated high for e-Learning maturity. Of the 15 firms, only four showed dynamic capabilities. Half of the firms ranked high in co-creativity, but all admitted that their firm would benefit from more activities that promoted collaboration, such as technology-enhanced professional development projects. As online and blended learning options continue to grow in popularity in business training settings, it is important to understand the implementation and collaborative variables when choosing these methods of training.

External learning factors can influence the learner outcome of e-Learning and blended learning training. Students may or may not be familiar with virtual learning environments or the learning tools used in the training. The quality of the training may be

inadequate for successful learning. The time a learner has in which to complete a course may affect their learning retention and outcome. Additionally, the costs of training development and registration can greatly affect a students' learning outcome as well as desire to take part in the training.

**Virtual Learning Environments**

Technology allows learners from a variety of social and economic backgrounds to access training modules at the time preferable to them. As technology can be widely used, it has the potential to reach greater audiences. In training settings, online and blended learning environments offer employees a way of learning outside of the classroom. Learners used to online social interaction may prefer online or blended learning options compared to face-to-face learning (Antoniadis & Konetas, 2011). As more employees are familiar with working with various technologies in the workplace, these options offer an unobtrusive way to learn.

In addition to new learning experiences, online or blended learning environments offer an expanded networking system for employees. Online learning environments allow for more opportunities for growth through interactivity and discussions (Chen & Shaw, 2006). Learners that may not normally interact with each other now have the opportunity to share ideas and network.

Online learning environments allow for tracking student progress in several ways. Students working collaboratively on a wiki or document will leave editing marks where they've contributed information. Blog posts and videos can be tracked to view visiting traffic. Learning Management Systems (LMS) and Course Management Systems (CMS) also provide a record for a learner. When this data is collected and reviewed, it is possible to

glean crucial information on training quality and a learner's digital footprint (Cohen & Nachmias, 2011).

It is important that the technology is compatible with the training design. For example, learners may be hesitant to use new technologies or may find features like the interface too complicated (Liu & Wang, 2009). The more experience the learner has with online training platforms the better they are to complete modules and retain information (Netteland, 2009). If is it too cumbersome for learners, they may not complete the course with the intended results. This can result in lost productivity, mismanagement of information, cost of training redevelopment, and retraining costs.

**Learning Tool Barriers**

Online and blended learning styles may not work for all learners. Depending on age and technological literacy, learners may find the flow, tools, lack of immediate feedback, and thought processes of online learning difficult to overcome (Wolfson et al., 2014). Learners find value in learning at their own rate and training developers should be aware and test for potential learning barriers. Wolfson, Cavanagh, & Kraiger (2014) reviewed ways instructional design and context considerations for delivering technology-based instruction to older adults in organizational and business school settings. They found that older adults experience psychological and cognitive changes that must be addressed in training design. The researchers suggested that older adults take online training that is highly structured, provides ample guidance throughout the training with feedback, includes prompts, includes a simple interface and incorporates principles from cognitive load theory and cognitive theory of multimedia learning such as working through examples or self-pacing with instruction. Additionally, older learners benefit from training motivation

### Quality Issues

Training standards for online and blended learning can vary dramatically by organization or institution. As these standards differ, so can the quality of the training (Ozdemir, Altinkemer, & Barron, 2008). It is important that the learning environment does not overpower the learning goals.

The instructional designer or developer is key to successful training. Businesses with in-house training teams may use trainers from a variety of backgrounds. These team members may not have adequate experience to build effective training modules. Aggarwal, Fowler, Hackbarth, Legon, and Turoff (2006) suggests that defining and teaching authoring procedures and supporting this learning process is needed for quality assurance. It is essential that those creating and implementing training remember their end user. Assuring quality training goes back to peer-review and testing of the content.

Training should also be constructed with international audiences in mind. Learners from different countries have diverse assumptions and preferences for online learning modules. Aside from content, e-Learning and blended learning systems and tools may vary based on cultural backgrounds of learners (Chen & Shaw, 2006). It is essential that the end user must be considered for successful material development and translations.

### Time/Flexibility

Quality training should not be limited by time. However, training in businesses is often constrained by a number of factors including operation hours or training costs. Many times, the quality of the training is based on a predetermined training length or date of when the training is to be implemented.

