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Jeffrey Lucas
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Approved:

Karl W. Stukenberg, Ph.D., ABPP
Chair, Department of Psychology

Mark S. Nagy, Ph.D.
Thesis Chair
Impact of Incorporating Visual Speech in Web-Based Training on Levels of Engagement
Thesis Committee

Chair
Mark Nagy, Ph.D.
Associate Professor of Psychology

Member
Morell Mullins, Ph.D.
Associate Professor of Psychology

Member
Amy Katz, Ph.D.
Adjunct Professor
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Abstract

Research has found that a major disadvantage of web-based training is the lack of interaction between the learner and the teacher. This study examined whether visual speech could supplement the missing interaction in web-based training. Participants were from a private Midwestern university and were asked to take place in an online web-based training session and to complete a pre- and post-training learning assessment. Training engagement and learner satisfaction were also examined in this study to determine the influence of visual speech. Results indicated that visual speech did result in a significant improvement between pre- and post-training learning assessment. There were no significant differences on the levels of training engagement and learner satisfactions but both constructs were found to be positively correlated to self-efficacy. This study demonstrated that visual speech can improve performance after training and that self-efficacy may be an important factor to consider when developing and/or implementing a web-based training program.
Chapter I

Review of Literature

Organizations must develop their employees’ talents and skills in order to continually increase their potential to sustain high levels of performance. Organizations have utilized training to educate their workforce, improve employees’ performance, and to update employees on changing policies and procedures. Training has also been offered to employees who have been identified as future leaders, to help them ascend into positions with greater demands and responsibilities. A critical component of the effectiveness of any training program however, is the mode of delivery of the training content. In other words, the type of design is an integral element of a training program’s success.

Taylor (2009) identified several different formats of organizational training. One of these types of training is on-the-job training (OJT). OJT is the oldest and most widely used method of informal training (Noe, 1986). Learning from OJT occurs through observation of others, feedback about work performance, and through manuals and job-relevant materials (Rothwell & Kazanas, 1990). On-the-job training has several advantages over other methods of training. OJT can be customized to the experiences and abilities of the employees (Noe). This allows managers to develop a customized training program by using the knowledge they have gained about their workforce. OJT can also be applicable to the job because the training occurs at the location where employees are working (Noe). Because the training takes place on the job, it saves organizations money
by reducing travel and other costs associated with conducting large scale formal training programs. In addition, Noe states that OJT can be conducted whenever it is needed because the instructors are the manager or peers that help other employees to improve their performance. Hence, OJT is a very flexible training method. An additional advantage is that the skills learned during OJT can be easily transferred to the job (Noe). These advantages make OJT a very attractive method for companies looking to educate their employees. Rothwell and Kazanas noted that most HR professionals that they surveyed agreed that OJT was important to the job.

On-the-job training also has several disadvantages due to the unstructured format of this method (Noe, 1986). Typically on-the-job training is very informal and the instructor has other responsibilities in addition to the training. Moreover, if the manager/trainer has bad work habits, they may pass these habits on to their employees. Trainers may not be properly trained and therefore unaware of what practices will aid their employees to transfer the knowledge gathered during the training (Noe). An unstructured OJT may also result in employees using dangerous methods to complete their job duties, which may result in serious injury or death. Rothwell and Kazanas (1990) found that while HR professional thought OJT was important, they also noted that structured approached to OJT seemed to work better in some cases in their organization. Noe states that in order for OJT to be successful it must be structured to ensure employees complete their duties in a safe and efficient manner. Despite these disadvantages, OJT is still the most widely used training method.

Another form of organizational training is the lecture (Noe, 1986). Lecture training usually takes place in a classroom setting and utilizes one-way communication.
The effectiveness of this training is greatly dependent on the training objectives set by the organization (Levy, 2003). An organization can use lecture training to present facts or new policies and procedures to a large group of employees at a relatively low cost. Although lectures have been criticized as a training method because of the lack of interaction between the instruction and the learner (Taylor, 2009), lecture is one of the least expensive and least time consuming methods for presenting information to a large group of employees (Noe). Sullivan and McIntosh (1996) believe that lecture training can be more beneficial when the lecture is interactive and allows for discussion between the trainer and trainees. Sullivan and McIntosh believe that conducting a discussion during the lecture allows the students to become engaged in the lecture and interact with the teacher. Lecture can also serve as a way to communicate information about training programs or key behaviors to trainees, which can help when using other methods of training such as behavior modeling or technology-based techniques (Noe).

Like OJT, there are also disadvantages of using the lecture method to train employees. During lectures, the involvement of the participants is limited and the lecture primarily appeals to the learners' sense of hearing both of which affect the learners' ability to transfer the training information to their job (Noe, 1986). In addition, it is often difficult for the instructor to judge the level of the participants' understanding of the material, making it difficult to address any problems that affect the participants' learning. Kennedy (1970) notes that lectures have has little success in engaging members who did not perform well in school setting, drawing the conclusion that these members do not prefer to be in a lecture classroom setting. Lectures are not useful to develop critical thinking skills or interpersonal skills; instead they are typically only useful when
attempting to communicate facts or procedures to the employees (Levy, 2003).

Whereas lecture was reported as the most widely used method of training, Shoенfels, Eastman, and Mendel (1991) found that it was reported by practitioners as the least effective method on the training objectives measured in their study (i.e. knowledge acquisition, knowledge retention, attitude change, development of interpersonal skills, development of problem solving skills, and participant acceptance).

Programmed Instruction (PI) is another type of training. Taylor (2009) explains that PI elicits a response from the learner by presenting information using a computer. Whereas this was usually thought to be useful only in simple subject matters, PI has been used as a training method in more complex occupations such as air traffic controllers, blueprint reading, and tax return analysis (Taylor). A similar type of training to PI is computer-assisted instruction (CAI). CAI allows students to interact with a computer during the training course, which allows the instructor to monitor progress as the learner navigates through the lesson (Taylor). In CAI, the lesson is presented through a computer instead of a traditional classroom setting, as in PI. Whereas some research has shown mixed results for the usefulness of CAI and PI, O’Callaghan (1998) found that students better understand the course concepts when taking the class using CAI. CAI allows the learners to have a high amount of control by allowing them to learn at their own pace. Another advantage of PI and CAI training programs is that they can be accessed by any number of participants including employees, managers, customers, and vendors from anywhere in the world (Noe, 1986). Another advantage of PI and CAI is that paperwork dealing with administrative information (enrollment, attendance, and completion of program) can be eliminated and the training materials can be updated easily (Noe).
On the other hand, the use of technology also leads to certain disadvantages associated with CAI and PI. One disadvantage of PI and CAI is that as the technology becomes more complex, the cost of implementing that technology also increases. Also with PI and CAI there may be a lack of management support as well as a lack of motivation for the employees to learn using PI and CAI (Noe, 1986). Employees will also need access to the internet, which may be a potential disadvantage of CAI and PI training programs (Noe). A final disadvantage is the lack of high-quality content (Noe). Hence, the disadvantages associated with PI and CAI training programs can be attributed to the technology they implement. If this technology is not up-to-date, the quality of training will suffer. Similarly, problems might be expected whenever a company attempts to incorporate technology in their training sessions.

Another type of organizational training is Audiovisual (AV) training. Closed circuit television and telephones resulted in the development of audiovisual training programs (Taylor, 2009). As technology has advanced, practitioners have started using video discs, compact discs, and Microsoft PowerPoint for their training presentations. AV training has expanded the range of skills that can be taught in a training session as well as the method that can be used to present this information.

An advantage of audiovisual training is that the use of video allows the trainee to navigate through the lesson as the training designers see fit, allowing them to customize the material based on the learners' needs (Noe, 1986). The flexibility of the training presentations allows trainees to advance through the presentation at their own pace. (Levy, 2003) The use of video also allows for dangerous situations to be simulated without the risk of injury or death as well as the consistent presentation of information in
different training sessions. Kennedy (1970) stated that AV training allows for materials to be presented with real life sounds and images in a virtual setting. This information may be more effective than a typical lecture training session. AV training does not require knowledge of complex video equipment. Lastly, AV training allows employees to review their own performance. That is, by videotaping employee performance, employees can directly review their performance instead of having a manager interpret their performance and provide feedback. Trainees often report greater satisfaction with AV training than training presented as a lecture (Levy).

Like other methods of training AV also has its share of disadvantages. If the employee is presented with too much information it can produce ineffective results. Moreover, if the acting in the video is overly dramatic or of at poor quality the message the video is trying to communicate could be compromised (Noe, 1986). Although audiovisual training can be a vital tool for allowing organizations to present a consistent message to their employees, careful attention must be given to make sure the video is clear and achieves all of the objectives of the training program.

Yet another type of training is simulation (Taylor, 2009). Two important determinants of the effectiveness of simulators are the physical fidelity and psychological fidelity of the simulation (Levy, 2003). Physical fidelity concerns the extent to which the training mimics the conditions in the real world. Psychological fidelity, on the other hand, deals with the behavioral process necessary for success in the training and how comparable they are to the processes necessary for success while on the job (Levy). The goal of a training simulation is to produce a high level of psychological fidelity.
Simulators replicate the essential characteristics of the work environment that are needed to produce learning and transfer of knowledge and skills.

An advantage of simulation is that the instructor can control the learning environment as well as produce a safer environment to train (Levy, 2003; Noe, 1986). Mistakes can be made in simulators with no repercussions, which is invaluable when training in a sector where mistakes can cause serious injury or death. Simulators also allow management teams to practice their emergency plans without the risk of serious injury or destruction to physical facilities (Moorthy, Vincent, & Darzi, 2005). Their high fidelity to real world conditions help to transfer the skills learned in training to real world situations (Levy). Simulators also allow teams to work together to develop team cohesiveness and become more comfortable working with their team members (Moorthy et al.).

A disadvantage of simulations is that they can be expensive to implement and must be constantly updated as new information becomes available (Noe, 1986). Simulators are typically used for complex occupations such as astronauts, airline pilots, and military fliers (Levy, 2003). Because of the complexity of these occupations, simulators can typically be rather expensive. In order to be effective in training, the use of simulations must be used in a structured manner in the curriculums that utilize this training method, meaning that two employees from different geographical regions should experience the same training and follow the same protocol (Moorthy et al., 2005). Moorthy et al. report that more research is needed to precisely identify what makes simulators realistic and effective as a method of training. Along with this research,
Moorthy et al. call for more evidence of efficacy and cost effectiveness of simulation training.