These factors have implications on the quality of training material development, learner comprehension, and training outcomes. A study by Kumar, Bhatia and Chiang (2013) followed the training of 4000 hospital employees on a new Electronic Medical Record/Health Information System. This whole process was to take no more than two months' time and allow all employees to complete regular job duties as assigned. Time and the number of learners did not allow for everyone to be trained face-to-face, so e-Learning was chosen as the path for training. However, E-Learning resulted in other implementation issues. Equipment was limited to 10 computers to be used by 4000 learners within the two-month time period. Almost 80% of the nurse workforce had never used a computer. This factor led the researchers to reevaluate their training plan to include face-to-face introductory training of the LMS and e-Learning modules and then allow learners to complete the online modules. This training of the LMS did not allow for additional training time. The length of the entire training time was still constrained the two-month time period. While time is an important factor to productivity and training costs, it is important that businesses allow time for proper training to be conducted and tested for successful outcomes.

**Cost**

The cost of effective training can be expensive. Proper implementation of instructional design methods is an issue at all levels of organizations because of the high cost of developing learning modules (Chan, Miller, & Monroe 2009). Monetary needs for instructional designers, equipment, human resources and instructional tools, for instance, are all added costs to training development that may have to be absorbed solely by the training departments (Kisielnicki & Sobolewska, 2010). It may be difficult to change or update training materials as cost and technology availability can be a factor (Olaniran & Rodriguez,

2010). For example, the cost of tools such as video software or cameras may limit the quality of e-Learning modules. Students may also find it difficult to participate in training if certain software or hardware is needed to complete training requirements.

Conversely, the cost ratio per student is less for online courses as the number of students can be greater than that of face-to-face instruction as costs for instructors can raise training costs (Lai and Liou, 2010). The more employees that are trained using the same training, the less the initial cost affects the total monetary outcome. If departments can reuse materials for future training modules, some of the initial costs may be more evenly balanced.

Kisielnicki and Sobolewska (2010) analyzed over 300 training companies in Poland to study the idea that continuous training better qualifies an employee in a constantly changing world and to look for cost reductions for training to maximize the work done by employees. 30% of the training companies offered e-Learning before the study, the rest offered face-to-face or blended learning options. The researchers found that at some point costs do affect the ability of a company to provide adequate training. Companies may not be able to continually train employees because of the monetary demands. On the other hand, not training an employee also diminishes their ability to be profitable for the company. The study suggested that a compromise of strategy and costs is e-Learning. Although the initial cost of e-Learning can be high, when analyzed over a long period of time, it is much more cost effective than traditional or blended learning.

Employee time is a cost to the overall productivity of the company. Time spent in training would otherwise be used by employees to complete their regular work tasks (Kisielnicki & Sobolewska, 2010). The cost of lost work time cannot outweigh the cost of the training gained.

The size of an organization can affect the value and learner satisfaction. Paulsen (2009) studied implementation of e-Learning training in small and medium-sized enterprises from 8 different European countries. Paulsen found that these companies valued the flexibility of e-Learning and the motivation learners possessed to complete the module. Learners, however, struggled with training costs as some had to pay their own course costs. Many times organizations do not offer or cannot offer assistance to fund the training (Baldwin-Evans, 2006). As in this example, there must be a learner motivation for personal growth or professional development in addition to company policy (when enforced) to be willing to pay for these training costs.

## Conclusions and Recommendations

The purpose of this study was to show how e-Learning and blended learning training methods were used in organizations today. It also discussed ways to measure the ROI of e-Learning and blended learning training methods within corporate learning environments. Additionally, it examined means to improve learning outcomes for learners and in effect, the organization.

To conclude this literature review, I will review the research questions proposed at the beginning of the paper.

**RQ1:** How are e-Learning and blended learning systems being used in corporate training?

Current training trends show the use of both e-Learning and blended learning methods in organizations. E-Learning and blended learning methods are functional for many areas of corporate training including: new employee training, career development, soft skills, meeting competencies, and product information (Lai & Liou, 2010). E-Learning has a growing acceptance rate among organizations and more research is going into the best methods for e-Learning success. Blended learning methods are newer to the industry and less research exists to analyze its effects on the organization and learner. While research has been completed covering one or the other learning methods, more research is needed comparing the two methods for best practices and learner outcomes.

Research exemplified how e-Learning modules offer learners the opportunity to complete tasks on their own time and at their own pace. E-Learning activities tend to be synchronous in nature allowing learners to focus on a common task. Synchronous learning requires strict parameters on training including time restrictions, schedules, and class sizes (Chen & Shaw, 2006). This allows students to complete tasks on their own, yet with similar

factors of face-to-face instruction such as accountability and task structure. It is essential that learners are aware of these module constraints to they complete training in an adequate amount of time. It is the role of the instructional designer (and at times the instructor/facilitator) to develop clear and logical materials and directions as many times e-Learning training is completed without the aid of the instructor.

Blended learning modules combine the face-to-face and online aspects of instruction. Instructors take a hands-on approach when facilitating courses and collaboration is a main factor in learning flow. While this method of training has recent gained popularity as it promotes feedback and through peer collaboration- networking opportunities for learners, additional research is needed specifically in corporate settings. Blended learning courses tend to promote asynchronous activities for learner engagement. Studies showed that asynchronous activities kept students active, yet could cause information overload. One way to counter this is to include group work and collaboration in materials preparation and during learning activities (Aggarwal et al. 2006). Instructors should be aware of learner limitations with technology and content as this may affect their success rate. Additionally, it should be a goal of the instructor to offer better feedback and collaboration opportunities during the duration of the training.

Researchers continue to explore technology-based learning in corporate settings. The previously mentioned study by Hattinger et al., (2014) is part of an ongoing research project called MERIT (Manufacturing Education and Research with Information Technology) that tests conditions for design and implementation of technology-based learning for employees in the manufacturing industry. In this case, it has been profitable for both academia and these manufacturing firms to produce learning knowledge and best practices in the fields of

industrial automation, virtual manufacturing, robotics and manufacturing processes. Such research partnerships should continue as research covering corporate training use through technical systems remains scarce.

**RQ2:** What are the effects of e-Learning and blended learning systems on organizational success as measured with ROI?

Organizations measure learning outcomes and success rates to find training ROI. This is done in several ways. Metrics supplied through an LMS offer pass/fail rates, completion numbers and specific course issues that learners may encounter. Research showed that surveys were able to represent the learner perception of e-Learning or blended learning training models and which they preferred to use.

In these studies, assessment or surveys were key to determining if learning was taking place. Assessments or surveys are also used to determine what technologies, learning styles, and challenges should be adjusted for learners (Calderon, Ginsberg, & Ciabocchi, 2012). The quality and the content of course assessments must be a reflection of the materials studied and the mediums in which they were presented to create a clear image of the learner's comprehension. As ROI is difficult to test past the time period of the training to see if the learner did learn a new skill, instructors or instructional designers should follow up with trainees to see if course goals were met. This process takes time and potentially more costs for training departments, but it will provide a more accurate representation of ROI than what an LMS may show alone

Training is an investment for an organization. Training models should be compared to verify hidden costs associated with development and implementation. Only then should organizations decide what method or methods to invest in. As previously mentioned, training

models are built on a variety of traits conducive to learning. It is important that organizations take the time to test which method is most effective for their employees and skill sets.

**RQ3:** What learning factors influence the effectiveness of e-Learning and blended learning?

As the research discussed above, the outcomes of training are based on many factors. Learners must remain engaged and active in the learning activities to complete coursework that could range from heavily synchronous to asynchronous methods. Learning activities either enhance or hinder learning. The tools and technology of a course is meant to enhance – not be – the topic of training. Quality control and instructional design must be thought through so learners are reaching the learning goals.

The function of learning environments must also be taken into account. Some systems may be easier to use than others. It is important for designers and instructors to use a compatible learning environment for the training module so as to not disengage the learner from the content.

Learning outcomes may change based on the method of instruction and how it is implemented into an organization. Studies showed that implementation of workplace e-Learning should be standardized throughout the organization to create consistency for the learner. Yet standardized learning, alone, does not account for learner needs and preferences or the quality of the learning module (Netteland, 2009). For example, blended learning methods are the most successful when combining formal training with informal learning geared toward the learner's learning style (Baldwin-Evans, 2006). This formula creates support for the learner to raise performance and knowledge.

Several studies showed that collaboration and feedback are relied on heavily for online learning. Individual and group learning opportunities can reduce turnover in an

organization. Where applicable, instructors should encourage feedback and collaboration for better content comprehension.

**Recommendations**

At the time of this review, there were relatively few studies focusing on corporate or organizational examples comparing e-learning or blended learning techniques and methods. Researchers commented that additional research covering these learning methods at an organizational level is essential for the growth of the field and the experimentation and verification of teaching methods (Ozdemir et al., 2008; Marcal & Caetano, 2010). Research would also validate the corporate use of one method over another.

Additional research is needed to verify long term ROI for organizations using online or blended learning methods for means of training. Stuart (2014) followed current safety training trends within the woodworking industry across Europe and noted the reduction of accidents after an increase in those taking training. However, these numbers alone did not bring accidents to an acceptable accident rate. A closer look at Ireland's construction industry took the next step to promote lifelong learning in safety training. Once successfully completed, these course paths certified workers for 2-5 years before recertification was needed. Blended learning was chosen as the approach for these safety courses as the students were working professionals at the same time.