The last type of training that Taylor (2009) identified deals with the use of business games. These games are designed to teach basic business skills and interpersonal skills. Characteristics that are typical of a business game involve a contest among the trainees or teams of trainees, who are required to demonstrate understanding of a concept, behavior, or skills (Noe, 1986). Business games typically have several alternative courses for the trainees to choose, allowing them to weigh the benefits and consequences of each choice (Noe). Typically, a component of business game involves the uncertain consequences as a result of a decision made during the game. (Noe). These games can allow an organization to test the trainees’ knowledge of a particular field and allow trainees to make business decision that can later be analyzed by managers who can give the trainees feedback about their performance (Noe).

A disadvantage of business games is that if they are too complex, the players might become demotivated and therefore lose all interest in the training session (Noe, 1986). If the business game is not motivating for the participant, it will not be effective as a method of training (Noe). Lundy (1991) proposed that students could enter the business game training with different approaches to learning. Lundy found that the approach that student adopt affect the learning that takes place during the business game. If an approach inhibit a student from learning the business game becomes ineffective. Fry, Kidron, and Schriesheim (1975) reported that no empirical evidence has been found supporting the effectiveness of business games (cf. Carroll Jr. et al. 1972). This lack of evidence may
make practitioners hesitant to use business games, especially when other methods of training have been proven to be highly effective.

Overall, organizations have suffered substantial costs when conducting various training programs due to travel (for both instructors and learners), space rental, and the cost of publishing materials for the training course. Although training has become more common in organizations, it is often one of the first services cut from an organization’s budget. For example, organizations spent 56.2 billion dollars on training in 2008 which was an 11 percent drop from 2007. This drop was a direct effect of organization attempting to save money due to the difficult conditions placed on them resulting from the economy (Campbell, 2009). Oftentimes, training services are cut due to the difficulty of associating a return on investment with training. Campbell argued against the propensity to cut training by stating that training allows employees to learn formally and informally about the business and their respective clients, making them capable of producing better results. With tighter budgets, organizations might consider looking for ways to reduce the cost of training which make it easier to meet the budget during tough economical times. One such method of training that may be less expensive than many other training programs is web-based training.

**Web-based Training**

Because ideas and practices differ depending on the organization, it is important to accurately define exactly what is meant by web-based training (WBT). Hall (1997) defined web-based training as instruction that is delivered over the internet or over a company’s intranet. Other types of WBT can be any training program that is delivered from a remote source, e-mail, or the electronic transformation of training course
materials. WBT is a type of CAI in that it is typically presented over the internet and uses some type of web browser which the participant uses to access the training materials. Hall noted that WBT can be delivered to any computer that can access the internet or a company intranet, making WBT materials accessible to virtually everyone.

Recently, the use of WBT has increased by 20% (Industry Analyst Report, 2008) signifying a possible change in how organizations train their employees. This increase could be due to a number of factors such as the reduced cost of technology (i.e. computers, servers, hardware, and software) making it more accessible for smaller organizations to utilize WBT. Indeed, WBT saves organizations money by eliminating some of the costs commonly associated with training, such as the costs of traveling to a remote location (Briggs, 2007; Hall, 1997).

The communication between the instructor and the employee that takes place in web-based training can be classified into two categories. The first, *synchronous*, is when the communication between the instructor and employee happens in real time (Chamers & Lee, 2004). Examples of synchronous WBT would be on-line discussion groups or videoconferencing. The second type is *asynchronous*, which Chamers and Lee describe as the communication that occurs when the instructor or employee accesses the WBT course and sees the contributions previously added by others. For instance, Blackboard uses asynchronous communication on its discussion boards. The instructor will open a forum asking for students' opinions and will not see the students' participation until logging back on at a later date. The decision to utilize either one of these types of communication might be based on the schedule flexibility and the needs of both the instructor and the employees.
Having the ability to utilize different types of communication is a major advantage of Web-based training. Another advantage is that WBT can be used on various types of computers as well as operating systems (e.g., Windows, Mac, and UNIX; Hall, 1997). Typically, users can access the training materials on any computer without having to install additional software or programs to view the materials. Consequently, training materials can be accessed from employees all over the world and in any type of setting as long as they have access to the internet or the company’s intranet.

Hall (1997) also identified flexibility as a major advantage to organizations implementing WBT. As with various types of PI and CAI, users can access the data at their own pace and navigate the data as they wish when using WBT. This gives users a lot of control over the training session, which has been found to increase learner satisfaction (Liu, Chiang, & Huang, 2007). This control can also help employees to better comprehend the material by providing them with as much time as needed to reflect on concepts and ideas before advancing in the training content (Minotti & Giguere, 2003).

Another advantage of WBT is the convenience of offering the training at all times. WBT can be accessed at any time, ensuring that when the employees access the training program, it is a convenient time for them to do so (Hall, 1997). This ensures that the training will not interrupt employees during a critical time of the day, when their attention might be focused elsewhere.

WBT is also able to save organizations money on travel and time. The self-paced learning allows the learner to access the material from any physical location with internet access, saving the organization from paying for employee travel so they can attend an instructor-led classroom training session. Employees also spend less time away from their
job, which is likely to translate to higher amounts of employee productivity. Another cost
savings of WBT is the organization saves on the costs on distributing training materials to
the employees. That is, an organization is able to store the information on the internet or
their intranet for virtually no cost. This saves the organization from having to distribute
training materials, saving money on printing, paper, and postage. These cost-saving
advantages of WBT are causing organizations to take a closer at implementing WBT in
their training programs (Briggs, 2007).

There are also disadvantages associated with web-based training which stem from
the delivery method of the training (Hall, 1997). Therefore, these disadvantages also
pertain to PI and CAI as well as WBT. One disadvantage is that some organizations may
lack the technological capabilities needed to optimize WBT. Hall stated that some
organizations have a less-than-optimal internet speed which may slow download speeds
of the training materials. If the materials take a considerable amount of time to download,
the user may become frustrated. Another disadvantage of WBT is the time and money it
costs to develop. Like PI and CAI, the development of WBT can be very expensive and
time consuming depending on the complexity of the technology being implemented.
Another disadvantage of WBT is that not all courses can be offered over the internet
because of the nature of the training material. For example, courses involving team-
building activities should not be done using WBT because these types of training
typically require an interpersonal interaction which is hard to accomplish over the
internet (Hall). Moreover, due to the sensitivity of some course materials, it may be more
appropriate to conduct the training in person to address the social support or interaction
that an employee may need when undergoing the training. For example, Hall suggests
that training regarding behavioral modification following a physical or verbal altercation may not be appropriate if conducted online, as the sensitivity of the subject matter may not be effectively communicated.

Another disadvantage of PI, CAI and WBT is the lack of interaction between the instructor and employee (Hall, 1997). The fact that instructor-led training is being used less makes some trainees fear that the interaction between the instruction and employee will be completely eliminated. Macurik, O’Kane, Malanga and Reid (2008) found that participants were more responsive to instructor-led training than online training because of a fear of losing the interaction with the instructor.

Distance Learning is also experiencing problems due to this lack of interaction between the instructor and learner. Distance Learning features two-way communication between people that are geographically dispersed. Distance learning can include virtual classrooms with the capability of projecting still, animated, and video images, instructor-participant audio discussion, sharing of computer application software, interaction using instant polling technology, and whiteboard marking tools (Noe, 1986). McHenry and Bozik (1995) found that incorporating technology into the classroom has negatively affected the communication between the students and teacher, and hurt the group’s ability to form a community. Saw et al. (2008) concluded that interactions between the teacher and student that happened simultaneously in the classroom facilitated learning. If this interaction is able to positively impact learning, and if WBT can incorporate this human interaction into the delivery of the training, then similar effects might be found with WBT. Hence, the purpose of this study is to modify the typical format of web-based by
investigating if the inclusion of visual speech in WBT enhances the utility of the training program.

One reason why a lack of interaction between the trainee and trainer may result in less learning may be due to lower training motivation. Training motivation is an important factor in the overall success of training programs (Baldwin, Magiuka, & Loher, 1991; Facteau, Dobbins, Russell, Ladd, & Kudisch, 1995). Baldwin et al. found that pretraining motivation was related to learning in a training session. If learners are motivated to participate in the training, they will be motivated to use the skills acquired in the training sessions in order to improve their job performance (Noe, 1986). Baldwin and Ford (1988) concluded that a motivated trainee is more likely to attend the training as well as use the skills learned during the training session in their job.

Another factor that may be affected by the lack of instructor interaction is self-efficacy. Self-efficacy is the extent to which employees are confident about their abilities (Kurbanoglu, 2003). Perhaps not surprisingly, Chuang et al. (2005) found that self-efficacy is related to training motivation and learning. If employees have high self-efficacy, they are more likely to learn from the training and use those skills to improve job performance (Chuang et al.; Jawahar et al., 2008). Self-efficacy is also important when it comes time for the individual to apply the skills learned in the training session. That is, the participant must be confident in their ability to use the skills learned in the training. For this to happen, the participant must be able to use the knowledge learned during the training which might have been limited if the participant was not motivated to participate in the training (Baldwin et al., 1991).
Factors That May Influence Effectiveness of WBT

Noe (1986) used term “motivation to learn” to describe employees who want to use the information presented to them in the training to improve their performance. Noe also comments that the learner’s attitude towards the training may affect motivation. Whereas this may be an important consideration for traditional training methods, it becomes increasingly important in WBT. Attitudes towards computer-based training may affect how people respond to WBT. With employees having various levels of comfort with technology it becomes increasingly important to consider the effect of the implementation of WBT. Although employees may want to learn and be motivated to use the skills in the job, the fact that WBT takes place via a computer may affect how they feel about the presentation and in turn their ability to use the information presented (cf. Steele, Palensky, Lynch, Lacy & Duffy, 2002). If participants are not comfortable with technology they may become demotivated during the training, which could negatively impact their learning and could result in lower levels of post-training performance. Hence, perceptions of technology are one of many employee characteristics that could be addressed by organizations to see if WBT is a viable possibility for their training programs.

Attitudes towards computer-based training moderating levels of engagement.

Interestingly, Steele et al. (2002) found that attitudes toward CAI did not impact the participants’ evaluation of training. Particularly, students preferred lecture and text-based learning over the CAI because they preferred to have interaction with the instructor. By attempting to supplement this interaction in WBT, participants’ attitudes towards
computer-based training may moderate the relationship between the training and the participants’ level of training engagement (cf. Steele et al.).

**Visual speech effects on WBT.** As noted earlier, web-based training lacks instructor-student interaction that has been found to be necessary for learning environments to be successful (Hall, 1997). This lack of interaction is a major disadvantage of WBT. Yet, the effectiveness of WBT may be enhanced by incorporating visual speech in WBT. In fact, Thompson and Ogden (1995) make the case for the inclusion of visual speech by stating that humans use information from multiple cues (i.e. audio and visual) to develop a clearer meaning of information. Thompson and Ogden pointed to research showing that the inclusion of a speaker’s face improved speech perception. Tiippana, Andersen, and Sams (2004) found that when the participant was distracted and not looking at the face of the instructor, the integration of the information was less efficient. Research has also shown that multiple cues have helped the listener to clearly identify the information being presented (Thompson & Ogden). If one of the cues (audio or visual) is ambiguous to listeners, they can use the information from the other cue to comprehend what is being presented (Tiippana et al., 2004). In addition, Liu, Massaro, Chen, Chan, and Perfetti (2007) used a 3D animated talking head to help train English speaking adults in Chinese pronunciation. One condition used only audio speech the second used a talking head. The animated talking head was paired with either synthesized or natural speech. Liu et al. found that participants trained with the talking head with either type of speech improved more than the other students. Research has also shown that the inclusion of visual speech aids in participants’ understanding and retaining of the presented information (Tiippana et al.; Liu et al.).
In sum, visual speech may be helpful in organizational training by helping to keep the employees engaged as well as providing more than one sensory method for the delivery of the information. If employees are able to focus on an instructor’s face while the information is being presented, this may increase their engagement and hopefully their job performance. Hence, it appears as though visual speech may enhance training effectiveness. To supplement the interaction between the instructor and the employee that is present during face-to-face training sessions, this study will utilize visual speech in WBT. That is, the trainee will be able to see the instructor’s face in the web-based video training while the lesson is taking place.

**Training engagement.** Pretraining motivation has been widely investigated because of its importance to the overall success of the training (Baldwin et al., 1991; Facteau et al., 1995). If employees are motivated to attend and participate in the training, they believe that the training will help them improve their performance (Noe, 1986). In addition to pretraining motivation, an important concept to consider is keeping the employee engaged during the training session. Schaufeli, Salanova, González-Roma, and Bakker (2002) defined engagement as, “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (p. 74). Combining the concepts of work engagement and training motivation can be used to create a new construct called training engagement. This term incorporates the motivation that employees need to attend the training as well as remain aware of their situation and ensure they absorb the information (Rothbard, 2001). The term “training engagement” is based on the notion that people need to be stimulated during the training session in order to absorb the information being presented to them. This idea parallels the findings of
Bakker, Schaufeli, Leiter, and Taris (2008) that external factors can influence employees’ level of work engagement. If the training stimulates the employees they may experience high levels of engagement. Higher levels of engagement have been found to predict higher levels of performance in student classrooms as well as in organizations (Bakker & Demerouti, 2008; Bakker et al., 2008). Because both training motivation and work engagement have been widely linked to improving performance, it is likely that training engagement will also improve training performance (Bakker & Demerouti; Bakker et al.; Baldwin and Ford, 1988). Hence, training engagement is likely to be an important construct to the overall success of a training program.

Whereas engagement may be a facet of training effectiveness, it does not come without criticism. The criticisms mainly deal with the usefulness of engagement over and above the contribution of a satisfaction construct. Wefald and Downey (2009) attempted to distinguish engagement from satisfaction by stating that while satisfaction encompasses the affect of involvement with job tasks, engagement focuses on the cognitive aspect. Yet, Wefald and Downey found evidence of a highly positive relationship between engagement and satisfaction. Liu et al. (2005) examined learner satisfaction, and found that participants reported higher levels of satisfaction in WBT than other, more traditional methods of training. Examining both engagement and satisfaction will serve two purposes in this study. First, learner satisfaction may be a valuable tool to aid in the correct identification of an effective WBT session. Especially with the limited research done on training engagement, it might be of some value to compare the levels of training engagement reported by participants to their level of learner satisfaction. Secondly, this study allows for the opportunity to use engagement to
identify information that is unique, and not found with learner satisfaction. By discovering unique information, research may begin to justify engagement as a separate and important construct in the field of psychology.
Chapter II

Rationale and Hypotheses

Web-based training (WBT) is a type of CAI that has been increasingly used in organizations due to its cost-saving features and versatility (Hall, 1997). Unfortunately, WBT lacks interaction between the trainer and trainees, which has been shown to be very important to a person’s ability to learn (Hall; McHenry & Bozik, 1995). In order to engage employees in WBT sessions, the utilization of visual speech may supplement the interaction that is currently missing from this method of delivery. Visual speech incorporates both spoken words as well as visual representation of a person’s face. Research has shown that visual speech has improved speech comprehension by providing multiple cues that the listener may use to interpret what is being said (Thompson & Ogden, 1995; Tiippana, Andersen, & Sams, 2004). Visual speech may help to keep the employees engaged resulting in higher performance while on the job. Consequently, the following is hypothesized:

Hypothesis 1a: Participants exposed to visual speech will report higher levels of training engagement than participants not exposed to visual speech.

Hypothesis 1b: Participants exposed to visual speech will report higher levels of learner satisfaction than participants not exposed to visual speech.

If participants are more engaged in training that utilizes visual speech, they may be more confident about using the skills they learned during the training session. This
confidence is important to the individual’s belief in their ability to use those skills to improve job performance (Kurbanoglu, 2003). Hence, self-efficacy should be investigated because of its ability to predict performance as well as ensuring the trainee will used the skills they have learned in the training session (Jawahar et al., 2008).

Therefore, the following is posited:

*Hypothesis 2a:* Participants’ level of self-efficacy will be positively related to the participants’ level of training engagement.

*Hypothesis 2b:* Participants’ level of self-efficacy will be positively related to the participants’ level of learner satisfaction.

Steele et al. (2002) found that attitudes toward CAI did not impact participants’ evaluation of the training. Because this study is utilizing visual speech in WBT, participants may be more receptive to this type of training despite their preconceived notions about computers. If the interaction is supplemented effectively, participants may respond better to a type of training when they feel a connection with the instructor.

Therefore, the following is hypothesized:

*Hypothesis 3a:* Participants’ attitudes towards technology will interact between visual speech and training engagement. In particular, participants with negative attitudes towards computer-based training will report higher levels of training engagement when exposed to visual speech than participants that are not exposed to visual speech (see Figure 1).

*Hypothesis 3b:* Participants’ attitudes towards technology will interact between visual speech and learner satisfaction. In particular, participants with negative attitudes towards computer-based training will report higher levels of learner
satisfaction when exposed to visual speech than participants that are not exposed to visual speech (see Figure 2).

Finally, if participants are more engaged, it is expected that they will absorb more information which will lead to improved performance. Rothbard (2001) stated that engaged employees absorb information about their situation. Thus, highly engaged trainees may absorb more information during the training session. It has also been demonstrated that high levels of engagement have been found to predict high levels of performance in organizations (Bakker et al., 2008; Bakker & Demerouti, 2008). Therefore, it is hypothesized that:

*Hypothesis 4:* Participants that undergo the WBT that utilizes visual speech will have larger increases in performance between the pre- and post-learning assessment test than participants that underwent the WBT that does not incorporate visual speech.
Figure Caption

*Figure 1.* Proposed relationship between visual speech and training engagement as a function of attitudes towards computer-based training.
Impact of Visual Speech on Training Engagement

Presence of Visual Speech in Training condition

- Positive Attitudes
  Towards Computer-based
  Training

- Negative Attitudes
  Towards Computer-based
  Training

Training Engagement
Low
High

Present
Absent
Figure Caption

*Figure 2.* Proposed relationship between visual speech and learner satisfaction as a function of attitudes towards computer-based training.
Presence of Visual Speech in Training condition

Positive Attitudes Towards Computer-based Training

Negative Attitudes Towards Computer-based Training
Chapter III

Methods

Participants

Assuming a medium effect size, to obtain a power coefficient of .80, 52 participants were needed for each of the three conditions resulting in a total of 156 participants (Cohen, 1992). There were 159 participants for this study, thus there was sufficient participation to meet this requirement for the power coefficient. There were 55 participants in the visual speech condition, 52 participants in the audio only condition, and 52 participants in the text only condition.

Participants were recruited using the participant pool from a small Midwestern university. In addition, participants enrolled in psychology classes were also recruited and were given class credit or extra credit for their participation in the study, pending approval from their instructor. To aid in recruitment, participants that completed the entire study and that were eligible to receive additional reward besides class credit were given a chance to win a 50 dollar gift certificate to a restaurant, which was rewarded to a randomly chosen individual who completed the entire study.

Participants were recruited from all age ranges and demographic backgrounds (see Table 1). No special prerequisites were considered when recruiting participants because they were not required by the study.
Table 1

Sample Sizes of Demographic Characteristics including Gender, Age Range, and Race ($N = 158$)

<table>
<thead>
<tr>
<th></th>
<th>Condition</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Visual Speech</td>
<td>Audio Only</td>
<td>Text Only</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>Age Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>30</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>26-33</td>
<td>13</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>34-41</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>42-49</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>50 and above</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>47</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>Black</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Demographic information was collected from participants to examine the diversity of the participants. This demographic information included gender, race, and age range. There was one participant who chose not to answer the demographic questionnaire.