Many of the studies that were reviewed focused on learner preference, yet only a few went so far as to test an organization's ROI for these methods of training. Focusing on lifelong learning throughout an employee's career or recertification paths would be an asset in this field of research (Stuart, 2014). As transfer of knowledge is an important indicator of the effectiveness of training, more studies on the methods used to transfer this knowledge is

needed to conclude the effectiveness of the training method (Joo et al., 2011). These examples of employee retention and topic retention are necessary to verify what methods (if any) are truly valuable to organizations.

Training is not always made in-house. More research is needed to compare the learner outcomes of commercially or pre-made e-Learning or blended learning to outcomes of in-house developed learning. Results from such study could determine if pre-made modules are more cost effective compared to in-house training or vice versa.

Online learning methods continue to evolve. It is essential that research is continued to develop training through new media and methodologies to find what is best for enterprises and learners (Wolfson et al., 2014). Through the wide availability of cell phones and iPads, mobile learning (m-Learning), for example, is becoming a learning method option for learners. This area continues to grow, yet needs more research done to provide any stable conclusions. More specifically, research comparing m-Learning, e-learning, and blended learning options is essential for forward movement in training development and effectiveness. Training, however, will move beyond m-Learning. There is a need to continue to progress toward new methods of effective learning that will assist organizations in the best way possible.

Aside from comparison studies, more research is needed to measure the effectiveness of technology in blended learning environment. As this method continues to grow in popularity, further study on blended instruction types such as combining synchronous and asynchronous learning methods (videoconferencing + online independent learning modules) should be evaluated and how it is effective (Gribbins et al., 2007). More assessment is needed on how this knowledge is distributed through the medium of instruction (Benbunan-

Fich & Arbaugh, 2006). Blended learning offers a variety of learning possibilities, but activities should be tested to conclude what are the best learning combinations for the learner.

## References

Aggarwal, A.K., Fowler, D., Hackbarth, G., Legon, R., & Turoff, M. (2006). Asynchronous learning: Emerging issues for the 21st century. *International Journal of Web-Based Learning and Teaching Technologies, 1*(4), 54-72.

Antoniadis, N. & Konetas, D. (2011). Correlation between awareness of blended learning techniques and participation rate in e-learning: A case study. *International Journal of Advanced Corporate Learning, 4(3)*. 5-9.

Baldwin-Evans, K. (2006). Key steps to implementing a successful blended learning strategy. *Industrial and Commercial Training, 38(3)*, 156-163.

Benbunan-Fich, R., & Arbaugh, J.B. (2006). Separating the effects of knowledge construction and group collaboration in learning outcomes of web-based courses. *Information & Management, 43*(6), 778-793.

Beyth-Marom, R., Saporta, K., & Caspi, A. (2005). Synchronous vs. asynchronous tutorials: Factors affecting students' preferences and choices. *Journal of Research on Technology in Education, 37*(3), 245-262.

Boushey, H., & Glynn, S. (2012, November 16). There are significant business costs to replacing employees. *Center for American Progress.* Retrieved from https://www.americanprogress.org/issues/labor/report/2012/11/16/44464/there-are-significant-business-costs-to-replacing-employees/

Calderon, O., Patraka Ginsberg, A., & Ciabocchi, L. (2012). Multidimensional assessment of pilot blended learning programs: Maximizing program effectiveness based on student and faculty feedback. *Journal of Asynchronous Learning Networks, 16*(4), 23-27.

Chan, P., Miller, R & Monroe, E. (2009). Cognitive apprenticeship as an instructional strategy for solving corporate training challenges. *TechTrends: Linking research and Practice to Improve Learning, 53(6)*, 35-41.

Chen, C.C., & Shaw, R.S. (2006). Online synchronous vs. asynchronous software training through the behavioral modeling approach: A longitudinal field experiment. *International Journal of Distance Education Technologies, 4*(4), 88-103.

Cohen, A., & Nachmias, R. (2011). What can instructors and policy makers learn about web-supported learning through web-usage mining. *Internet and Higher Education, 14*(2), 67-76.

Edginton, A., & Holbrook, J. (2010). A blended learning approach to teaching basic pharmacokinetics and the significance of face-to-face interaction. *American Journal of Pharmaceutical Education, 74*(5).

Granda, J.C.,Garcia, D.F., Nuno, P. & Suarez, F.J. (2010). An efficient networking technique for synchronous e-learning platforms in corporate environments. *Computer Communications, 33*, 1752-1766.