**Measures**

**Training engagement.** Training engagement was measured using the Utrecht Work Engagement Scale (UWES) developed to measure the key components of engagement: vigor, dedication, and absorption (Schuafeli et al., 2002). All items were scored using a 7-point scale ranging from 0 (never) to 6 (always). To aid the ability to statistically examine the data, the scale on this measure ranged from 1 (never) to 7 (always). The items on this scale asked participants questions about their feeling during and about work, such as, “At my work, I feel bursting with energy”, and “I am proud of the work that I do”. For this experiment, the items were slightly reworded to reflect the participant’s level of engagement with the training session. For example, instead of “At my work, I feel bursting with energy” the item was changed to, “During the training session, I felt bursting with energy” (see Appendix A). Schuafeli et al. (2006) stated that the internal consistency of each of the subscales of the UWES typically has been found to fall between .80 and .90. Schuafeli, Salanova et al. also reported internal consistency for the three subscales: the vigor subscale the internal consistency ranged from .78-.79, the dedication subscale ranged from .84 and .89, and the absorption subscale ranged from .72-.73. Cronbach’s alpha for three different subscales were as follows: vigor subscale alpha was .77, the dedication subscale alpha was .83 and the absorption subscale alpha was .85.
Learner satisfaction. To assess satisfaction, a subscale of the Learning Effectiveness scale was used (Liu et al., 2007). The learner satisfaction subscale included five items rated on a five-point scale ranging from strongly disagree (1) to strongly agree (5). The items asked participants about their experience with the material. For example, one item was, “I am satisfied with the (online) manual”. The items for this measure were reworded to better reflect the participant’s experience in this study. For instance, the item above was changed to, “I am satisfied with the web-based training session” (see Appendix B). Liu et al. reported the alpha for the learner satisfaction subscale to be .84. To achieve an appropriate alpha level, two items from the scale (items 1 and 2) were deleted. After deleting these items the alpha level was .82, and all subsequent analyses were conducted with these two items removed from the Learner Satisfaction measure.

Self-efficacy. A subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) was used in this study to assess the participants’ self-efficacy (Duncan & McKeachie, 2005). This subscale consisted of eight items that were rated on a 7-point scale ranging from 1 (not at all true of me) to 7 (very true of me). For the purposes of this study, the items were slightly reworded to better suit the needs of the study. For example, an original item on the MSLQ is, “I’m certain I can master the skills being taught in this class”, had been reworded to, “I’m certain I can master the skills being taught in this training session” (see Appendix C). Duncan and McKeachie reported an alpha score of .93 for the original MSLQ. Cronbach’s alpha for this measure in this study was .95.

Attitudes towards computer-based training. In order to assess the participants’ attitudes towards computer-based training, an Education subscale of The Cybernetics Attitude Scale was used (Wagman, 1983). This subscale consisted of 10 items (5
positively worded and 5 negatively worded) which were rated on a 7-point scale ranging from strongly agree (1) to strongly disagree (7). The negatively worded questions were reversed coded, so that a high score represented negative attitudes towards computer, and a low score represented positive attitudes. An example of a positively-worded item on this subscale was “I would feel more at ease learning from a computer than from a teacher”, and a negatively worded item was similar to, “A computer can never match the human contact a teacher provides” (see Appendix D). Cronbach’s alpha for this measure in this study was .76.

Learning assessment. Performance was measured using a test that assessed the participants’ knowledge of the training materials. This performance test consisted of 15 items regarding calculating a budget and how to accurately estimate the monthly cost of groceries (see Appendix E). The questions for this learning assessment were based on the information presented in the training session. For the learning assessment taken pre-training the mean was 9.27 questions answered correctly with a standard deviation of 2.16. For the learning assessment taken post-training the mean was 11.94 questions answered correctly with a standard deviation of 2.19.

Procedure

This study sought and received approval from the Institutional Review Board (IRB) at Xavier University (see Appendix F). This study attempted to accomplish its objectives by having participants complete a WBT session on calculating their personal budget. This training session was constructed using online presentation software created and maintained by Sliderocket, Inc. When a participant first typed in the hyperlink to access the experiment, they were asked to read and give their consent to participant. The
consent form (see Appendix G) included all information so the participant could make an informed decision. After giving their consent the participant was asked to read through a short instruction page which described the experiment in detail (see Appendix H). Any participant that volunteered for the study was asked to create a four-digit code that was used for administrative purpose only. The participants were asked to develop a code that was meaningful to them. The participants first took a pre-test of performance, which asked participants about their knowledge of how to calculate a budget. Participants also were asked to complete the Cybernetic Attitude Scale to get an assessment of that individual’s attitudes towards computer-based training. These questionnaires along with all of the questionnaires used in this study were created using SurveyMonkey.

Once the first phase of the experiment was complete, participants completed the training session. There were three conditions of the training session that were assigned randomly to participants. The first condition presented a text presentation of the training information while showing a video with audio of the instructor giving the lesson. The instructor was shown from the midsection-up, allowing participants to view the instructor’s face and facial expression. The second condition presented the text presentation the participant with audio only. The third condition presented the information in text format only. There were no audio or video cues in this condition of the study. The content of the training session consisted of a step-by-step procedure to calculate a household monthly budget. Included in this training session was a procedure for estimating an appropriate cost of groceries for the month.

After the training sessions, the participants were directed to complete four additional questionnaires. The first two asked participants about their level of training
engagement and their satisfaction with the training. The third was the self-efficacy subscale, and the last was a second performance assessment (i.e. post test) after the training. The participant was then debriefed (see Appendix I). Finally, the participant was asked to complete a short demographic questionnaire (see Appendix J) in which the participant was asked for their name, age, gender and race. Also with this the participant was asked for their instructor’s name, so that they would be eligible for credit in their class. Lastly, they were asked for contact information (see Appendix K), which was used to contact the participant if they won the gift card. This information was kept separate from all other survey data.

The data collected during the study was protected by using the participants’ code number. Each survey asked the participants for this code before proceeding on the questionnaire. The experimenter was not able to pair participants’ names to their code number. The pre- and post-performance tests were constructed as if they were two separate tests. Therefore, the pin codes served as a tool to enable the ability to compare the participants’ score on both the pre- and post-performance tests.
Chapter IV

Results

A t-test was conducted to test Hypothesis 1a and 1b. Hypothesis 1a examined whether or not participants exposed to visual speech (i.e. the audio and video condition) would report higher levels of training engagement than participants not exposed to visual speech (i.e. the audio only and text only conditions). This hypothesis was not supported, $t(157) = -0.29, p = .77$. As a follow up analysis a one-way ANOVA was conducted to examine differences between the three conditions. This analysis was not significant, $F(2,156) = 1.96, p = .14$. Hypothesis 1b examined if participants reported higher levels of learner satisfaction when exposed to visual speech than those not exposed. This hypothesis was not supported, $t(157) = .61, p = .54$. As a follow-up analysis, each group was examined separately. A one-way ANOVA was conducted and this analysis showed a significant finding, $F(2, 156) = 3.13, p = .04$. However, subsequently analysis revealed that the audio only condition was greater than the text only condition, which was not hypothesized. The means and standard deviations for each of the conditions can be found in Table 2. Hence, support for Hypotheses 1a and 1b was not obtained.
Table 2

Mean and Standard Deviation scores of Utrecht Work Engagement Scale (UWES), the Learning Effective Scale (LES), and The Cybernetics Attitude Scale (CAS)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Scale</th>
<th>UWES</th>
<th>LES</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Speech</td>
<td>Mean</td>
<td>59.29</td>
<td>11.10</td>
<td>33.90</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>17.86</td>
<td>2.45</td>
<td>9.84</td>
</tr>
<tr>
<td>Audio Only</td>
<td>Mean</td>
<td>56.82</td>
<td>10.30</td>
<td>35.63</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>14.01</td>
<td>1.95</td>
<td>8.49</td>
</tr>
<tr>
<td>Text Only</td>
<td>Mean</td>
<td>59.84</td>
<td>11.42</td>
<td>35.36</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>17.33</td>
<td>2.57</td>
<td>9.58</td>
</tr>
</tbody>
</table>
A Pearson Product-moment correlation was conducted to test Hypothesis 2. Hypothesis 2a examined if self-efficacy and training engagement were positively related. This hypothesis was supported, $r(157) = .38$, $p < .001$.

Hypothesis 2b examined if self-efficacy and learner satisfaction were positively correlated. This hypothesis was also supported, $r(157) = .30$, $p < .001$.

A regression analysis was conducted to examine whether attitudes towards computers moderated the relationship between the type of training and training engagement (Hypothesis 3a) as well as learner satisfaction (Hypothesis 3b). For training engagement, there was no support for the hypothesized moderation, $F(3, 155) = 3.80$, $p = 14$. Moreover, there was no evidence for attitudes toward computers moderating the relationship between type of training and learner satisfaction, $F(2, 156) = 2.14$, $p = .45$. Therefore both Hypotheses 3a and 3b were not supported.

Lastly, hypothesis 4 examined if visual speech influenced participant scores on a learning assessment. A one-way ANOVA was conducted between the three training conditions and the change in scores between the pre- and post-training learning assessment. This analysis produced a significant result, $F(2, 156) = 5.35$, $p = .006$. Follow up Tukey post hoc tests were conducted to examine the difference between groups. The mean difference between the pre- and post- test for the visual speech condition ($M = 3.07; SD = 2.66$) was significantly greater than the mean difference in the audio only condition ($M = 1.73; SD = 2.48$), $p = .007$. Therefore Hypothesis 4 was supported. Furthermore, the mean difference in the text only condition ($M = 3.19; SD = 2.44$) was also significantly greater than the audio only condition ($M = 1.73; SD = 2.48$), $p = .004$. 
Supplemental Analysis

An interesting question to pursue as a supplemental analysis would be to determine the extent to which training engagement and learner satisfaction were related. A Pearson Product-moment correlation was conducted to examine the relationship between training engagement and learner satisfaction. A significant correlation was found, $r(157) = .48$, $p < .001$, therefore providing evidence that the relationship between training engagement and learner satisfaction was indeed positively correlated (See Table 3). For further evidence, a factor analysis was conducted to determine if the analysis would show the presence of separate factors for engagement and satisfaction. The strength of the relationship between training engagement and learner satisfaction suggests that, whereas the two may be significantly correlated, there is not enough overlap between the two to consider them to be the same construct. In addition to this, a factor analysis was conducted to determine if the engagement scale and the satisfaction scale would produce separate factors. Using Principal Component Factor Analysis with Varimax rotation, four separate factors were identified when the satisfaction and engagement scales were combined. These four factors accounted for 66% of the total amount of variance.

Follow-up analyses were conducted to examine if the diversity among participants influenced the results in any way. Table 1 summarized the demographic variables collected in this study. An independent samples t-test was conducted to examine the affects of gender on the dependent variables (training engagement, learner satisfaction, self-efficacy, difference of scores between pre- and post- learning assessment, and
Table 3

**Correlation Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>CAS</th>
<th>LES</th>
<th>UWES - Vigor</th>
<th>UWES - Ded</th>
<th>UWES - Absorp</th>
<th>MSLQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>34.95</td>
<td>9.30</td>
<td>(0.76)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LES</td>
<td>10.95</td>
<td>2.39</td>
<td>0.15</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UWES - Vigor</td>
<td>20.40</td>
<td>6.29</td>
<td>0.24**</td>
<td>0.39**</td>
<td>0.77**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UWES - Ded</td>
<td>19.03</td>
<td>5.74</td>
<td>0.16*</td>
<td>0.51**</td>
<td>0.83*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UWES - Absorp</td>
<td>20.36</td>
<td>6.54</td>
<td>0.22**</td>
<td>0.45**</td>
<td>0.82**</td>
<td>0.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSLQ</td>
<td>43.47</td>
<td>8.93</td>
<td>-0.04</td>
<td>0.30**</td>
<td>0.36**</td>
<td>0.34**</td>
<td>0.36**</td>
<td>0.95</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed)**

*Correlation is significant at the 0.05 level (2-tailed)*

Alpha scores are designated in parentheses

**CAS** - Education subscale of The Cybernetics Attitude Scale
**LES** - Learning Effectiveness Scale
**UWES - Vigor** - Utrecht Work Engagement Scale – Vigor Subscale
**UWES - Ded** - Utrecht Work Engagement Scale – Dedication Subscale
**UWES - Absorp** - Utrecht Work Engagement Scale – Absorption Subscale
**MSLQ** - Motivated Strategies for Learning Questionnaire
attitudes towards computers). The t-tests conducted for each dependent variable revealed no significant findings. Thus, gender did not influence any of the findings in this study.

In regards to age, the participants were asked to categorize their age by selecting an appropriate range (18 – 25, 26 – 33, 34 – 41, 42 – 49, 50 and above). The effect of age was examined by using a one-way ANOVA on each of the dependent variables. Regarding training engagement a significant ANOVA was found ($F(4, 153) = 4.40, p = .002$). Follow up Tukey post hoc tests revealed that participants in the age range of 26 – 33 ($M = 67.70; SD = 13.68$) were significantly more engaged than participants in the 42 – 49 age range ($M = 45.00; SD = 14.86$). There were no other significant influences of age difference on the dependant variables found in these analyses. Because there was a significant ANOVA when examining the relationship between age group and training engagement, hypothesis 1 was retested while control for the effects of age. This ANCOVA was found not to be significant, $F(2, 154) = 1.95, p = .15$.

Race was also examined to determine if it influenced the results of the study. After conducting a one-way ANOVA for each of the dependant variables, no significant influence was found. Therefore, the race of the participant did not affect their reporting on any of the dependant variables.

A follow-up t-test was conducted to test whether scores on the pre- and post-training learning assessment were significantly different. The t-test was significant, $t(158) = 12.9, p < .01$, indicating the post-training test scores ($M = 11.94, SD = 2.19$) were significantly greater than the pre-training test scores ($M = 9.27, SD = 2.16$). Therefore, this provides some evidence that the training did have an effect on learning.
Chapter V

Discussion

This study was conducted to examine the effect of adding a visual component to the typical version of web-based training. Specifically, this study attempted to examine the effect of adding visual speech to web-based training (WBT) on training engagement, learner satisfaction, and improvement between a pre- and post-training learning assessment. It was believed that adding visual speech to WBT would supplement the interaction between an instructor and an employee. This interaction is missing in a typical web-based training session, which may affect the overall effectiveness of the training. The results of this study, while not always supporting the proposed hypotheses, do offer some interesting findings.

The term training engagement incorporates the ideas of both work engagement and training motivation. The overall concept concerns the fact that employees must be motivated to attend the training as well as be stimulated during the training session to keep their focus on the training materials being presented to maximize absorption of the material. Rothbard (2001) believed that to be fully engaged an employee must always be aware of their situation as well as absorb any relevant information in their environment. It was hypothesized in this study (Hypothesis 1a) that a WBT session with two sources of stimuli (audio and video) would be more engaging than a training session with just one
(only audio or only text). In other words, it was proposed that the presence of the instructor’s face would keep the employee more engaged than the typical web-based training session which only incorporates text and/or audio. However, this hypothesis was not supported. In addition, Hypothesis 1b, which examined if learner satisfaction would be affected by the type of web-based training that participants underwent, was also not supported. When examining the scores from both hypotheses it was surprising that the highest scores were reported from participants in the text only condition. The age of the sample population may have also had an effect on this finding. Younger participants (age 18-25), may have found it more comfortable to read from a computer screen than to watch and listen to the instructor talking. Although no definite conclusions should be drawn because the differences were not statistically significant, the pattern of the results from both hypotheses 1a and 1b suggest that there may be certain features of the training conditions that are better in a training environment.

The obtained results are a bit surprising given previous research involving engagement and visual speech (Thompson and Ogden, 1995; Tiippana et al., 2004). Whereas the incorporation of visual speech in web-based training is becoming more present in the professional field the research supporting its use is limited. The higher raw scores of engagement and learner satisfaction from participants in the text only condition are very surprising given that the text only condition was thought to be the least engaging of the three conditions. Previous research has concluded that the more environmental cues available to a person in a given situation, the better able they are to absorb that information (Tiippana et al., 2004). A key part to the construct of engagement is absorption of the information surrounding a person’s job or situation (Rothbard, 2001),
therefore it very surprising that text only condition had higher raw scores than the other
two conditions. Future research needs to explore this finding to determine if WBT is
more effective when only one cue is available to the participants. By having only the text
available for the participant, it may actually enhance engagement because it forces the
materials to be read by the learner which results in more engagement. Future research
should consider this as a possibility and include ways to investigate it further.

A second aspect of this study investigated the importance of training engagement
and learner satisfaction by examining how confident a participant would be of their
knowledge and/or skills learned in the training session. Self-efficacy was included in this
study because of its importance in predicting future performance (Jawahar et al., 2008).
Hypothesis 2 examined the relationship between participants' self-efficacy with training
engagement and learner satisfaction. Both the relationships between self-efficacy and
training engagement and self-efficacy and learner satisfaction were found to be positively
correlated. When taken together, these findings suggest that training engagement and
learner satisfaction may be important when evaluating a training program. Indeed,
previous research has demonstrated that self-efficacy is important to improve job
performance (Chuang et al., 2005; Jawahar et al., 2008). When evaluating a training
program a key criterion for success is the improvement of the employees' skills/abilities.
Typically any improvement is based upon performance or some other measure of output.
The fact self-efficacy was positively related to training engagement and learner
satisfaction supports the importance of ensuring participants are engaged during the
training session and satisfied with the training session as a whole. Future research should
continue to examine the relationship between self-efficacy and training engagement and
learner satisfaction. If self-efficacy can be proven as a stable predictor of training engagement and learner satisfaction it may be used to help select individuals for the training who will be engaged in the training.

Future research regarding self-efficacy may want to examine its effects on learner performance. If self-efficacy was found to improve performance, organizations could incorporate ways to enhance self-efficacy after the training. The goal for future research may also be to identify ways in which training sessions can be designed to improve self-efficacy. For example, training which involves numerous practice sessions and shows the employee their improvement in performance on those practice sessions may improve an employee’s self-efficacy. If the employee is able to see an actual improvement in performance, they may believe in the effectiveness of the training. On the other hand, research might also want to investigate whether high levels of self-efficacy can impede learning. That is, it might be possible that if participants are overly confident of their skills, they may see the training as unnecessary, and thus may perform poorly. Consequently, there may be a range in which moderate self-efficacy is optimal for training performance, or it may simply be that higher self-efficacy is related to higher training performance. Future research should look to determine if high levels of self-efficacy can actually improve or impede performance on the job.

Hypothesis 3 tested for the presence of an interaction between attitudes towards computers and the effects of visual speech. First, it was hypothesized that the interaction would have an effect on training engagement levels (hypothesis 3a). In particular, it was hypothesized that even if participants had negative attitudes towards computers, they would report high levels of engagement after the training session if visual speech was
present in the session. It was thought that visual speech would replace the interaction between the teacher and the student that is missing from WBT sessions (Hale, 1997), thus allowing participants to feel more engaged in training session, even if they had negative attitudes towards computers. Hypothesis 3b included the same basic framework except it examined learner satisfaction instead of training engagement. Unfortunately, both hypotheses 3a and 3b were not supported from the data as there were no significant interactions involving visual speech and attitudes towards computers.

Given the fact that visual speech did not increase the levels of training engagement or learner satisfaction, the non-significant interactions are not very surprising. If visual speech was not able increase the training engagement for participants as a whole, it is very unlikely that it would improve engagement scores for a group of people who do not like using computers in the first place. The lack of support for this hypothesis illustrated that the inclusion of a video cue in web-based training was not able to improve learner satisfaction among participants with negative attitudes towards computers. Although this finding may be due to the ineffectiveness of the visual speech, it may also have to do with the fact that some employees, no matter what methods are used in the training session, may never be comfortable learning through computers. For these individuals, the training course taking place via a computer may lead to a sense of separation from the instruction that cannot be replaced. Future research could examine the construct of attitudes towards computers to get a better understanding of why individuals have a negative attitude towards computers and if this attitude can be changed. Research regarding attitudes towards computers could also give practitioners a better idea if WBT is likely to be effective in their organization. Knowing this
information ahead of time would be very beneficial before companies invest the time and
money to develop a WBT program.

Hypothesis 4 investigated the score on a pre- and post- training learning
assessment to determine if greater improvement was made by participants in the visual
speech condition of the experiment than by participants in the other training conditions.
This hypothesis follows the research conducted by Thompson and Ogden (1995), who
believed that humans use the information collected from cues (audio and visual
information) in the environment and then use the information from these cues to develop
deeper understanding of the situation. It was believed that multiple cues (audio and
visual) would serve as two sources of information which the participants could use to
absorb the material being presented in the training session. Hypothesis 4 was supported
as participants in the visual speech training conditions did have significantly more
improvement in scores between the pre- and post- learning assessments than in the audio
only conditions.