Gribbins, M., Hadidi, R., Urbaczewski, A., & Vician, C. (2007). Technology-enhanced learning in blended learning environments: A report on standard practices. *Communications of the Association for Information Systems, 20*, 741-759.

Hattinger, M., Ericksson, K., Malmskold, L., & Svensson, L. (2014). E-learning readiness and absorptive capacity in the manufacturing industry. *International Journal of Advanced Corporate Learning, 7(3),* 33-40.

Hrastinski, S. (2006). Introducing an informal synchronous medium in a distance learning course: How is participation affected? *Internet and Higher Education*, *9*(2), 117-131.

Joo, Y.J., Lim, K.Y., & Kim, S. M. (2012). A model for predicting learning flow and achievement in corporate e-learning. *Journal of Educational Technology & Society, 15(1)*, 313-325.

Joo, Y.J., Lim, K.Y., & Park, S. Y. (2011). Investigating the structural relationships among organizational support, learning flow, learners' satisfaction and learning transfer in corporate e-learning. *British Journal of Educational Technology, 42(6)*, 973-984.

Kim, K., Bonk, C.J., Oh, E. (2008). The present and future state of blended learning in workplace learning settings in the united states. *Performance Improvement, 47(8)*, 5-16.

Kisielnicki, J., & Sobolewska, O. (2010). E-Learning as a strategy of acquiring a company's intellectual capital. *Interdisciplinary Journal of E-Learning and Learning Objects, 6*, 153-175.

Kumar, A., Bhatia, S., & Chiang, I. (2013). Deployment of an in-house designed training process in a quaternary care hospital. *Technology & Health Care, 21*(5), 469-478.

Kupritz, V.W., Lim, D., & Morris, M.L. (2007). Online vs. blended learning: Differences in instructional outcomes and learner satisfaction. *Journal of Asynchronous Learning Networks, 11*(2), 27-42.

Lai, C., & Liou, W. (2010). Implementation of e-learning and corporate performance: An empirical investigation. *Internationsal Journal of Advanced Corporate Learning, 3(1)*, 4-10.

Lee, H., & Bonk, J. (2014). Collaborative learning in the workplace: Practical issues and concerns. *International Journal of Advanced Corporate Learning, 7*(2), 10-17.

Leino, J., Tanhua-Piiroinen, E., & Sommers-Piiroinen, J. (2012). Adding social media to e-learning in the workplace: Instilling interactive learning culture. *International Journal of Advanced Corporate Learning, 5*(3), 18-25.

Liu, Y. & Wang, H. (2009). A comparative study on e-learning technologies and products: From the east to the west. *Systems Research & Behavioral Science, 26(2)*, 191-209.

Lu, J., Yang, J. & Yu, C. (2013). Is social capital effective for online learning? *Information & Management, 50*(7), 507-522.

Marcal, J., & Caetano, A. (2010). Corporate blended learning in portugal: Current status and future directions. *European Journal of Open, Distance and E-Learning, (1).*

Netteland, G. (2009). Implementation of e-learning in a large organization: The critical role of relevance to work. *International Journal of Advanced Corporate Learning, 2(3)*, 58-65.

Olaniran, B., & Rodriguez, N. (2010). The role of computer-mediated communication: A look at methods for delivering and facilitating training in academic and organizational settings. *International Journal of Information and Communication Technology Education, 6*(4), 61-74.

Oncu, S., & Cakir, H. (2011). Research in online learning environments: Priorities and methodologies. *Computers & Education, 57*(1), 1098-1108.

Ozdemir, Z.D., Altinkemer, K., & Barron, J.M. (2008). Adoption of technology-mediated learning in the U.S. *I.T. and Value Creations Decision Support Systems, 45*(2), 324-337.

Paulsen, M.F. (2009). Successful e-learning in small and medium-sized enterprises. *European Journal of Open, Distance and E-Learning 1*, 9.

Stuart, A. (2014). A blended learning approach to safety training: Student experiences of safe work practices and safety culture. *Safety Science, 62*, 409-417.

Wan, Z., Compeau, D, & Haggerty, N. (2012). The effects of self-regulating learning processes on e-learning outcomes in organizational settings. *Journal of Management Information Systems, 29(1),* 307-339.

Wolfson, N.E., Cavanagh, T.M., & Kraiger, K. (2014). Older adults and technology-based instruction: Optimizing learning outcomes and transfer. *Academy of Management Learning & Education, 13*(1), 22-44.

Yeh, Y., Huang, L., & Yeh, Y. (2010). Knowledge management in blended learning: Effects on professional development in creativity instruction. *Computers & Education, 56*(1), 146-156.