In addition to this finding, the text only condition also had a significantly larger
difference in score between the pre- and post- learning assessment ($M = 3.19; SD = 2.44$)
than the audio only condition ($M = 1.73; SD = 2.48$). These findings show that the audio
only condition produced the smallest improvement in mean difference scores thus having
the smallest impact on the overall performance improvement of the learner.

The inclusion of training engagement and learner satisfaction in this study
allowed for additional analyses that were used to develop a deeper understanding of the
results. This allowed the examination of differences, if any, between satisfaction and
engagement based upon the WBT. One outcome of this analysis was that training
Engagement and learner satisfaction were positively correlated but not to the degree that they were the same construct. This adds to the debate about engagement and satisfaction being two distinct constructs. The finding that engagement is unique from satisfaction contradicts research by Wefald and Downey (2009) who found that the constructs were so closely related that they were unable to distinguish between the two. In contrast, Alan (2006) examined the relationship between engagement and satisfaction and was able to find a relationship between the two constructs that supported the idea of two separate constructs. Alan found engagement to mediate a relationship involving satisfaction thus demonstrating that, while they may be closely related, the construct themselves could also be considered different. The engagement and satisfaction scales were factor analyzed to provide further evidence for the idea that these two constructs are unique from one another. The engagement scale used in this study was comprised of three subscales addressing three different components of engagement; vigor, dedication, and absorption. When the engagement scale items were combined with the satisfaction scale items, four factors were identified. Three factors were identified as the engagement items and a fourth was comprised of the satisfaction items used in this study. The results of this study suggest that, at least in terms of WBT, that training engagement and learner satisfaction are indeed two separate constructs.

Further analyses also examined the potential influence of demographic diversity on the findings obtained in this study. Although there was no effect of gender or race on the findings there was an effect of age. Specifically, the age range 26 – 33 was significantly more engaged during the training than participants in the age range of 42-49. Subsequent analyses controlling for age, however, did not change the direction of the non-significant
results. When considered together it appears that there were little, if any, influences of demographics on the obtained results.

**Contributions.** This study found that incorporating visual speech improved scores on a learning assessment more than a typical web-based training program that only contained audio information. Organizations should incorporate visual speech into their WBT because it improves the learner’s ability to recall the information presented to them in the training session. This study was also able to provide evidence that organizations may want to avoid audio only WBT as compared to text only or visual speech WBT, as these latter two options of WBT were shown to have a greater impact on improving performance on a learning assessment. This is an important finding that will hopefully increase the amount of research pertaining to visual speech and its inclusion in WBT.

The results of this study found that self-efficacy plays a major part in the overall effectiveness of training programs, at least in terms of learner satisfaction and training engagement. The relationship between these three constructs appears to be important to the overall effectiveness of any WBT program and organizations should look for ways to enhance self-efficacy prior to sending their employees to any training program.

Lastly, this study was able to provide evidence that engagement and satisfaction may be two separate constructs. The correlation between learner satisfaction and training engagement was small enough to suggest that, while they are related, they are unique enough to justify treating them as separate constructs. Because the two constructs are different it supports the idea that engagement can add something unique above and beyond learner satisfaction. Future research should continue to examine the relationship between engagement and satisfaction and provide evidence of why it is important to
include them when evaluated a training session. In addition to this, future research should also continue to define the term engagement. Engagement has different meanings depending on the environment and/or the individual. Therefore, to help distinguish between engagement and satisfaction a clear definition of the term engagement should be developed.

**Limitations.** One limitation of this study is the population that was asked to participate on the study. It would have been ideal to use a population of employees from an organization about to implement a new training program. Because of time and budget constraints this was not a feasible option. Therefore, a population of college students was used. The training materials had to be modified to attempt to appeal to every participant of the training sessions. As a result, this training material may have not been as motivating to the college students as job-relevant materials would be to an employee. Also, the sample of participants from different age ranges was not representative of the population. There was a high number of participants in the 18-25 range, and very low numbers in the other age ranges.

Also, the participants were not asked how many years of work experience they have had in their lifetimes. Having this information may have helped to determine if participants in this study had any experience in the workforce, allowing for a better comparison to the ideal population sample for this study. Also, it would have helpful to know if participants had ever experienced any type of WBT training. If the participant had been in a web-based training session they made have already formed an opinion of WBT and therefore affected their attitude toward computers. Also, this previously formed opinion may have affected how engaged they were in the training. Thus, previous
experience with WBT may have affected the results in a significant way. These pieces of information would have helped to better understand the results.

The internal consistency of the learning satisfaction scale was very low compared to previous research (Liu et al., 2007). Therefore, in order to improve its internal consistency, two items were deleted. With these two items deleted, the alpha was similar to the score reported in the research. The fact that the entire scale could not be included in the analysis may suggest that this construct was not measured as completely as in past research (Liu et al.). Future research should determine whether or not this scale is a better measurement of satisfaction when the two items are included than when they are deleted.

Another limitation of this study is the lack of research pertaining to training engagement. This construct has only been discussed in the popular press book and the research support for this construct is relatively nonexistent. Whereas the construct of training engagement was derived from sound research pertaining to employee engagement, the overall findings of this study have not been replicated in other studies or other areas of research. Therefore further research is needed to determine if these findings are indeed valid and not due to an outside influence which has not been identify or discovered yet. With more research these outside influence which affect training engagement can be identified and controlled for in experimental studies.

**Conclusions.** This study attempted to investigate how WBT may be improved and how one of the major complaints about WBT, that there is no connection between the instruction and the employees, could be rectified. In fact, in classroom settings the connection between the teacher and student may promote more responsive participants (Macurik, et al., 2008). Therefore, the goal of this study was to determine if visual speech
could supplement that relationship and lead to more effective web-based training. A learning assessment was used to evaluate the effectiveness of the training by examining the difference in pre- and post-training scores. The condition with visual speech was able to produce greater improvements in training engagement and learner satisfaction than the audio only condition. This provides evidence that the visual speech addition to WBT makes it more effective and can lead to greater improvement of performance.

The results suggest training engagement may very well be important when evaluating a training program. It would seem that engagement must play a role in learning especially in an environment where there are distractions. If a person is not paying attention to what is going on around them, the chances that they may miss pieces of information become increasingly overwhelming. When in a training session where information is being passed at a very high rate, it becomes vital for the person to be concentrating solely on the training session. Therefore if a session is able to engage the person by including a video of the instructor, it will improve that person’s ability to absorb the information.

Because WBT has so many advantages for organizations, it appears as though WBT will continue to be used well into the future. In fact, given the prevalence of WBT, it appears that employees will have to adapt to a workplace in which the majority of teaching and/or training will take place over a computer. Indeed, this type of training is taking on new meaning almost on a daily basis. With advances in hardware and the increase of use with the internet and social media, the possibilities for WBT are unlimited. For instance, an organization may have an internal social media website to help connect its employees together who may work in different states or countries. This
social media website may also help to connect employees to share best practices or new ideas. WBT can then be distributed to employees to help training them on these practices. Hence, organizations will have to prepare their workforces to adapt to changes in WBT in order to make the training useful for their employees. In addition, based on the results of this study, organizations may have to examine generational differences in technology to identify a universal effective manner to deliver the training materials.

Web-based training is becoming more and more commonplace in today’s technology driven society. The advances of technology are allowing organizations to do more with less than ever before. Given that WBT is a cost effective approach to employee training, research should continue to look at ways to improve WBT not only from a technology standpoint but a psychological standpoint as well. With technology advancing on a daily basis, research should continue to examine how a person’s ability to use that technology will aid in learning and, ultimately, become better at his or her job.
Chapter VI

Summary

Training for an organization is a very important part of the process of developing employees to improve their knowledge and their skills. Training can also be offered to employees who the organization believes to be future leaders of the company. The training can help prepare employees for their increasing roles within the organization. There are various types of training available to organization and each has their advantages and disadvantages. An important part of any training program is how the information is delivered to the employees.

Taylor (2009) identified several types of training including programmed instruction (PI) and computer-assisted instruction (CAI). Both of these types of training are very similar, they use a computer to present the information to the learner. Because the information can be passed to students using the internet, the information can be accessed all over the world (Noe, 1986). This makes the information very accessible to the learner, and again allows the learner to have the control over when they want to take the training course.

A type of CAI which is typically presented over the internet to various individuals around the country or around the world is web-based training (WBT). Hall (1997) defined WBT as any instruction which was delivered over a computer using the internet
or a company’s intranet. Because of the accessibility of WBT, the use has recently increased by 20% (Industry Analyst Report, 2008).

The advantages for an organization implementing a WBT program include; saving money on travel, the learner’s ability to work at their own pace, and the possibility of offering various types of communication which can be used for discussion (synchronous and asynchronous; Chambers & Lee, 2004) Despite these advantages there are also disadvantages of implementing a PI, CAI and WBT program which stem from the limitations of technology. Because the information is passed through a computer, the learner does not have the opportunity to connect with the teacher as they would in a classroom training session. This interaction has been found to affect the participants’ overall feeling of the training program (Macurik et al., 2008). McHenry and Bozik (1995) had similar findings in which the implementation of technology in the classroom (online discussions) actually affected the level of communication between the learner and the teacher and affected the class’s ability to form a community like relationship. These types of interactions happened instantly in the classroom and it is something that is currently missing from WBT (Saw et al., 2008).

Examining factors that may influence the effectiveness of WBT can help to determine what impacts this lack of interaction has on the learner. Factors such as self-efficacy should be examined because of their relationship with training motivation and learning (Chuang et al., 2005). Employees with high level of self-efficacy have been found to be more likely to learn from the training and use those skills to improve their performance (Chuang et al.; Jawahar et al., 2008).
Because WBT is delivered over a computer, the learners’ attitudes towards
computer become important to examine. If a learner has a negative attitude towards
computers it may demotivate them to learn during the training thus influencing its
effectiveness on performance (cf. Steele et al., 2002).

The lack of visual speech in a WBT session may be another factor that affects the
learner’s ability to absorb the information. The inclusion of a video of a person speaking
has been found to improve speech perception and may be able to supplement the
interaction that is currently missing from WBT (Thompson and Ogden, 1995; Hall,
1997). In fact the presentation of multiple cues of information (the instructor’s voice and
their facial expressions) has been found to be useful because the listener can use the
multiple cues to develop a clearer understanding of what is being said (Tippana et al.,
2004).

Training engagement was derived using research from two fields related to an
employee’s ability to learn and improve their performance. The first is employee
engagement which involves an employee being aware of their situation and able to
absorb information around them and use this information in a constructive manner
(Rothbard, 2001). Secondly, training engagement is based upon pretraining motivation
which Noe (1986) described as the learner’s desire to attend the training and use the
information presented to improve performance. Training engagement was included in this
study to examine the idea that the learner must be motivated to attend the training while
as the same time engaged in the training to absorb the information being presented.
Learner satisfaction was examined in this study to look at its effects on WBT as well as
its relationship with engagement.
The purpose of this study is to look at the effects of incorporating visual speech into WBT on factors such as training engagement, learner satisfaction, and self-efficacy. This study will examine whether participants in the visual speech WBT condition will report higher levels of these factors than participants not in the visual speech condition. The incorporation of visual speech has been found to increase the learner’s ability to understand spoken words better as well as have a better chance of understanding information not presented in a clear manner (Tippana, et al., 2004). If visual speech is able to result in higher levels of engagement, this may result in better performance which would be similar to the findings of work engagement (Bakker et al., 2008; Bakker & Demerouti, 2008). Steele et al. (2002) found that attitudes towards CAI did not impact participants’ evaluation of the training. In this study, attitudes towards computers will be examined to determine if they can somehow impact the learner’s engagement or satisfaction of the WBT.

Hypotheses for this study were as follows:

Hypothesis 1a: Participants exposed to visual speech will report higher levels of training engagement than participants not exposed to visual speech.

Hypothesis 1b: Participants exposed to visual speech will report higher levels of learner satisfaction than participants not exposed to visual speech.

Hypothesis 2a: Participants’ level of self-efficacy will be positively related to the participants’ level of training engagement.

Hypothesis 2b: Participants’ level of self-efficacy will be positively related to the participants’ level of learner satisfaction.
Hypothesis 3a: Participants' attitudes towards technology will interact between visual speech and training engagement. In particular, participants with negative attitudes towards computer-based training will report higher levels of training engagement when exposed to visual speech than participants that are not exposed to visual speech.

Hypothesis 3b: Participants' attitudes towards technology will interact between visual speech and learner satisfaction. In particular, participants with negative attitudes towards computer-based training will report higher levels of learner satisfaction when exposed to visual speech than participants that are not exposed to visual speech.

Hypothesis 4: Participants that undergo the WBT that utilizes visual speech will have larger increases in performance between the pre- and post-learning assessment test than participants that underwent the WBT that does not incorporate visual speech.

Method

Participants

Participants were recruited using the participant pool from a small midwestern university. A total of 159 individuals participated in this study, 59 male and 99 females. There were 55 participants in the visual speech test condition, 52 in the audio-only, and 52 in the text-only condition. This sample of individuals included 134 Caucasians, 14 Blacks, 7 Hispanics, and 3 Asians. Ages of the participants were reported as follows: 102 from the age range 18-25, 30 from 16-33, eight from 34-41, 12 from 42-49 and six who
reported their age as 50 and above. One participant chose not to fill out the demographic questionnaire.

Measures

Training engagement. Training engagement was measured using the Utrecht Work Engagement Scale (UWES) developed to measure the key components of engagement: vigor, dedication, and absorption (Schuafeli et al., 2002). All items were scored using a 7-point scale ranging from 0 (never) to 6 (always).

Learner satisfaction. To assess satisfaction, a subscale of the Learning Effectiveness scale was used (Liu et al., 2007). The learner satisfaction subscale included five items rated on a five-point scale ranging from strongly disagree (1) to strongly agree (5). To achieve an appropriate alpha level, two items from the scale (items 1 and 2) were deleted.

Self-efficacy. A subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) was used in this study to assess the participants' self-efficacy (Duncan & McKeachie, 2005). This subscale consisted of eight items that are rated on a 7-point scale ranging from 1 (not at all true of me) to 7 (very true of me).

Attitudes towards computer-based training. In order to assess the participants’ attitudes towards computer-based training, an Education subscale of The Cybernetics Attitude Scale was used (Wagman, 1983). This subscale consisted of 10 items (5 positively worded and 5 negatively worded) which were rated on a 7-point scale ranging from strongly agree (1) to strongly disagree (7).

Training performance. Performance was measured using a test that was developed for this study to assess the participants’ knowledge of the training materials.
This performance test consisted of 15 items regarding calculating a budget and how to accurately estimate the monthly cost of groceries.

**Procedure**

This study asked participants to complete a WBT session over the internet using online presentation software developed and maintained by Sliderocket, Inc. The participants first took a learning assessment, which asked them about their knowledge of calculating a budget. Next the participants were asked to complete the Cybernetic Attitude Scale to access their attitudes towards computers. These questionnaires as well as the other questionnaires used in this study were made available to the participants via SurveyMonkey.

In the next phase of the study, participants were asked to participate in a WBT session. There were three different types of training session which served as the three test conditions in this study. The visual speech condition contained a text presentation of the information along with video of the instructor speaking and an audio recording of the presentation. The audio only condition included the text presentation along with just an audio recording of the instructor speaking; there was no video available in this condition. The third condition included just a text presentation of the information with no audio or video of the instructor (this condition is referred to as text-only condition).

After the training session ended participants were asked to complete several more questionnaires. The questionnaires examined the participants’ self-reports of training engagement, learner satisfaction, and self-efficacy. Lastly, the participants were again asked to take the learning assessment. The participants were then asked to take a short demographic questionnaire which asked for their gender, age and race. Contact
information was also collected which included their name, the name of their professor, and their course number.

**Results**

**Hypothesis tests.** A t-test was conducted to test whether or not participants exposed to visual speech (i.e. the audio and video condition) would report higher levels of training engagement than participants not exposed to visual speech (i.e. the audio only and text only conditions). This hypothesis was not supported, \( t(157) = -.29, p = .77 \). Hypothesis 1b examined if participants reported higher levels of learner satisfaction when exposed to visual speech than those not exposed. This hypothesis was also not supported, \( F(2,156) = 1.959, p = .14 \).

A Pearson Product-moment correlation was conducted to examine whether or not self-efficacy and training engagement were positively related. This hypothesis was supported, \( r(157) = .38, p < .01 \). Hypothesis 2b examined whether or not self-efficacy and learner satisfaction was positively correlated. This hypothesis was also supported, \( r(157) = .30, p < .01 \).

A regression analysis was conducted to examine the hypothesized interaction of attitudes towards computers and experimental condition on training engagement (Hypothesis 3a) and learner satisfaction (Hypothesis 3b). For training engagement, the interaction effect was found to be non-significant, \( F(3,155) = 3.8, p = 14 \). The interaction effect on learner satisfaction was also found to be non-significant, \( F(2,156) = 2.14, p = .45 \). Therefore both Hypotheses 3a and 3b were not supported.

Lastly, hypothesis 4 examined if visual speech influenced participants' scores on a learning assessment. A one-way ANOVA was conducted between the three training
conditions and the change in scores between the pre- and post-training learning assessment. This analysis produced a significant result, $F(2,156) = 5.36, p < .01$. Follow up Tukey post hoc tests were conducted to examine the difference between groups. The mean difference between the pre- and post-test for the visual speech condition ($M = 3.07; SD = 2.66$) was significantly more than the mean difference in the audio only condition ($M = 1.73; SD = 2.48$), $p < .01$. Therefore hypothesis 4 was supported.

**Supplemental Analysis**

A significant correlation between training engagement and learner satisfaction was found, $r(157) = .48, p < .01$, using a Pearson Product-moment correlation. The strength of this relationship suggest that while the two constructs are related there is not enough overlap between the two to consider them the same construct. Also, a factor analysis was conducted to see if engagement and satisfaction would be identified as separate factors. When the two scales were combined, the satisfaction scale was identified as a separate factor from the engagement scale.

The demographic variables in this study were examined to determine if the diversity among the participants had any impact on the results of the study. An independent samples t-test found no significant impact of the participants’ gender. A significant ANOVA was found between training engagement and the age of the participants. Follow up Tukey post hoc tests showed that the age range of 26 – 33 ($M = 67.70, SD = 13.68$) was significantly more engaged that participants from the age range of 42 – 49 ($M = 45.00; SD = 14.86$). An ANCOVA was conducted controlling for the effects of age but was found not to be significant, $F(2, 154) = 1.95, p = .15$. There was also no effect of race on the results of the study.
A follow-up t-test was conducted to test whether or not the scores on the pre- and post-training learning assessment were significantly different. The t-test was significant, \( t(158) = 12.9, p = .00 \), therefore the difference between the two assessment was significant.

**Discussion**

Hypothesis 1a examined whether participants from the visual speech condition would report higher levels of training engagement than participants from the audio only condition. Similar to this, hypothesis 1b looked at whether participants from the visual speech condition would report higher levels of learner satisfaction than participants from the audio only condition. Using a t-test both of these hypotheses were not supported by the results of the study.

These results seem to disagree with past research relating to work engagement and visual speech. Past research demonstrated that giving participants more cues (speech, audio, and text) would give them more resources of information. It is therefore interesting that the text only condition had higher raw scores on training engagement and learner satisfaction than the other two conditions. The differences between the three conditions were not significant so therefore no direct conclusions should be drawn. Work engagement deals with the absorption of information from a person’s environment (Rothbard, 2001), so it becomes surprising that higher levels of engagement were not found in the experimental conditions where more cues of information were presented to the participants. Future research should attempt to determine if only having the text cue in WBT is the more effective method. Only having the text present during the presentation may force the participant to read the information thus making them dedicate their full attention to the training.
Hypothesis 2a examined the relationship between self-efficacy and training engagement. It was thought that self-efficacy would be positively correlated to training engagement based upon the fact that the more engaged a participant was, the more they may have learned during the training and therefore the more confident they would be about using their skills (Jawahar et al., 2008). Hypothesis 2b was developed using similar logic, but this hypothesis looked at the relationship between self-efficacy and learner satisfaction. Both of these hypotheses were supported by the data.

This finding might demonstrate how important training engagement and learner satisfaction are when evaluating a training program. If there is a direct connection between these two constructs and self-efficacy, which has been found to predict future performance (Jawahar et al., 2008), it may be of some value for research to examine these construct further. Future research should continue to examine this relationship and determine how this information can help organization when developing training programs and choosing which employees should participate in the training.

Hypothesis 3a tested for the presence of an interaction between attitudes towards computers and training engagement. Hypothesis 3b test for a similar interaction, only for this hypothesis learner satisfaction was included instead of training engagement. It was hypothesized that even if participants had negative attitudes towards computers the present of visual speech would result in participants reporting higher levels of engagement and satisfaction than participants in the audio only condition. These hypotheses were not supported by the results of the study.

If visual speech was not able to result in higher levels of training engagement and learner satisfaction for the entire study population it is not surprising that it was not able
to result in higher levels from individuals with negative attitudes towards computers. This finding may have to do with the fact that some learners, no matter how the information is presented will never be comfortable with learning through a computer. Future research should continue to examine the construction of attitudes towards computers to determine if anything can change a person’s perception. If not, the additional resources should be used to develop a reliable and easy way for organizations who determine which individuals will not be comfortable learning through a computer.

Hypothesis 4 investigated the improvement of performance on a learning assessment which was given to the participants before and after the training session. This hypothesis was supported by the results of the study. Participants in the visual speech condition had significantly bigger improvement in scores than participants in the audio only condition. This finding follows the research conducted by Thompson and Ogden (1995) which states that giving an individual multiple cues (audio and video) in their environment would help them to develop a deeper understanding of the information. In addition to this finding, participants in the text only condition also had a significantly larger improvement in scores than the participants in the audio only condition.

Contributions

This study found that incorporation visual speech in WBT improved scores on a learning assessment more than a typical web-based training program that only contains audio information. This study was also able to provide evidence that an audio only training session may be the worse in terms of improving performance and keeping employees engaged in the training. While the difference between the groups was not significant, the fact that the raw scores were greater for the text only condition could lead
to future research. But because of the absence of significance no direct conclusions should be drawn from this finding.

This study also found that self-efficacy may play a major role in the effectiveness of any training program. This study provided evidence of its relationship with training engagement and learner satisfaction. Self-efficacy may be able to serve a vital role in choosing who participates in the training. Lastly, this study was able to provide support for the idea that satisfaction and engagement are not the same construct. The results demonstrated that these two constructs while similar did not overlap to the point of becoming redundant.

Limitations

The population of college student is a limitation of this study. It would have been ideal to have a population of employees going through a training program, but because of budgetary and time restrictions this was not feasible. An additional limitation was the unproportional distribution of participants’ age ranges. There were a larger number of 18-25 year old participants compared to any of the other age ranges included in the study. Also, the participants were not asked for years of work experience, nor were they asked if they had ever participated in a WBT session. Both of these pieces of information would have helped in analyzing the data. The internal consistency of the satisfaction scale was also another limitation. Two items were deleted from the scale to achieve an appropriate alpha level. Another limitation is the lack of academic research pertaining to training engagement. This construct has been discussed in numerous popular press books but the experimental research is limited.
Conclusions

This study was not able to find evidence of visual speech increasing levels of training engagement and learner satisfaction but it was able to determine that visual speech can improve performance on a learning assessment. The evidence provides future research the motivation to examine visual speech further and implements ways for its continued implementation in WBT.
References


http://services.tekrati.com/research/9987/


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login.aspx?direct=true&db=aph&AN=36792327&site=ehost-live&scope=site


http://www.reproline.jhu.edu/english/6read/6training/lecture/delivering_lecture.htm


Appendix A

The Utrecht Work Engagement scale is protected by copyright so it is not reproduced in this document. This measure is made available in the following reference:


doi:10.1023/A:1015630930326
Appendix B

The Learning Effectiveness scale – Learner satisfaction subscale is protected by copyright so it is not reproduced in this document. This measure is made available in the following reference:

Appendix C

The Motivated Strategies for Learning questionnaire is protected by copyright so it is not reproduced in this document. This measure is made available in the following reference:


doi:10.1207/s15326985ep4002_6
Appendix D

The Cybernetics Attitude scale is protected by copyright so it is not reproduced in this document. This measure is made available in the following reference:

Appendix E

Learning Assessment

1. Why should you calculate your budget?
   A. To determine how big of a car loan you can afford.
   B. To determine if you are heading in the right direction financially.
   C. To determine if you can afford the minimum payment of your credit card
   D. To sort your essential and nonessential charges

2. Which of your expenses should be included first in your budget chart?
   A. Groceries
   B. Utilities
   C. Credit payments
   D. Rent/Mortgage

3. The key to any budget is having a plan and putting it to action.
   A. True
   B. False

4. When listing your income you should only include the places where you have a regular paycheck?
   A. True
   B. False

5. Which of the following items should not alter if your budget does not equal out?
   A. Credit card payment
   B. Student Loan payments
   C. Rent/Mortgage payments
   D. Cost of groceries

6. What should you do if you budget shows an excess in income?
   A. Put half in savings and half can be spent on luxuries
   B. Increase payments on credit cards, loans, etc.
   C. Place in a emergency fund in case of a unforeseen event
   D. Include more luxuries in your budget as a reward to yourself
7. Because the cost of groceries is never a set amount, you should always overestimate the monthly cost.

   A. True
   B. False

8. If your budget is working your expenses will be equal to your income.

   A. True
   B. False

9. What should be the second item listed in your budget?

   A. Groceries
   B. Utilities
   C. Credit payments
   D. Rent/Mortgage

10. How should you determine your insurance payment if payment is due once a year?

    A. Divide total payment by 6
    B. Divide total payment by 4
    C. Divide total payment by 12
    D. Divide total payment by 2

11. How should you calculate the cost of groceries per day?

    A. Calculate the cost per meal for the family as a whole
    B. Calculate the cost per family member for the entire day
    C. Calculate the cost per meal for each individual family member

12. When calculating the price of a meal, you should break down the meal into its components (sandwich = two pieces of bread, piece of meat, piece of cheese, tomato).

    A. True
    B. False
13. For more accurate estimations of groceries prices you should balance out each family member's:

   A. Breakfast
   B. Lunch
   C. Dinner
   D. Snack

14. Which method should you not adopt to lower your grocery budget?

   A. Decrease amount of expensive items on grocery list
   B. Use coupons for desired groceries
   C. Use smaller serving sizes for meals
   D. Shop around for cheaper items

15. Calculating groceries is the most complex component of a monthly budget.

   A. True
   B. False
June 14, 2010

Mr. Jeffrey Lucas
3 Alanna Drive
Wilder, KY 41095

Re: Protocol #0671: The Impact of Incorporating Visual Speech in Web-Based Training on Levels of Engagement

Dear Mr. Lucas:

The IRB has reviewed the revised materials regarding your study, referenced above, and has determined that it meets the criteria for the Exempt from Review category under Federal Regulation 45CFR46. Your protocol is approved as exempt research, and therefore requires no further oversight by the IRB.

If you wish to modify your study, including the addition of data collection sites, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

Please contact our office if you have any questions. We wish you success with your project!

Sincerely,

[Signature]

Kathleen J. Hett, Ph.D., ABPP
Interim Chair, Institutional Review Board
Xavier University
Appendix G

Consent Form

You are being asked to participate in a project conducted through Xavier University. This is a research project designed to determine effective methods for web-based training. Your participation in this experiment will involve participating in a web-based training session, filling out questionnaires regarding your opinion of the training session, and completing a learning assessment regarding your knowledge of calculating a personal budget. This study is anticipated to take approximately 30 minutes of your time.

There are no foreseeable risks or discomforts related to your participation.

You may receive research credit in your course or any other form of compensation you might be eligible to receive for your participation, as outlined by your course instructor. In addition to this compensation, you may be eligible to have the chance to win a gift certificate for Applebee’s Restaurant, pending approval from your course instructor.

Your name and results are strictly confidential. Your responses will be in no way linked to your name as you will be going to a separate survey when you record them. At the end of the study you will be asked for your name and contact information. This will be used only to ensure that you received the appropriate credit for participating in this study. This data will be kept separate from the survey data and will be destroyed once all eligible participants have received their credit.

If you have additional questions about the purpose of this study or the results we obtain from this study, you may contact the principal investigator, Jeff Lucas (phone # 859-802-7821 or email: jeffmllucas@gmail.com) or his research advisor, Dr. Mark Nagy (513-745-1958 or nagyms@xavier.edu). Questions about your rights as a research participant should be directed to Xavier University’s Institutional Review Board at 513-745-2870.

You are under no obligation to participate in this study, and you are free to withdraw at any time. There will be no penalty for withdrawal from the study.

We will be happy to answer any questions you have via contact with the primary researcher at the phone number or email address provided above.

At the end of the experiment, we will provide you with an explanation of the purpose of this study.

By clicking below you are acknowledging that you have read this consent form and are agreeing to participate.
Appendix H

Instructions

Thank you for choosing to participate in this research. First, you will be asked to complete two assessments, one of them being a learning assessment. This assessment will attempt to measure your knowledge about calculating a personal budget, chose the best answer for each question. After completing both of these tests, you will be directed to a Web-based Training session. This session will last approximately ten minutes and will cover information on how to conduct a personal budget. Once the training session has concluded, you will be asked to complete three surveys regarding the training session. Please answer these questions honestly based on your opinion of the training session. Lastly, you will be asked to complete another learning assessment to assess your knowledge regarding calculating a personal budget.
Appendix I

Debrief Form

Thank you very much for participating in this research. The purpose of this research was to examine the difference in participant’s level of engagement during the training session based upon how the training material was presented. If you have any questions please feel free to contact Jeff Lucas at jeffmlucas@gmail.com or 859-802-7821.

Please click below to be taken to a separate survey, in which you can enter your name and your instructor in order to receive credit for participating in this study.
Appendix J

Demographic Questionnaire

1. Gender  M    F

2. Age  18-25  26-33  34-41  42-49  50 or above

3. Race  Causation  Black  Hispanic  Asian  Other

4. Did you experience any problems during the training?
   Yes  No  (please circle answer)
Appendix K

Contact Information

Name ________________________________

Email address __________________________

Phone number __________________________

Name of your instructor __________________